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Sustainability & Energy Statement – Addendum

Land to the East of Longwater Road, Finchampstead

Iceni Projects Limited on behalf of
Stonebond Properties (Guildford) Ltd

November 2024

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ON BEHALF OF
STONEBOND PROPERTIES
(GUILDFORD) LTD

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Sustainability & Energy Statement –
Addendum
LAND TO THE EAST OF LONGWATER ROAD,
FINCHAMPSTEAD

CONTENTS

1. EXECUTIVE SUMMARY 1

2. INTRODUCTION 3

3. PLANNING POLICY FRAMEWORK 10

4. SUSTAINABILITY STATEMENT 25

5. ENERGY STRATEGY 38

6. SUMMARY 47

APPENDICES

- A1. SITE PLAN
- A2. WATER USAGE CALCULATOR
- A3. SAP OUTPUTS
- A4. GENERAL NOTES

1. EXECUTIVE SUMMARY

- 1.1 Icen Projects Ltd has been commissioned by Catesby Strategic Land Ltd and Stonebond Properties (Guildford) Ltd to produce a Sustainability & Energy Statement to accompany the application for the proposed residential development of the Land to the East of Longwater Road, Finchampstead.
- 1.2 This full planning application proposes the provision of 38 homes, open space, landscaping and associated infrastructure.
- 1.3 Sustainability is a core consideration of the application and has been incorporated from the project outset. Energy and water efficiency have been maximised, whilst the production of waste and pollution is to be minimised, thus ensuring the impact of the proposals on its immediate surroundings and the environment as a whole is minimised.
- 1.4 Consideration has been given to Chapter 14 of the National Planning Policy Framework (NPPF), the Wokingham Borough Local Development Framework Adopted Core Strategy, as well as the Wokingham Borough Development Plan Adopted Managing Development Delivery Local Plan, the Finchampstead Neighbourhood Plan, the Wokingham Climate Change Interim Policy Position Statement and the Wokingham Borough Local Development Framework Sustainable Design and Construction Supplementary Planning Document and its Companion Document in the overall formulation of this strategy, with two key elements proposed for the approach to the scheme's sustainability proposals, as follow:
 - The overall development has been assessed using the Wokingham Borough Core Strategy, Development Delivery Local Plan and the Finchampstead Neighbourhood Plan policies relating to sustainability, as well as the Climate Change Interim Policy Position Statement and the Wokingham Borough Local Development Framework Sustainable Design and Construction Supplementary Planning Document and its Companion Document, to demonstrate that the proposed dwellings will maximise resource efficiency, minimise the generation of waste and pollution, and ensure the risk of flooding on-site is mitigated during both construction and in operation, to provide dwellings that meet the recommended standards for well-being of future occupants; and
 - The carbon dioxide (CO₂) emissions reduction strategy for the proposals is based on the energy hierarchy to provide a rigorous methodology, which aims to reduce the carbon dioxide emissions from the development as far as possible. This is intended to be achieved through the employment of highly efficient building fabric components to reduce energy demand, and the potential inclusion of renewable and low carbon energy technologies to deliver further carbon dioxide emissions reductions. It is anticipated that the proposed carbon dioxide emissions reduction strategy will facilitate an approximate minimum 64.3% reduction in carbon dioxide over the Part

L:2021 Building Regulations baseline for all proposed dwellings. This is in exceedance of the current requirements to achieve a minimum 31% reduction in carbon dioxide emissions over the Part L:2021 baseline as set out within the Wokingham Borough Council policies, as clarified within the Wokingham Climate Change Interim Policy Position Statement.

1.5 The proposed strategy has been based around the objectives of the Wokingham Borough Local Development Framework Adopted Core Strategy Policy CP1, the Wokingham Borough Development Plan Adopted Managing Development Delivery Local Plan Policies CC01, CC04, CC05, CC06, CC09, and CC10, the Finchampstead Neighbourhood Plan Policies ES1 and IRS5, and the Wokingham Climate Change Interim Policy Position Statement. In summary, based on this strategy, the proposed development will;

- make efficient use of land;
- promote the use of sustainable and active modes of transport;
- reduce the risk of flooding on-site and in the surrounding area;
- minimise internal water consumption to 110 litres per person per day;
- incorporate low-impact materials, according to the BRE Green Guide to Specification;
- minimise waste production during construction and maximise the proportion of waste to be diverted from landfill;
- mitigate the risk of overheating;
- incorporate measures to improve site biodiversity, including biodiverse planting;
- ensure air, noise, ground, light and water pollution are minimised as far as possible;
- minimise energy demand through the specification of low U-values, low air permeability and low thermal bridging to reduce heat loss;
- be fossil fuel free, utilising electric-only air source heat pump (ASHP) systems to serve the space and water heating demands of the proposed dwellings; and
- achieve an approximate minimum 64.3% reduction in CO₂ emissions over the Part L:2021 baseline for the proposed dwellings, following the Energy Hierarchy methodology.

1.6 Overall, the proposals constitute sustainable development in accordance with national and local policy requirements and will provide a development that seeks to promote these principles in operation.

2. INTRODUCTION

- 2.1 Icen Projects Ltd was commissioned by Catesby Strategic Land Ltd and Stonebond Properties (Guildford) Ltd to produce a Sustainability & Energy Statement to accompany the application for the proposed residential development of the Land to the East of Longwater Road, Finchampstead.

Report Objective

- 2.2 This document details the sustainable design and construction measures adopted by the proposed development and gives an overview of the design proposals that will ensure the development operates in a sustainable manner over the lifespan of the scheme. The Sustainability & Energy Statement report headlines will provide a framework for the project team to operate consistently within sustainability guidelines set out by Wokingham Borough Council.
- 2.3 The report is structured to meet these guidelines as follows:
- Section 3 discusses the planning context and policies which are relevant to sustainability;
 - Section 4 discusses the development response to the policy drivers for sustainability;
 - Section 5 sets out the development's energy strategy to minimise CO₂ emissions; and
 - Section 6 summarises the development's design response.

Site and Surroundings

- 2.4 The application site (Appendix A1) is located on the eastern edge of Finchampstead, Wokingham, approximately 3km to the southwest of Crowthorne train station. The site is bounded by residential properties fronting onto Wood Moor and Cricket Hill, as well as a public footpath within the site boundary, to the north. Longwater Road (B3016) and an associated mature treeline bounds the site to the west, whilst a ditch and mature plantation hedgerow form the southern boundary, beyond which lies land allocated for the future Blackwater Valley Country Park (Manor Farm Nature Reserve extension). The eastern boundary of the site is formed by grassland and mature trees.
- 2.5 The application site itself currently comprises open grassland. The surrounding area is predominantly residential to the north and north west, with the site located at the southern edge of Finchampstead. There are allotments and woodland located to the west of the site, and the area to the east is characterised by agricultural land with areas of woodland. The Moor Green Lakes Nature Reserve extension and proposed Blackwater Valley Country Park lie to the south of site, and can be accessed via a Public Right of Way (PRoW) leading from Longwater Road.

The Proposed Development

2.6 The description of development is as follows:

“Erection of 38no. dwellings (Use Class C3), together with associated outdoor space and landscaping, drainage infrastructure, hard and soft landscaping, parking, access, and associated works”.

2.7 The images below, provided by Thrive Architects, show the site layout of the proposals, as well as the typical elevations and layouts of the proposed dwellings. A site location plan is provided in Appendix A1.

Figure 2.1 Proposed site layout



Figure 2.2 House Type P3.14 – front (left) and rear (right) elevations



Figure 2.3 House Type P3.14 – ground (left) and first (right) floor layouts



Figure 2.4 House Type A2.1 – front (left) and rear (right) elevations



Figure 2.5 House Type A2.1 – ground (left) and first (right) floor layouts



Figure 2.6 House Type A1.2 – front (left) and rear (right) elevations



Figure 2.7 House Type A1.2 – ground (left) and first (right) floor layouts



Figure 2.8 House Type A2.2.2 – front (left) and rear (right) elevations



Figure 2.9 House Type A2.2.2 – ground (left) and first (right) floor layouts



Figure 2.10 House Type A3.6 – front elevation



Figure 2.11 House Type A3.6 – ground (left) and first (right) floor layouts



Figure 2.12 House Type A3.3 – front (left) and rear (right) elevations



Figure 2.13 House Type A3.3 – ground (left) and first (right) floor layouts



3. PLANNING POLICY FRAMEWORK

- 3.1 Built environment sustainability is incorporated within policy and regulation at a national and local level, as set out below.

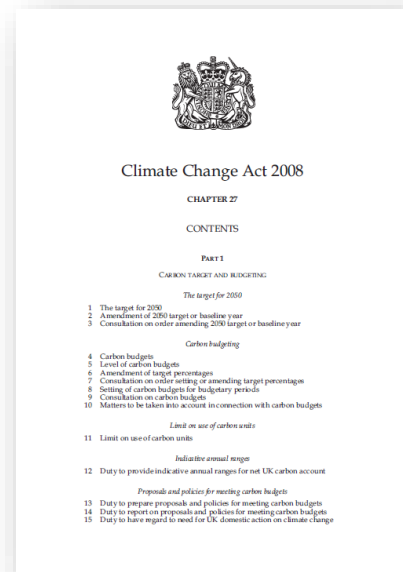
National

Climate Change Act 2008 (November 2008)

- 3.2 On 26th November 2008, the UK Government published the Climate Change Act 2008; the world's first long-term legally binding framework to mitigate against climate change. Within this framework, the Act sets legally binding targets to increase greenhouse gas emission reductions through action in the UK and abroad from the 60% target set out in the Energy White Paper, to 80% by 2050.

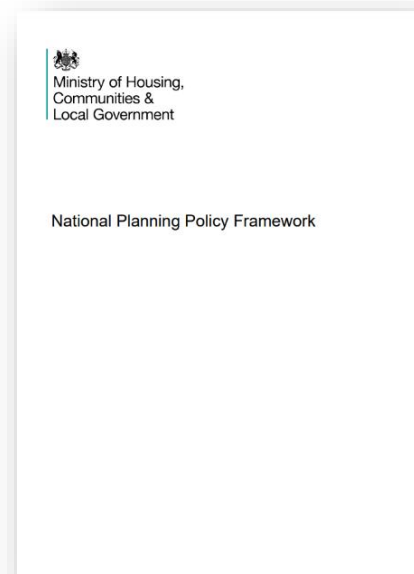
- 3.3 As required under Section 34 of the Climate Change Act, the Sixth Annual Carbon Budget was accepted by the Government in April 2021. This sets out a budget for UK emissions for the period 2033 – 2037.

- 3.4 Following a commitment in June 2019, the Climate Change Act has been amended to target net zero carbon emissions by 2050.



National Planning Policy Framework (December 2023)

- 3.5 The Ministry of Housing, Communities & Local Government determines national policies on different aspects of planning and the rules that govern the operation of the system. Accordingly, the National Planning Policy Framework (NPPF), which came into force in March 2012 and was updated in February 2019, aims to strengthen local decision making. Additional updates have since been made through the latter half of 2020 and in January and July 2021 to reflect changes related to use classes, permitted development rights, the calculation of housing need, and requirements to achieve beauty alongside sustainability. Further updates were made in September and December 2023 with respect to



onshore wind development, and beauty, design, infrastructure, neighbourhood and the environment, respectively.

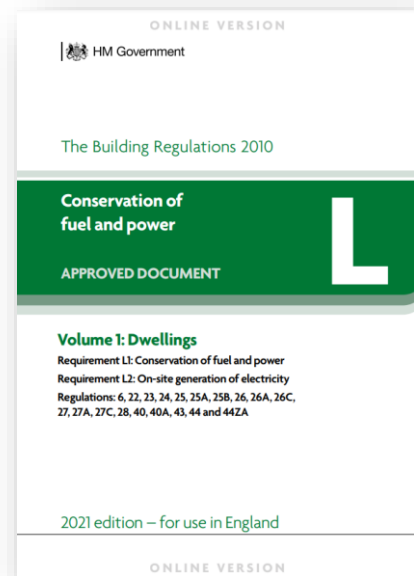
- 3.6 Paragraphs 10 and 11 of the NPPF confirm that at the heart of this document is a “*presumption in favour of sustainable development*”, and that development proposals that accord with an up-to-date development plan should be approved without delay.
- 3.7 Paragraph 7 states that the purpose of the planning system is to contribute to the achievement of sustainable development. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs.
- 3.8 Achieving sustainable development means that the planning system has three overarching activities, which are interdependent and need to be pursued in mutually supportive ways, so that opportunities can be taken to secure net gains across each of the different objectives:
- **An Economic Role** – ensuring the provision of land and infrastructure needed to help build a *strong, responsive and competitive economy*.
 - **A Social Role** – supplying the required amount of housing while at the same time ensuring and building *strong, vibrant and healthy communities*. Ensuring that the built environment is sited around accessible local services which help support a community’s *health, social and cultural well-being*.
 - **An Environmental Role** – ensuring development contributes to the protection and enhancement of the *natural, built and historic environment* through the improvement of biodiversity, minimising the use of natural resources and production of pollution / waste, and guaranteeing sufficient adaptation to climate change.

Part L:2021 of the Building Regulations (June 2022)

- 3.9 Part L of the Building Regulations relates to the conservation of fuel and power, and applies to both new and existing buildings. The current edition covers the energy efficiency requirements of the building regulations as set out in Part L of Schedule 1 to the Building Regulations. Technical guidance is contained in two Part L Approved Documents.

3.10 The documents of relevance to this scheme include:

- **Approved Document L Volume 1: Dwellings.** This provides the methodology for new build, domestic buildings to meet current energy efficiency standards, including backstop U-values, carbon dioxide emissions calculations and minimising the risk of overheating. Carbon dioxide emissions reductions are prescribed for 'regulated' emissions only, and relate to heating, hot water, lighting, auxiliary and cooling (where specified). Emissions from domestic appliances (cooking, for example) are considered to be unregulated emissions, and are excluded from the analysis.



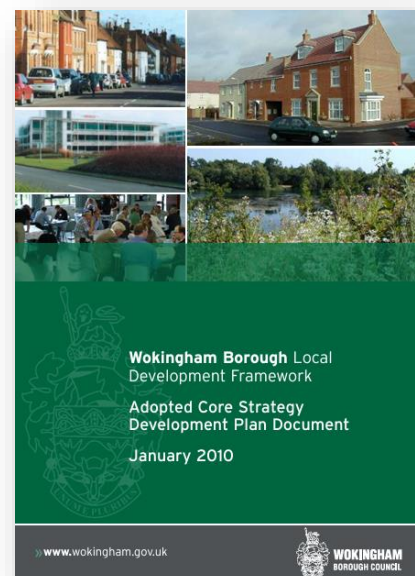
Local

3.11 In determining the local context, the Wokingham Borough Local Development Framework Adopted Core Strategy (January 2010) and the Wokingham Borough Development Plan Adopted Managing Development Delivery Local Plan (February 2014) set out policy relevant to sustainability.

Wokingham Borough Local Development Framework Adopted Core Strategy (January 2010)

3.12 The Core Strategy sets out where development will occur within the borough to 2026, taking account of the health, well being and quality of life of residents. The policies set out in the Core Strategy cover everything from homes, shops, offices and factories to libraries, schools and health & leisure facilities. Policies of relevance to this project in the context of sustainability and energy are as follows:

- **Policy CP1: Sustainable development** states that planning permission will be granted for development proposals that:
 - Maintain or enhance the high quality of the environment;
 - Minimise the emission of pollutants into the wider environment;
 - Limit any adverse effects on water quality (including groundwater);

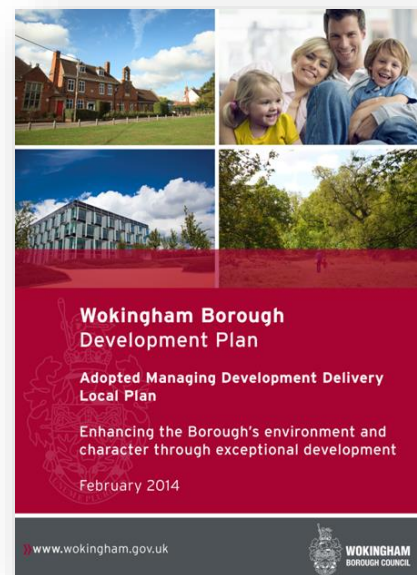


- Ensure the provision of adequate drainage;
- Minimise the consumption and use of resources and provide for recycling;
- Incorporate facilities for recycling of water and waste to help reduce per capita water consumption;
- Avoid areas of best and most versatile agricultural land;
- Avoid areas where pollution (including noise) may impact upon the amenity of future occupiers;
- Avoid increasing (and where possible reduce) risks of or from all forms of flooding (including from groundwater);
- Provide attractive, functional, accessible, safe, secure and adaptable schemes;
- Demonstrate how they support opportunities for reducing the need to travel, particularly by private car;
- Contribute towards the goal of reaching zero-carbon developments as soon as possible by:
 - Including appropriate on-site renewable energy features; and
 - Minimising energy and water consumption by measures including the use of appropriate layout and orientation, building form, design and construction, and design to take account of microclimate so as to minimise carbon dioxide emissions through giving careful consideration to how all aspects of development form.

**Wokingham Borough Development Plan Adopted
Managing Development Delivery Local Plan (February
2014)**

3.13 The Wokingham Borough Development Plan Adopted Managing Development Delivery Local Plan adds extra detail to the policies set out in the Core Strategy. Policies of relevance to the proposed development at the Land East of Longwater Road include:

- **Policy CC01: Presumption in Favour of Sustainable Development** states that planning applications that accord with the policies in the Development Plan for Wokingham Borough will be approved without delay, unless material considerations indicate otherwise.



Where there are no policies relevant to the application or relevant policies are out of date at the time of making the decision then the Council will grant permission unless material considerations indicate otherwise – taking into account whether:

- Any adverse impacts of planning permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework (NPPF) taken as a whole; or
 - Specific policies in the National Planning Policy Framework indicate that development should be restricted.
- **Policy CC03: Green Infrastructure, Trees and Landscaping** states that Green Routes and Green Route Enhancement Areas are defined on the Policies Map.

Development proposals should demonstrate how they have considered and achieved the following criteria within scheme proposals:

- Provide new or protect and enhance the Borough's Green Infrastructure networks, including the need to mitigate potential impacts of new development.
- Promote accessibility, linkages, permeability between and within existing green corridors including public rights of way such as footpaths, cycleways and bridleways.
- Promote the integration of the scheme with any adjoining public open space or countryside.
- Protect and retain existing trees, hedges and other landscape features.

- Incorporate high quality, ideally, native planting and landscaping as an integral part of the scheme.

Development proposals which would result in the loss, fragmentation or isolation of areas of green infrastructure will not be acceptable.

Development proposals within the River Valley areas shall improve or contribute toward:

- The establishment of a Loddon/Blackwater riverside footpath and bridleway, as defined on the Policies Map, to accommodate dual use.
- The establishment of a riverside footpath and cycleway to accommodate dual use along the Emm Brook.
- Opportunities for improvement to green infrastructure to help minimise flood risk.
- **Policy CC04: Sustainable Design and Construction** states that planning permission will only be granted for proposals that seek to deliver high quality sustainably designed and constructed developments by:
 - Seeking to achieve the requirements of the full Code for Sustainable Homes Level 4.
 - Meet internal potable water consumption targets of 105 litres or less per person per day (as part of the requirement to meet full Code for Sustainable Homes Level 4).

All new non-residential proposals of more than 100 sq m gross non-residential floor space shall at least:

- Achieve the necessary mandatory Building Research Establishment Assessment Method (BREEAM) requirements or any future national equivalent.
- Meet or exceed statutory requirements for water resource management.

All development, including conversions, alterations and extensions shall incorporate suitable waste management facilities, including on-site recycling.

- **Policy CC05: Renewable Energy and Decentralised Energy Networks** states that local opportunities to contribute towards decentralised energy supply from renewable and low-carbon technologies will be encouraged.

Planning permission will only be granted for proposals that deliver a minimum 10% reduction in carbon emissions through renewable energy or low carbon technology where the development is for:

- Schemes of more than 10 dwellings (gross); or

- Non-residential proposals of more than 1,000 sq m gross floorspace.

Proposals for renewable energy and decentralised energy works, including wind turbines, must demonstrate that:

- They are appropriate in scale, location and technology type.
- They are compatible with the surrounding area, including the impact of noise and odour.
- They do not have a damaging impact on the local topography and landscape.
- There is no significant impact upon heritage assets, including views important to their setting.
- In the case of wind turbines, they take account of their cumulative effect and properly reflect their increasing impact on the landscape and on local amenity.
- **Policy CC06: Noise** states that proposals must demonstrate how they have addressed noise impacts to protect noise sensitive receptors (both existing and proposed) from noise impacts.

Noise impact of the development must be assessed. Where there is no adverse impact (No Observed Effect Level) then noise will not be a material consideration.

Where there is an adverse effect (Lowest Observed Adverse Effect Level to Significant Observed Adverse Effect Level), then:

- The development layout must be reviewed. Where this results in there no longer being an adverse impact then design and mitigation measures should be incorporated accordingly.
- Where there is still an adverse impact then internal layout must be reviewed. Where this results in there no longer being an adverse impact then design and measures should be incorporated accordingly.
- Where there is still an adverse impact then physical mitigation measures such as barriers/mechanical ventilation must be reviewed. Where this results in there no longer being an adverse impact then design and mitigation measures should be incorporated accordingly.
- Where there is still an adverse impact and the development falls within the significant observed adverse effect level then planning permission will normally be refused.
- **Policy CC09: Development and Flood Risk (from all sources)** states that all sources of flood risk, including historic flooding, must be taken into account at all stages and to the appropriate degree at all levels in the planning application process to avoid inappropriate development in areas at risk of flooding. Proposals must be consistent with the guidance in paragraphs 99 – 104 of the National Planning Policy Framework (NPPF); the Technical Guidance to the NPPF and

demonstrate how they have used the Strategic Flood Risk Assessment (SFRA) to determine the suitability of the proposal.

Development proposals in Flood Zones 2 and 3 must take into account the vulnerability of the proposed development.

Development must be guided to areas of lowest flood risk by applying the sequential approach taking into account flooding from all sources and shall ensure flood risk is not worsened for the application site and elsewhere, and ideally that betterment of existing conditions is achieved. The sequential test will not be required if at least one of the following apply:

- Replacement of an existing single residential property. However, the replacement property should, where possible, be located on the part of the site at the lowest risk.
- Conversions and change of use unless it involves a change to a more vulnerable class.
- Minor development, as defined in footnote 10 of the Technical Guidance Note to the NPPF.

In exceptional circumstances, new development in areas of flood risk will be supported where it can be demonstrated that:

- The development provides wider sustainability benefits to the community that outweigh flood risk.
- The development will:
 - Be safe for its lifetime, taking account of the vulnerability of its users.
 - Not increase flood risk in any form elsewhere and, where possible, will reduce flood risk overall.
 - Incorporate flood resilient and resistant measures into the design.
- Appropriate evacuation and flood response procedures are in place to manage the residual risk associated with an extreme flood event.

Where required, suitable and appropriately detailed flood risk information will need to accompany a planning application. A Flood Risk Assessment (FRA) is required for:

- All proposals in areas of known historic flooding from all sources.
- Where there is evidence of a risk from all sources of flooding identified in the Strategic Flood Risk Assessment.
- Those proposals set out in footnote 20 to paragraph 103 of the NPPF.

- **Policy CC10: Sustainable Drainage** states that all development proposals must ensure surface water arising from the proposed development including taking into account climate change is managed in a sustainable manner. This must be demonstrated through:
 - A Flood Risk Assessment; or
 - Through a Surface Water Drainage Strategy.

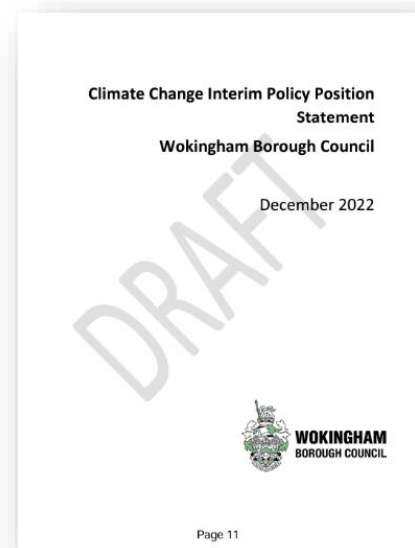
All development proposals must:

- Reproduce greenfield runoff characteristics and return run-off rates and volumes back to the original greenfield levels, for greenfield sites and for brownfield sites both run-off rates and volumes be reduced to as near greenfield as practically possible.
- Incorporate Sustainable Drainage Systems (SuDS), where practicable, which must be of an appropriate design to meet the long term needs of the development and which achieve wider social and environmental benefits.
- Provide clear details of proposed SuDS including the adoption arrangements and how they will be maintained to the satisfaction of the Council (as the Lead Local Flood Authority (LLFA)).
- Not cause adverse impacts to the public sewerage network serving the development where discharging surface water to a public sewer.

Wokingham Borough Council Climate Change Interim Policy Position Statement (December 2022)

3.14 The Wokingham Borough Council Climate Change Interim Policy Position Statement sets out the position of Wokingham Borough Council on the issue of climate change when assessing planning applications. It is an explanatory document that emphasises the fact that the Climate Emergency is a key material consideration when assessing planning applications.

3.15 It is noted that the adopted Local Plans were prepared with the intention of promoting the sustainable use, conservation and disposal of resources, whilst mitigating and adapting to climate change. At the time, it was a national expectation that all new homes built after 2016, and new non-domestic buildings built after 2019, would be zero carbon. However, the Government subsequently abandoned these plans.



3.16 Wokingham Borough Council declared a Climate Emergency in July 2019, committing to achieve carbon neutrality across the Borough by 2030. Following this, a Climate Emergency Action Plan was produced, establishing the baseline emissions data for the Borough, and setting out the following key priorities:

- Reduce carbon dioxide emissions from transport
- Reduce carbon dioxide emissions from domestic and business property
- Generate more renewable energy in the Borough
- Create a local plan that specifies net zero construction and infrastructure
- Increase the levels of carbon sequestration in the borough through greening the environment
- Engage with young people and support sustainable schools
- Reduce waste sent to landfill
- Encouraging behaviour change

3.17 Existing polices set out within the Wokingham Borough Local Development Framework Adopted Core Strategy (2010) and the Wokingham Borough Development Plan Adopted Managing Development Delivery Local Plan (2014) are considered within the Climate Change Interim Policy Position Statement in the context of the Climate Emergency Declaration. Many of the climate change-related policies contained within the adopted planning policy documents are to be applied as written until superseded by the new Local Plan, with some policies provided with clarifications. In particular, Policies CC04 and CC05 are clarified as follows:

- **Policy CC04: Sustainable Design and Construction.** Given the Code for Sustainable Homes (CfSH) has been withdrawn, applicants must meet the interim Future Homes Standard (as required by Building Regulations) of a minimum 31% reduction in emissions and are encouraged to work towards the full Future Homes Standard of 75 – 80% less carbon emissions. Any uplift to minimum Building Regulations requirements is a material planning consideration which will be taken into account. The expectation will be that developments meet the optional Building Regulations standard of 110 litres per person per day as a minimum given CfSH has been revoked. Delivery beyond these standards is a material planning consideration which will be taken into account.
- **Policy CC05: Renewable Energy and Decentralised Energy Networks.** For clarification, the policy requirement for 10% energy reduction through renewable / low carbon technologies is expected to be achieved in addition to the uplifted emissions improvements required through Building Regulations (as updated in June 2022).

Finchampstead Neighbourhood Development Plan 2022 – 2038 (September 2023)

3.18 The Finchampstead Neighbourhood Development Plan establishes a guiding vision for the parish of Finchampstead to help deliver the local community's aspirations and needs for the plan period 2022 – 2038. To do this, a number of policies relating to sustainability are set out:

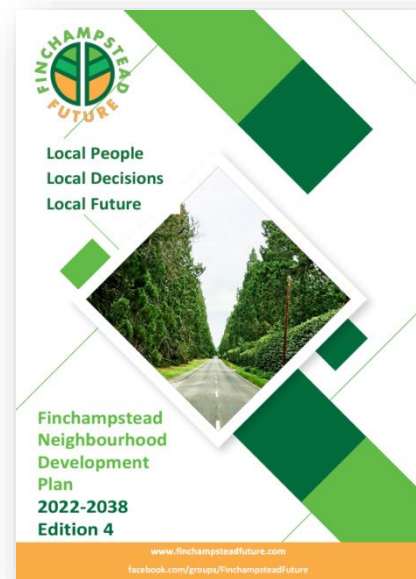
- **Policy ES1: Environmental standards for residential development** states that development proposals for residential development will be supported provided they meet the following environmental standards:
 - Minor residential developments will additionally be expected to achieve at least a 19% improvement in the dwelling emission rate over the target emission rate, as defined within Building Regulations Approved Document Part L 2013 or satisfy any higher standard that is required under new national planning policy or Building Regulations.
 - Major residential development will additionally be expected to be designed to achieve carbon neutral homes.
 - Provision is made for charging for electric vehicles in all domestic dwellings where garages or vehicle parking spaces are provided.

These standards should be achieved as a minimum unless it can be demonstrated that exceptional circumstances exist. Where on-site achievement is not viable or practical, appropriate financial contributions to off-site provision may be considered.

- **Policy IRS5: Ecologically important areas and Biodiversity** states that development should seek to protect and enhance biodiversity areas wherever possible.

The Plan area abuts the Thames Basin Heaths Special Protection Area (SPA), specifically Bramshill Site of Special Scientific Interest (SSSI). Any development within the zones of influence for the SPA must abide with saved policy NRM6 of the South East Plan and policy CP8 from Wokingham Borough Council's Core Strategy to 2026.

Development will only be permitted if it can be demonstrated that:

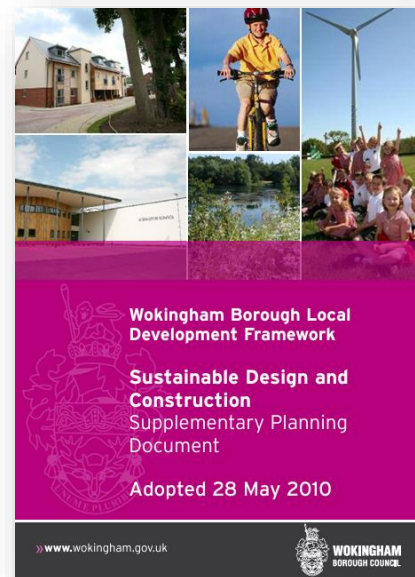


- It will not have an adverse impact on local biodiversity or Sites designated as of importance for nature conservation using an independent survey report, which is supported by the Borough's Ecological Adviser.
- There are no alternatives with less harmful impacts.
- Appropriate mitigation measures or, as a last resort, compensatory measures either on site or off-site and in accordance with Environment Bill 2021.
- Measures can be provided to achieve a net enhancement to the site's biodiversity. • Development proposals should conserve and enhance the natural environment and green spaces of the area, specifically:
 - Ensure that there is no loss of biodiversity and will normally provide a net gain of at least 10% over base value. Where there is likely to be a loss of biodiversity, development will only be acceptable if mitigation measures can be put in place to ensure there is no net loss of biodiversity, through the creation of like-for-like habitats.
 - Ensure that all water courses and ditches are protected from any contamination or interruption to natural flow.
 - Ensure mitigation through suitable alternatives of any loss of bird nesting habitat.
 - Take any opportunities to protect, enhance and extend wildlife corridors between existing open spaces and habitats as a means of mitigating the impacts of development on biodiversity.
 - Conserve the environment for nocturnal species, through the avoidance of lighting and mitigating the impact of external lighting likely to increase night-time human presence.
 - Contain measures that will help to mitigate the impacts of, and adapt to, climate change with reference and adherence to the Wokingham Borough Council Climate Change action plan.

Ensure that all species protected by law, including bats, badgers and others named at the time are subject to an ecological survey or assessment which accompanies a development proposal. The survey is to be undertaken at an appropriate time of year for the relevant species and must include proposals for the measures that will be taken by way of appropriate mitigation to minimise and compensate for any likely impact the development may have on them, in accordance with the requirements of the licence from Natural England.

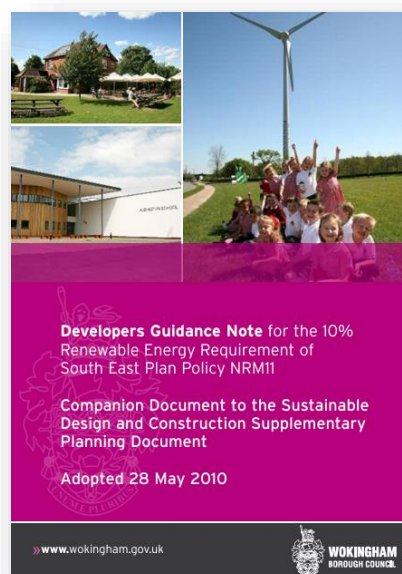
**Wokingham Borough Local Development Framework
Sustainable Design and Construction Supplementary
Planning Document (May 2010)**

- 3.19 The Sustainable Design and Construction Supplementary Planning Document (SPD) provides an up to date and comprehensive approach to considering sustainable design and construction in new development. It is a material planning consideration for all planning applications.
- 3.20 The Sustainable Design and Construction SPD promotes the use of sustainable techniques (including renewable energy technologies) and materials in the construction of buildings and structures. The SPD provides guidance to help improve the sustainability performance of buildings and spaces through their design and subsequent use.
- 3.21 Guidance is provided under the heading of the following 12 sustainability issues within the Sustainable Design and Construction SPD:
- Adhering to national codes on construction standards
 - Minimising energy consumption
 - On-site decentralised/low carbon energy generation
 - Water resource management
 - Flood risk management
 - Biodiversity
 - Waste, recycling and composting
 - Cyclist facilities and parking
 - Air, noise and light pollution and land affected by contamination
 - Responsibly sourced and recycled materials
 - Site waste management plans
 - Construction pollution



Companion Document to the Sustainable Design and Construction Supplementary Planning Document (May 2010)

- 3.22 The Companion Document to the Sustainable Design and Construction Supplementary Planning Document (SPD) provides guidance on how to achieve the requirement of Policy NRM11 of the South East Plan (2009) to deliver at least 10% of energy demand from decentralised, renewable or low-carbon technologies.
- 3.23 Guidance is provided on how to improve the energy efficiency of new development, to reduce demand related to heating, hot water, lighting and appliances. In addition, the Companion Document sets out how to calculate the renewable or low carbon energy requirement for both residential and non-residential proposals.



Other Considerations

Written Ministerial Statement (Statement UIN HCW488; March 2015)

- 3.24 On the 25th March 2015, the Secretary of State for the Ministry of Housing Communities and Local Government at the time, provided a planning update, outlining the steps to be taken to streamline the planning system, protect the environment, support economic growth and assist locally-led decision-making. Within this update, it was stated that, for the specific issue of energy performance, local planning authorities will continue to be able to set and apply policies in their Local Plans which require compliance with energy performance standards that exceed the energy requirements of Building Regulations until commencement of amendments to the Planning and Energy Act 2008 in the Deregulation Bill. It was added that the energy performance requirements in the Building Regulations would be set at a level equivalent to the Code for Sustainable Homes Level 4. Whilst the Code for Sustainable Homes is no longer in use, it is still an expectation that local planning authorities take this statement of the Government's intention into account in applying existing policies, and not setting conditions with requirements above a Code Level 4 equivalent. This equates to a 19% reduction in regulation carbon dioxide emissions over the Part L 2013 baseline.

Declaration of a Climate Emergency (July 2019)

- 3.25 On the 18th July 2019, Wokingham Borough Council declared a climate emergency, and set a target to reduce its carbon emissions to net zero by 2030, as follows:

*“Wokingham Borough Council believes the world is now in a climate emergency.
More concerted and urgent action is needed at local, national and international level*

to protect our planet for future generations. As such, this Council commits to playing as full a role as possible – leading by example as well as by exhortation – in achieving a carbon neutral Wokingham Borough by 2030 and report within six months as to what actions are required.”

4. SUSTAINABILITY STATEMENT

- 4.1 The Sustainability & Energy Statement for the proposed development is divided into two main parts.
- 4.2 The sustainability strategy for the proposed development has been assessed in line with the guidance set out within relevant policies of the Wokingham Borough Local Development Framework Adopted Core Strategy (January 2010), the Wokingham Borough Development Plan Adopted Managing Development Delivery Local Plan (February 2014) and the Finchampstead Neighbourhood Development Plan 2022 – 2038 (September 2023). This enables a holistic sustainability approach to be set out for the proposed development. The Wokingham Borough Local Development Framework Adopted Core Strategy, the Wokingham Borough Development Plan Adopted Managing Development Delivery Local Plan and the Finchampstead Neighbourhood Development Plan 2022 – 2038 encourage new development to incorporate high-quality design measures, and therefore represents best practice guidance to meet high standards of sustainable design and construction.
- 4.3 The carbon dioxide (CO₂) emissions reduction strategy for the proposed building to be delivered as part the development is based on the energy hierarchy to provide a rigorous methodology, which maximises cost-effective opportunities for emissions reduction, as detailed in Section 5.

Sustainable Design and Construction

- 4.4 In line with the guidance provided in the Wokingham Borough Local Development Framework Adopted Core Strategy (January 2010) and the Wokingham Borough Development Plan Adopted Managing Development Delivery Local Plan (February 2014), the sustainability features of the proposed development are outlined below.
- 4.5 Issues related to energy conservation, renewables and reducing greenhouse gases follow in a dedicated section.

Making Effective Use of Land

- 4.6 Figure 4.1 below shows the location of the development site with respect to its surroundings.

Figure 4.1 Current site

 Approximate site boundary



- 4.7 As shown above, the proposed development site is located at the edge of an existing settlement, with residential properties located to the north and north west of the site within the village of Finchampstead. A range of community facilities and amenities are located within Finchampstead and the surrounding settlements of Eversley, Eversley Cross and Yateley, including primary schools, a secondary school, shops, restaurants and areas of public open space, all within walking or cycling distance of the application site.
- 4.8 The proposed development is therefore considered to be an extension of the existing village of Finchampstead, and therefore makes effective use of land, located within an established settlement.

Location and Transport

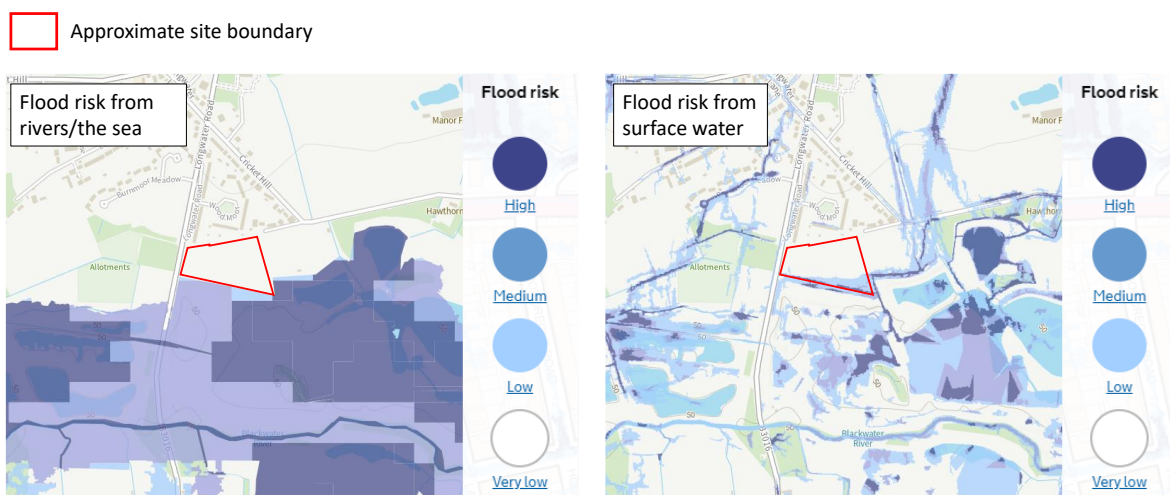
- 4.9 Accessibility to public transport connections contributes to the sustainability of a site's location. Crowthorne railway station is located approximately 3.6km to the north east of the site. This station provides frequent access to Redhill, Reading, Gatwick Airport and Guildford via Great Western Railway services.
- 4.10 The nearest bus stops are located on Longwater Road (B3016) and Wood Moor, approximately 250m to the north of the site. These stops are served by a number of services, including the following:
- Route 145, which runs between Three Mile Cross, Finchampstead and Wokingham;
 - Route 401, which runs between Three Mile Cross, Finchampstead, and Yateley; and
 - Route 406, which runs between Finchampstead, Eversley and Yateley.

- 4.11 It is also noted that, at the time of writing, discussions are being held with local bus operators with respect to potential service improvements for the site.
- 4.12 A footway runs along Longwater Road (B3016) and along the frontage of the site, providing access to the centre of Finchampstead village to the north. A Public Right of Way (PRoW; FP FINC 13) runs along the northern boundary of the site, providing a linkage across Longwater Road (B3016) to FP FINC 12 to the west of the site. This footpath provides pedestrian access to Finchampstead C of E Primary School to the north and other facilities. Whilst there are no official cycle routes within Finchampstead, many local facilities lie within reasonable cycling distance from the site. Wokingham is also accessible to cyclists, via either Longwater Road (B3016) and Jubilee Road (B3348), or via the PRoW network.
- 4.13 As detailed within the Transport Statement, prepared by David Tucker Associates, the internal layout of the proposed development will ensure future residents and site users will be able to easily walk and cycle within the local community. The site access road will be provided with a 2m footway, which will connect to the existing provision along the site frontage. Both cycle and car parking will be provided in line with Wokingham Borough Council's requirements.

Reducing Flood Risk and Surface Water Run-off

- 4.14 Information contained within the Flood Risk Assessment (FRA) and Conceptual Drainage Strategy, prepared by RPS, confirms that the site falls entirely within Flood Zone 1, indicating a less than 1 in 1,000 (0.1%) chance of flooding from rivers or the sea per year.
- 4.15 In addition, and as demonstrated in Figure 4.2 below, the vast majority of the site is at very low risk of flooding from surface water sources. The south east corner of the site, as well as areas along the southern boundary are, however, shown to be at low risk of flooding from this source, with some localised areas at medium risk. It is noted in the FRA and Conceptual Drainage Strategy that the areas of surface water flood risk identified within the southern portion of the site are likely associated with a surface water flow path that originates offsite, and which enters the site from the east. However, based on the proposed layout of the scheme, the built form of the scheme will be located away from the areas of surface water flood risk, with a sustainable drainage (SuDS) feature and area of open space located in this area of the site. With the introduction of the proposed SuDS strategy, a betterment over the existing case will be delivered, ensuring the risk of surface water flooding at the site in the post-development context is low.
- 4.16 The FRA and Conceptual Drainage Strategy confirms that the site is not at risk of flooding from reservoir flooding, and that the risk of flooding from sewers and groundwater is also low. It is noted, however, that due to a potentially shallow groundwater table in the area, SuDS features may need to be lined to prevent groundwater ingress, and monitoring is recommended at the site to inform this.

Figure 4.2 Extract from the Environment Agency's online flood map



- 4.17 The proposed surface water drainage assessment, set out within the FRA and Conceptual Drainage Strategy prepared by RPS, seeks to collect and convey surface water runoff via a gravity sewer system to an attenuation basin located in the south east corner of the site. Surface water runoff will be attenuated in the basin prior to its discharge to an ordinary watercourse located at the southern boundary of the site, at a rate restricted to 5.6 l/s. The proposed discharge rate of 5.6 l/s has been based on the greenfield runoff rate for the proposed impermeable area of the development, and will ensure that the surface water runoff is adequately managed up to and including the 1 in 100 year +40% climate change storm event. Details on the treatment of attenuated surface water runoff and the maintenance of the proposed SuDS features are provided in the FRA and Conceptual Drainage Strategy, which accompanies this submission.

Reducing Water Consumption

- 4.18 The majority of England is under water stress, with more water often being consumed than is available during dry weather. As the population continues to grow, and with changes to the frequency of rainfall events projected as a result of climate change, this situation will be further exacerbated, with even greater pressure exerted on the supply of potable water.
- 4.19 In order to actively mitigate against this, it is intended that water efficient fittings and appliances shall be installed to target a maximum internal water consumption target of 110 litres per person per day, based on the DCLG water efficiency calculator. Full details of the water consumption calculations are provided in Appendix A2. This level of water consumption is in compliance with Table 2 of the Wokingham Borough Council Climate Change Interim Policy Position Statement (December 2022), which sets out an expectation that developments will meet the optional Building Regulations water consumption standard of 110 litres per person per day.
- 4.20 Table 4.1 forms a basis for the residential element of the proposals, subject to changes at later detailed design stages.

Table 4.1 Proposed water use

Fitting	Consumption
Low volume dual flush toilets	6 litres (full) / 3 litres (part)
Wash hand basin tap	5 litres per minute
Kitchen sink tap	5 litres per minute
Bath (where fitted)	178 litres capacity (to overflow)
Shower	9 litres per minute
Washing machine	7 litres/kg
Dishwasher	1.25 litres/place setting

- 4.21 To aid in reducing potable water consumption for external uses, it is recommended that water butts, or similar, be provided for each dwelling to enable rainwater harvesting for irrigation purposes. It is also recommended that drought-resistant and drought-tolerant species be incorporated within the proposed Landscape Strategy to reduce external water demand.

Materials and Waste

- 4.22 Materials should be responsibly sourced by the main contractor, and be specified to have a low embodied impact. Materials with a low embodied impact, as defined within the BRE Green Guide to Specification, should be selected for use in the building design and construction.
- 4.23 The selection of materials is determined by a variety of factors, such as the architectural context, design rationale, embodied carbon and maintenance requirements. For the proposed development, consideration will be given to the lifecycle environmental performance with materials selected in consideration of the BRE's Green Guide to Specification, aiming for A or B rated materials wherever possible.
- 4.24 The use of locally sourced materials will be prioritised wherever possible to reduce the impacts associated with the transportation of materials. Using materials produced in the local area will also aid in developing the identity of the development, by ensuring it is in line with the local character and context. For the proposed development, there will be a focus on sustainable design, with materials selected that are in keeping with the local vernacular and landscape character, aiming for locally sourced materials where possible.

- 4.25 During detailed design of the building fabric, consideration will be given to minimising the environmental impact of materials, by selecting non-toxic and robust materials to ensure longevity and a minimal impact on the health of occupants. At this stage, a commitment is made to procuring insulation materials in consideration of their global warming potential (GWP), seeking to only procure materials with a GWP less than 5, where technically feasible, practicable and appropriate. Similarly, it is intended that materials will be procured in consideration of Environmental Product Declarations (EDPs), seeking to only procure materials that have a verified EDP available, where technically feasible, practicable and appropriate.
- 4.26 Timber will be selected and purchased in consideration of sustainability certification. It is intended that all structural timber elements along with any timber used for temporary uses, such as scaffolding, will be sustainably sourced, e.g. from FSC and/or PEFC sources.
- 4.27 Consideration has been given to the reduction and recycling of waste during both the construction and operation phases.
- 4.28 During the construction phase, the principal contractor will be required to implement a Site Waste Management Plan (SWMP), which will detail who will be responsible for resource management, which types of waste will be generated, how the waste will be managed (e.g. reduced, reused or recycled), which contractors will be used, and how the quantity of waste generated by the project will be measured. Should any demolition be required on the site, demolition contractors will incorporate best practice measures to maximise the recovery of materials from the demolition site for reuse or recycling, in line with the guidance set out by the Institute of Civil Engineers' (ICE) "Demolition Protocol".
- 4.29 To encourage a greater proportion of the operational waste to be diverted from landfill, it is proposed to provide dedicated spaces of sufficient size and within convenient locations for each of the new dwellings. All waste collection and storage facilities will be considerate of Building Regulations and Council requirements. A dedicated external waste storage area for refuse and recycling will also be allocated for each house to be delivered as part of the proposed development.

Tackling Increased Temperatures and Drought

- 4.30 In order to protect the development against overheating in the future, a number of key design features have been proposed to ensure the proposals are resilient to increased temperatures, which may be experienced as a result of climate change. The following measures are deemed to contribute to the mitigation of the effects of climate change:
- The dwellings' facades will have a balanced amount of glazing to mitigate direct solar heat gain whilst optimising daylight penetration.

- Openable windows on multiple aspect spaces will be integrated to provide a passive ventilation strategy that utilises crossflow ventilation to maximise the potential for natural ventilation within the dwellings.
- Internal heat gains will be minimised through the use of energy efficient lighting and equipment, the anticipated employment of air source heat pump (ASHP) technology, and the insulation of hot water distribution pipework to prevent heat loss into the dwelling spaces.

Ecology and Landscape

- 4.31 The Ecological Appraisal, prepared by The Environmental Dimension Partnership Ltd, confirms that no statutory or non-statutory nature conservation designations are present within the site. The site falls within the Zone of Influence (Zoi) of the Thames Basin Heath Special Protection Area (SPA), which is located 2.7km to the south, as well as: the Longmoor Bog Special Scientific Interest (SSSI), which is 2.6km to the north; the Castle Bottom to Yateley and Hawley Commons SSSI, 2.7km to the north; the Castle Bottom National Nature Reserve (NNR), 2.8km south; the Bramshill SSSI, 2.8km south west; the Wellington College Bog SSSI, 3.4km east; the Heath Lake SSSI, 3.7km north east; the Sandhurst to Owlsmoor Bogs and Heaths SSSI, 3.9km east, the Blackwater Valley SSSI, 4.4km south east; the West Minley Meadow SSSI, 4.7km south; and the Broadmoor to Bagshot Woods and Heaths SSSI, 5km to the north east. It is noted within the Ecological Appraisal, however, that due to the scale of the proposals, and the special separation between it and the identified designated sites, any impacts are anticipated to be minor. In order to avoid and mitigate for any impacts, in particular on the integrity of the Thames Basin SPA, it is required that a financial contribution be made towards the provision of Suitable Alternative Natural Greenspace (SANG) and Strategic Access Management and Monitoring (SAMM).
- 4.32 In addition, the site is located within the Blackwater Valley Biodiversity Opportunity Area (BOA), and is located within 2km of the Longwater Lane Meadow Local Wildlife Site (LWS), the Fleet Copse LWS, the Thames Basin Heaths BOA, the Moor Green Lakes LWS, the East Court Woods LWS and the Finchampstead Ridges LWS. It is considered that the proposed development would not result in the increased fragmentation of the Blackwater Valley BOA, due to its located at the northern edge of this BOA, and that the development proposals will be capable of compensating for the loss of species-poor semi-improved grassland. This will aid in contributing to the targets of the BOA through habitat restoration and the provision of new planting. Furthermore, it is considered that the provision of open space within the proposed development in combination with the presence of extensive areas of green space within the proximity will mitigate potential adverse impacts on the Longwater Lane Meadow LWS. It is considered that adverse impacts on other LWSs and BOAs in the surroundings of the site will be limited due to their separation from the site and the relatively small scale of the proposals.
- 4.33 Habitats present at the site include semi-improved grassland, dense and scattered scrub, species-poor hedgerow with trees, and mature trees. The majority of the habitats present on the site are of

negligible to site-level importance, although it is noted that the mature trees and hedgerow have intrinsic ecological importance at a local level. The proposed development will retain important habitats within the layout as far as possible, in particular the hedgerow and plantation woodland present along the eastern and southern boundaries, as well as the existing mature trees. In order to mitigate damage and disturbance to retained habitats, it is recommended that tree protection measures be implemented, with additional physical protection for wider habitats, and general environmental protection measures, detailed within a Construction Environmental Management Plan (CEMP).

4.34 The site provides suitable habitat for breeding, nesting and woodland bird species, however it is noted that the diversity and abundance of breeding bird species recorded at the site is relatively low. A number of trees present within the site and its immediate surroundings are considered to be suitable or roosting bats, and the habitats present within the site are assessed to be of moderate suitability for foraging and commuting bats. The site is considered to offer low potential for the presence of otter and water vole, however there are opportunities present for foraging and breeding hedgehogs. The habitats present on the site also offer foraging and dispersal opportunities for great crested newts, as well as common toads and other amphibian species. Small populations of slow worm, grass snake and common lizard are also considered to be supported by the habitats present on the site. In light of this, the following mitigation measures are recommended within the Ecological Appraisal to ensure adverse impacts on wildlife using the site are minimised as far as possible:

- To ensure any birds nesting on the site are protected, the removal of habitat with the potential to support these species should be undertaken outside of the breeding bird season (generally September to February), or under the supervision of an ecologist where this is not possible. The provision of Ecological Protection Zones (EPZs) around retained trees and hedgerows will also ensure birds using these habitats are protected during construction.
- Three of the nine trees identified as having potential to support roosting bats will be removed as part of the proposed development, and it is therefore required that these trees be comprehensively assessed prior to their felling. Should roosts be present in these trees, bat exclusion and felling will be undertaken under a Natural England licence and under the supervision of a licensed bat ecologies. Soft felling techniques will be employed where appropriate, with measures to be set out within a CEMP. All retained trees will also be suitable protected by fencing prior to construction. To protect foraging and commuting bats during the operation of the proposed development the woodland to the south of the site will be retained and buffered. A wildlife-sensitive lighting scheme will also be adopted.
- To minimise impacts on otter and water vole, artificial lighting use should be minimised during construction works, in particular in proximity to the ditch and woodland edge. The ditch will be provided with protective fencing and an EPZ during construction, with industry-standard pollution prevention measures to be implemented.

- To ensure no adverse impacts on badgers, a number of measures will be incorporated within the CEMP, including: the implementation of a 30m EPZ around the identified sett; the prevention of vegetation clearance within 10m of active setts; the undertaking of vegetation clearing within 10m and 20m of a sett under the advice of a suitably qualified ecologist, using hand tools only and no lower than 300mm above ground level; and no excavations or movement of heavy machinery to be permitted within 20 – 30m of an active sett. Further precautionary measures should also be taken, including: the provision of toolbox talks for site personnel; the undertaking of works during daytime hours only; the provision of gaps within fencing to allow badger movement; the provision of means of escape from excavations; and the incorporation of measures to deter badgers from creating new setts on-site.
- The retention and buffering of favourable habitats for great crested newts and other amphibians will aid in mitigating potential adverse effects on these species. Vegetation clearance during construction should be undertaken between March and October, and this clearance should be undertaken in a phased manner, under the supervision of a suitably qualified ecologist.
- It is recommended that the site continue to be regularly cut during the summer to prevent reptile colonisation. Clearance of vegetation during construction should be undertaken between March and October, in a phased manner.

4.35 It is recommended that the following ecological enhancements be incorporated within the proposed Landscape Strategy, prepared by The Environmental Dimension Partnership Ltd and shown in Figure 4.3 below:

- Provision of new hedgerow, tree and scrub habitat, in addition to the creation of species-rich and structurally diverse grassland and new wetlands within the proposed SuDS attenuation basin.
- Installation of bird and bat boxes and bricks on retained trees and new buildings.
- Potential incorporation of seasonally wet wildflower grassland habitat and open-water habitats within the SuDS features to deliver opportunities for aquatic biodiversity.
- Strengthening of the existing vegetated boundary habitats and retained corridors of open space through new native planting.
- Provision of log piles and wildflower meadows to enhance suitability of habitats for amphibians.
- Provision of at least one amphibian/reptile hibernaculum within areas of green space along the northern boundary of the site, comprising a mixture of log wood, brick rubble and vegetation.

Figure 4.3 Proposed Landscape Strategy



Air Pollution

- 4.36 The Environment Act 1995 requires all Local Authorities to review air quality within the districts. If it appears that any air quality 'Objective' prescribed in the regulations, and in the National Air Quality Strategy, is not likely to be achieved, then the local authority must designate the affected area as an Air Quality Management Area (AQMA).
- 4.37 As highlighted within the Air Quality Assessment prepared by RPS, the site location is not specified as an AQMA. It is noted that there are several AQMAs, declared due to the exceedance of annual mean nitrogen dioxide (NO₂) levels, within the administrative boundary of Wokingham Borough Council. The closest AQMA to the site is located approximately 4.5km to the west, within the neighbouring borough, and covers Crowthorne High Street.
- 4.38 The Air Quality Assessment concludes that, during the construction phase, impacts on local air quality have the potential to occur, due to exhaust emissions associated with construction vehicles and plant, as well as the generation of dust and particulate matter from earthworks, construction and trackout activities. In order to mitigate potential impacts on local air quality during the construction phase, it is recommended that a dust management plan (DMP) be prepared and agreed with the local authority. The DMP should include details of measures to be incorporated to control dust and general pollution from the site, as well as details of any monitoring schemes that may be implemented, where appropriate. Recommended best practice mitigation measures may include: mechanisms to minimise the number of vehicle movements to and from the site; discouragement of on-site vehicle idling; minimisation of on-site parking; and the provision of secure cycle parking and

encouragement of the use of public transport. Through the implementation of the mitigation measures outlined within the Air Quality Assessment, the residual impacts of the proposals on local air quality during construction will be negligible.

- 4.39 Due to the scale of the proposed development, it is not expected to exceed traffic thresholds for an assessment, and the air quality effects on the surrounding area during operation are not considered to be significant. In terms of the air quality at the site experienced by future residents and visitors, it is expected that pollutant concentrations at the facades of the proposed dwellings will be well within the relevant health-based air quality objectives. It is therefore concluded that future occupants should be exposed to acceptable air quality, and the site is therefore suitable for its proposed residential use.

Noise Pollution

- 4.40 As detailed within the Noise Impact Assessment Report, prepared by RPS, the dominant source of noise affecting the proposed development site is road traffic present on Longwater Road (B3016).
- 4.41 The majority of the proposed development is expected to achieve acceptable noise levels both internally and externally, without the need for additional mitigation. For properties located closest to Longwater Road (B3016), it is expected that external amenity areas will be protected by locating garden areas on the screened side of the proposed dwellings, such that they face away from the road. In addition, it is noted that the distance between Longwater Road (B3016) and the closest proposed dwellings will provide some natural noise attenuation for the proposed development. In light of this, it is expected that acceptable levels of internal noise will be achieved within the properties located closest to the road through the provision of standard thermal glazing in combination with an alternative means of ventilation, such that windows can remain closed should future occupants wish to do so. It is therefore concluded that, with respect to noise, the development site is suitable for the proposed scheme.

Ground Contamination

- 4.42 As detailed within the Phase I Desk Study, prepared by GRM Development Solutions Ltd, the site is currently used as pasture land, with the ground surface predominantly comprising grass. There are no historic records of development of the site and, as no potential hazards have therefore been identified, the risk to the proposed development is considered to be very low.
- 4.43 It is anticipated that the site is underlain by Alluvium in the extreme south eastern corner of the site, with River Terrace Deposits present across the southern half of the site. No superficial deposits are recorded across the northern half of the site. Bagshot Formation is anticipated to be present beneath the topsoil in the north of the site, and beneath the River Terrace Deposits and locally occurring Alluvium in the south. The underlying Alluvium, River Terrace and Bagshot Formation are classified

as Secondary A Aquifers, however the site is not located within a Groundwater Source Protection Zone, and the closest groundwater abstraction is located 484m to the north east of the site.

4.44 The Longwater River is located approximately 380m to the south of the site, however considering this distance, it is not considered a viable receptor of pollutants arising at the site. Unnamed secondary rivers (drains) are present on the eastern and southern boundaries, however there are no surface water abstraction licences recorded within 250m of the site. There is a discharge consent recorded on the western boundary of the site associated with drainage of the gravel extraction to the south.

4.45 Based on the information contained within the Phase I Desk Study, the following potential geotechnical hazards and actions have been identified:

- Possible localised soft strata associated with the presence of Alluvium may cause poor trafficability. This may require the use of deepened foundations, and will require further ground investigation.
- The presence of variable strata, shrinkable clay and trees may also result in a requirement for deepened foundations, which would need to be informed by further ground investigation.
- The presence of drainage ditches results in potential for siltation. This may be addressed through the implementation of a suitable surface water management strategy.
- There is potential for a shallow groundwater table to be present, which would reduce the bearing capacity of granular soils. Ground investigation and monitoring is therefore recommended at detailed design stage.

4.46 The Phase I Desk Study concludes that the risk from ground contamination and ground gas is negligible. It is noted that a ground investigation will be required and that this should allow for testing to be undertaken to confirm whether a soil capping system will be required, to determine whether standard water supply pipes will be suitable, and to undertake gas monitoring. The following recommendations are also made:

- Traditional trench fill foundations are generally considered to be suitable, however the deepening of foundations through Alluvium should be anticipated due to the inherent variability and poor strength of this form of deposit. It is also noted that a percentage of plots may require piled foundations due to the potential presence of cohesive strata and trees.
- The adoption of a supervised dig and pour philosophy, and the use of full trench support, is recommended at this stage should ground instability be present. It is also recommended that upgrading dewatering systems, such as well-pointing, be allowed for.

- It is recommended that the use of suspended floors be allowed for, with voids to be included for where properties are located within proximity to trees and where cohesive soils are present.

Light Pollution

- 4.47 As outlined in the Ecological Appraisal, prepared by The Environmental Dimension Partnership Ltd, a sensitive lighting strategy designed in accordance with the recommendations of the Bat Conservation Trust and the Institute of Lighting Professionals (2023) Guidance Note 08/23 - Bats and Artificial Lighting at Night, should be implemented during the construction and operation of the proposed development.

Water Pollution

- 4.48 The implementation of the proposed sustainable drainage strategy (SuDS), outlined in the Flood Risk Assessment (FRA) and Conceptual Drainage Strategy, prepared by RPS, will include appropriate pollution control measures to minimise the risk of pollution entering the ground and surface water bodies from surface water runoff from the development. An appropriate SuDS treatment train, consisting of an attenuation basin, has been incorporated within the design to treat surface water before it is discharged to an ordinary watercourse located at the southern boundary of the site.
- 4.49 Additional measures will also be adopted during construction to minimise the risk of ground and surface water pollution, including:
- Oil separators;
 - Clear marking and signage of drainage stems;
 - Full bunding of on-site fuel or oil delivery areas;
 - Bunding of areas to be used for cleaning activities; and
 - Best practice measures, implemented as part of a Construction Environmental Management Plan (CEMP), to mitigate the impacts of construction-related dust and emissions.

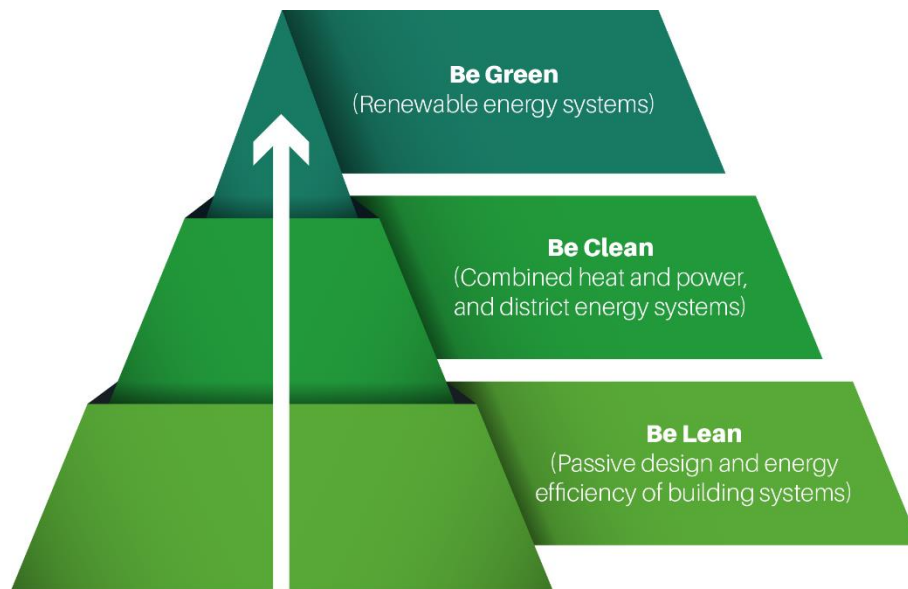
5. ENERGY STRATEGY

- 5.1 With reference to the policy requirements, guidance and industry best practice detailed in Section 3, a comprehensive energy and carbon dioxide (CO₂) emissions assessment has been carried out for the proposed development. The energy performance of the scheme has been analysed and evaluated against the most up-to-date iteration of Part L of the Building Regulations and pertinent Wokingham Borough Council policies.
- 5.2 In order to maintain a degree of flexibility in meeting the national standards set out in the Building Regulations on carbon and energy performance, as required by Wokingham Borough Council, the measures outlined below describe a potential means of achieving a reduction in CO₂ emissions over the Part L:2021 baseline. Therefore, the final building specification may be subject to change during detailed design, although the overall principles proposed below will be retained to deliver a low carbon dwellings in operation.

The Energy Hierarchy

- 5.3 The proposed strategy is based upon the principles of the Energy Hierarchy on the basis that it is preferable to reduce carbon dioxide emissions through reduced energy consumption above decarbonisation through alternative energy sources.
- 5.4 The tiers of the Energy Hierarchy are:
- Be Lean Use less energy
 - Be Clean Supply energy efficiently
 - Be Green Use renewable energy

Figure 5.1 The Energy Hierarchy



'Be Lean' (Use Less Energy)

- 5.5 Within the first stage of the energy hierarchy, it is proposed to incorporate high levels of passive and energy efficient design measures in order to reduce the development's energy consumption and associated CO₂ emissions, utilising a 'fabric first' approach to reduce energy demand.
- 5.6 Details of the passive design and indicative energy efficiency measures proposed have been detailed below.
- 5.7 Passive design utilises daylight, solar energy, shading and stack or wind driven ventilation to illuminate, heat, shade where necessary and ventilate/cool the building, thus requiring less (mechanical) energy to achieve the performance standards for health and wellbeing of the residents.
- 5.8 Site characteristics relating to local climate, surroundings, scale and size of the development therefore passively influence the potential energy requirement and savings that can be achieved through the consideration of these aspects. The parameters that most influence the potential to utilise sunlight and solar gains are the orientation and layout of buildings, however these are typically driven by various factors other than energy efficiency or bioclimatic design considerations (e.g. aesthetics, function, etc.).
- 5.9 As shown in Figure 2.1 above, the orientation of the dwellings will be dictated by the plot orientation in order to give the overall scheme a cohesive design approach. The distances between buildings will be optimised to ensure sufficient access to natural daylight and passive solar gains to the dwellings. Light and solar gain will also be influenced by the fenestration and the selection of glazing with a high degree of light transmittance.

- 5.10 The following U-values are proposed as a means of limiting heat loss through the dwellings' building fabric.

Table 5.1 Proposed domestic building fabric U-values

Building Fabric Element	Part L1:2021 backstop U-values (W/m ² K)	Proposed U-values (W/m ² K)
Ground floor	0.18	0.12
External wall	0.26	0.18
Roof	0.16	0.08
Windows	1.60 (including frame)	1.20 to 1.40 (including frame)

- 5.26 It is expected that glazing will be double glazed, with a low emissivity coating. Thermally efficient glazing will be employed, with window U-values of 1.4 W/m²K or better (including frame), a g-value of 0.63 and light transmission of ~70% to improve natural daylight penetration.
- 5.27 A high level of air tightness is proposed, where a level equal to or below 4.5 m³/h/m² shall be targeted, meaning that air infiltration between the internal and the external environment will be largely controlled, and space heating/cooling demand further reduced.
- 5.28 The other significant means of heat loss from dwellings is due to thermal (or cold) bridging. This is typically a construction detail which has higher thermal conductivity than the surrounding materials, creating a path of least resistance for heat transfer. Thermal bridges result in an overall reduction in thermal resistance of the building elements and should be designed out where possible to minimise unwanted heat loss. In order to minimise heat loss through thermal bridges it is intended that an equivalent ψ -value of no more than 0.05 W/m²K will be targeted for each dwelling.
- 5.29 High efficiency plant, equipment and controls are proposed to limit the energy consumed in order to provide the required level of indoor environmental performance and control. Performance efficiency values have been specified in line with the requirements of the Building Regulations in order to minimise carbon dioxide emissions as far as possible through the 'Be Lean' stage.
- Low energy LED lighting will be installed throughout the residential units.
 - In order to remove the need for fossil fuel combustion on-site, it is intended that space and water heating will be provided by air source heat pump (ASHP) systems. This is addressed in more detail in the renewable and low carbon energy technology section below.

- All residential units will be provided with opening windows to enable a natural ventilation strategy that utilises cross ventilation where feasible to provide fresh air to habitable spaces, without increasing the risk of overheating. Dwellings will also be provided with decentralised, mechanical extract ventilation with a Specific Fan Power (SFP) of no more than 0.15 W/l/s. These systems will be installed in kitchens and wet rooms (i.e. bathrooms) to ensure these rooms can be sufficiently ventilated, in line with Part F of the Building Regulations, without the need to open windows. This ensures that air can be purged from these rooms when required, and provides opportunities for future occupants to ventilate these space without having to open windows, particularly in the winter.
- Energy management systems, such as smart meters, will be installed in all dwellings to enable future residents to monitor their energy usage, and therefore aid in reducing their energy consumption.
- All future residents will be provided with a Home User Guide, to ensure all plant and equipment provided is used correctly and to enable efficiency of use to be maximised.
- Time and temperature zones will be employed in all dwellings and will be controlled by the suitable arrangement of plumbing and electrical systems.

'Be Clean' (Supply Energy Efficiently)

- 5.30 The potential for the proposed development to incorporate a low carbon heating system has been reviewed for the scheme.
- 5.31 Local heat and power sources minimise distribution losses and achieve greater efficiencies when compared to a separate energy system. This in turn reduces the site-wide energy consumption and associated carbon dioxide emissions.
- 5.32 The potential integration of a district heating network or a conventional gas-fired combined heat and power (CHP) plant to provide low carbon heat and power on-site has been evaluated for the development, in compliance with industry best practice and appropriate planning policies.

District Heating Feasibility

- 5.33 The feasibility of a district heating network is heavily dependent on a location's heat demand. In turn, heat demand in the locality is dependent on building usage and the surrounding area heat demand density.
- 5.34 Figure 5.2 below displays the development site within its proposed surroundings. From this, it can be concluded that the site itself is undeveloped, with low-density residential settlement to the north and north west. The surrounding area is therefore likely to be characterised by a low heat demand.

- 5.35 There are no existing or proposed district heating networks within close proximity to the development site. In addition, due to the relatively low density of the development, and the cost of the infrastructure required to connect a peri-urban location to a district heat network, it is not deemed cost effective to establish a district heat network on the site.

Figure 5.2 Site and surroundings

 Approximate site boundary



- 5.36
- 5.37 Based on the anticipated timescale of the proposed development and the predicted trajectory of the national electricity grid decarbonisation, the development of a combined heat and power (CHP) network powered by fossil fuels is not considered to be the most carbon efficient approach.
- 5.38 The incorporation of a gas-fired CHP network will lock the development into relatively carbon intensive gas-fired heating and hot water technology, and will not facilitate the transition to less carbon intensive solutions.
- 5.39 Based on the information presented above, it is considered that the incorporation of a gas-fired CHP network is not the optimum solution for the proposed development.

‘Be Green’ (Utilise Renewable and Low Carbon Technologies)

- 5.40 The proposed development has given consideration to renewable and low carbon energy technologies that may be applicable to deliver the required level of carbon dioxide savings over the Part L:2021 baseline, and the likely local effects on the environment.

5.41 In determining the appropriate renewable and low carbon energy technology for the site, a number of factors including carbon dioxide savings, site constraints, and potential visual impacts have been considered. Further details of each technology and its associated assessment in relation to the development are provided below.

- **Biomass** – This technology is not considered a practical solution for reducing carbon dioxide emissions, in the view of limited options available for domestic scale installations, storage space requirements for the combustible material, and the transport related carbon emissions which are not normally accounted for within energy modelling. Furthermore, high nitrous oxide (NO_x) and particulate matter (PM_x) emissions are associated with the use of biomass fuel, and as the proposed development will form part of a wider urban settlement, permitted emissions will be restricted.
- **Air Source Heat Pumps (ASHP)** – Given the site location and the lack of local existing or proposed heat networks, it is proposed that air source heat pump (ASHP) technology is incorporated within the development. It is proposed that highly efficient, individual ASHP systems are installed to serve both the space and water heating demands of the proposed dwellings. Typical manufacturing specifications for the proposed systems quote a heating coefficient of 4.36, and a hot water efficiency of over 100%. Time and temperature zones will be employed in all dwellings which will be controlled by the suitable arrangement of plumbing and electrical systems. Whilst the specified system operates quietly, as the design progresses, it is recommended that acoustic measures to further limit the noise generated by the outside unit of the system during operation are considered.
- **Ground Source Heat Pumps (GSHP)** – Due to the nature of the proposed, the site is not suitable for a horizontal ground collection loop. Furthermore, ground investigation and borehole drilling are likely to be cost prohibitive and may not yield a suitable energy source. In addition to this, the carbon dioxide and energy cost savings arising from the use of this technology are unlikely to be significant, particularly as high-grade heat is required to generate domestic hot water. The use of ground source heat pumps for the proposed development is therefore not considered viable, and it is intended that air source heat pump (ASHP) technology will be employed instead.
- **Photovoltaics (PV)** – Whilst the employment of this technology within the proposed development is technically feasible, for the purposes of this strategy, it has not been included for. This is because the proposed 'fabric first' approach and intended employment of air source heat pump (ASHP) technology to serve the space and water heating demands of the dwellings will enable the scheme to achieve the carbon dioxide emissions reductions over Part L of the Building Regulations required by Wokingham Borough Council, without the need for additional electricity generation.

- **Solar Thermal Hot Water (STHW)** – This technology is presently not required as domestic hot water is proposed to be provided by individual air source heat pumps (ASHP). In addition to this, hot water demand is considered to be outside the energy generating period for the solar thermal panels, meaning its ability to significantly reduce carbon emissions during operation is limited.
- **Wind Turbines** – This technology is suitable for the proposed development on the basis of its potential impact on visual amenity and relatively low efficiency from unpredictable, turbulent wind conditions associated with low-lying locations.

Energy Assessment Results

5.42 Energy modelling of the proposed development has been undertaken using the Standard Assessment Procedure (SAP) for six of the proposed dwellings. The locations of these dwellings are shown in the image below, with further details given in Table 5.3.

Figure 5.3 Sample dwellings modelled



Table 5.2 Sample dwellings modelled

Dwelling Reference	House-Type	Dwelling Type	Aspect
Plot 2	A 2.2.2	2-bed, Semi-detached	N, E, W
Plot 4	P 4.13	4-bed, Detached	N, E, S
Plot 11	A 3.3	3-bed, Semi-detached	E, W
Plot 20	A 1.2	1-bed, Semi-detached	E, W
Plot 31	A 2.7	2-bed, Semi-detached	N, E, W
Plot 36	A 3.6	3-bed, Semi-detached	N, E, W

- 5.43 The carbon dioxide emissions for the sampled dwellings are shown below. The SAP outputs demonstrating the performance of the modelled dwellings are provided in Appendix A3.

Figure 5.4 Domestic regulated carbon dioxide emissions

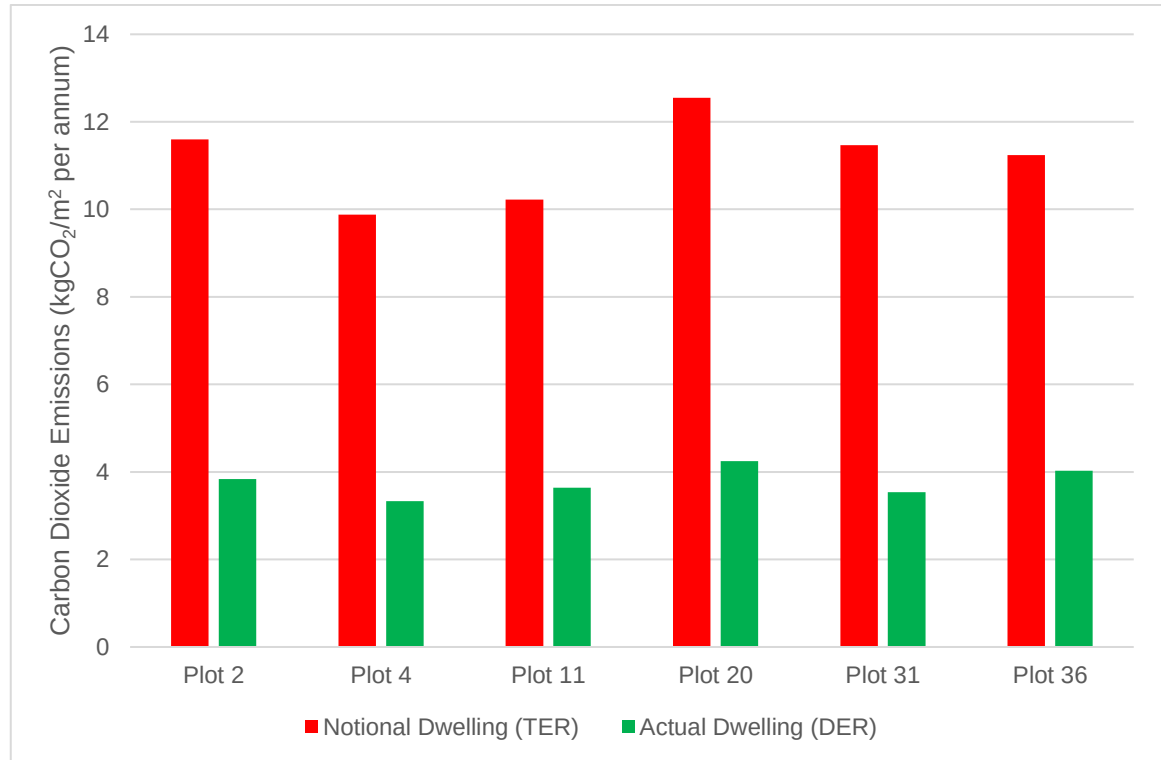


Table 5.3 Domestic regulated carbon dioxide emissions

Dwelling Reference	TER: Baseline: Part L:2021 Emissions (kgCO ₂ /m ² per annum)	DER: Proposed Dwelling Emissions (kgCO ₂ /m ² per annum)	Emissions Savings (kgCO ₂ /m ² per annum)	Emissions Savings (%)
Plot 2	11.6	3.8	7.8	67.2%
Plot 4	9.9	3.3	6.6	66.7%
Plot 11	10.2	3.6	6.6	64.7%
Plot 20	12.6	4.3	8.3	65.9%
Plot 31	11.5	3.5	8.0	69.6%
Plot 36	11.2	4.0	7.2	64.3%

- 5.44 The above analysis shows that the proposed dwellings will achieve an approximate minimum on-site carbon dioxide emissions saving of 64.3% through energy efficiency measures and renewable and low carbon energy technologies over the Part L:2021 baseline. It should be noted that compliance with Part L:2021 of the Building Regulations is equivalent to a 31% reduction over the Part L:2013 baseline. The proposed development therefore delivers carbon dioxide emissions reductions that exceed the minimum requirements of Wokingham Borough Council.

- 5.45 As the tested dwellings provide a representative sample the proposed development, it is expected that the savings presented within this assessment may be scaled across the development. This is in compliance with the requirements set out within the Wokingham Borough Council policies as set out within the Wokingham Borough Local Development Framework Adopted Core Strategy, the Wokingham Borough Development Plan Adopted Managing Development Delivery Local Plan, the Finchampstead Neighbourhood Plan, the Wokingham Climate Change Interim Policy Position Statement and the Wokingham Borough Local Development Framework Sustainable Design and Construction Supplementary Planning Document and its Companion Document.

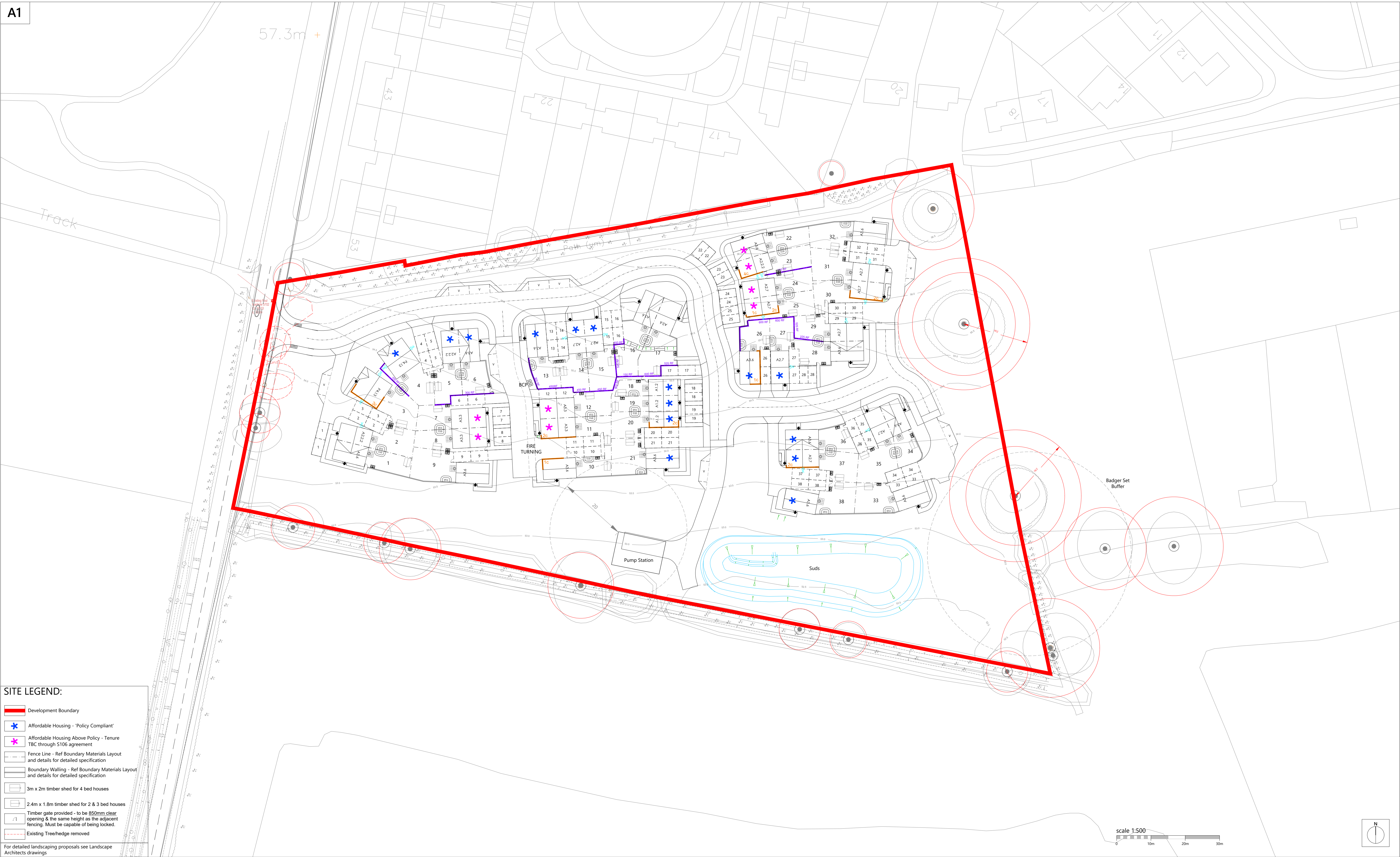
6. SUMMARY

- 6.1 This Sustainability & Energy Statement provides an overview as to how the development of the Land East of Longwater Road, Finchampstead contributes to sustainable development in the context of the strategic, design and construction considerations.
- 6.2 Consideration has been given to Chapter 14 of the National Planning Policy Framework (NPPF; 2023), the Wokingham Borough Local Development Framework Adopted Core Strategy (2010), as well as the Wokingham Borough Development Plan Adopted Managing Development Delivery Local Plan (2014), the Finchampstead Neighbourhood Plan (2023), the Wokingham Climate Change Interim Policy Position Statement (2022) and the Wokingham Borough Local Development Framework Sustainable Design and Construction Supplementary Planning Document and its Companion Document (2010) in the formulation of this strategy, aiming to minimise the environmental impact of the proposed development during construction and operation, and ensure the development is constructed to rigorous sustainability standards.
- 6.3 By designing to rigorous energy standards, employing electric-only systems, and integrating renewable and low carbon energy technologies, the application will respond directly to the Climate Emergency declared by the Council in July 2019. These measures combine to provide a significant carbon dioxide emissions savings compared to the Part L:2021 baseline, aiming to significantly exceed the requirements to achieve a minimum 31% reduction in carbon dioxide emissions over the Part L:2021 baseline as set out within the Wokingham Borough Council policies, as clarified within the Wokingham Climate Change Interim Policy Position Statement.
- 6.4 It is noted that, whilst Policy ES1 of the Finchampstead Neighbourhood Plan (2023) requires major residential development to be designed to achieve carbon neutral homes, in light of the fact that the proposed development will be principally an affordable scheme in the first instance, this is not considered to be practical or viable. It is highlighted, however, that the proposed development will deliver a significant carbon dioxide saving, with an approximate minimum 64.3% reduction over the Part L:2021 of the Building Regulations baseline demonstrated. Further to this, the use of electric-only systems for space heating and hot water generation will push the scheme towards being fossil fuel free, and compatible with the Government's intended trajectory to achieve net zero carbon emissions by 2050. In this way, the proposed development will be future-proofed to achieve net-zero carbon emissions in operation, in line with the anticipated decarbonisation of the national electricity grid.
- 6.5 Sections 4 and 5 of this statement demonstrate that the siting and design of the proposals support relevant policies relating to sustainable development. This shows that the proposed development:
- make efficient use of land;

- promote the use of sustainable and active modes of transport;
- reduce the risk of flooding on-site and in the surrounding area;
- minimise internal water consumption to 110 litres per person per day;
- incorporate low-impact materials, according to the BRE Green Guide to Specification;
- minimise waste production during construction and maximise the proportion of waste to be diverted from landfill;
- mitigate the risk of overheating;
- incorporate measures to improve site biodiversity, including biodiverse planting;
- ensure air, noise, ground, light and water pollution are minimised as far as possible;
- minimise energy demand through the specification of low U-values, low air permeability and low thermal bridging to reduce heat loss;
- be fossil fuel free, utilising electric-only air source heat pump (ASHP) systems to serve the space and water heating demands of the proposed dwellings; and
- achieve an approximate minimum 64.3% reduction in CO₂ emissions over the Part L:2021 baseline for the proposed dwellings, following the Energy Hierarchy methodology.

6.6 Overall, the proposals for the scheme are in line with the principles of sustainable development as well as the policy requirements of the NPPF and Wokingham Borough Council and will provide a development that promotes these principles in operation.

A1. SITE PLAN



Romsey T:01794 367703
Portishead T:01275 407000
London T:01794 367703

www.thrivearchitects.co.uk

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Rev	Description	Date	Au	Ch
A	Issued for Planning	31.05.24	MK	
B	Amended to suit CMP-02	16.10.24	MK	
	Amended to suit Client comments	21.10.24	MK	
	Amended to suit Engineer's comments	23.10.24	MK	
	Amended to allow 19.2m RPA.	01.11.24	RA/MK	
	Affordable annotations added, engineer's info added.	19.11.24	MK	

Project	Land at Longwater Road, Finchampstead		
Drawing	Site Layout		
Client	Catesby Estates PLC & Stonebond Properties (Guildford) Limited		
Job no.	CATE230603	Date	26.03.24
Dwg no.	SL01	Rev.	B
Author	MK	Checked	
Status	PLANNING	Scale	1:500 at A1
Client ref.		Office	Romsey



A2. WATER USAGE CALCULATOR



Job no:	1000043
Date:	24/05/2024
Assessor name:	
Registration no:	N/A
Development name:	Land East of Longwater Road

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PRINTING: before printing please make sure that in "Page Setup" you have selected the page to be as "Landscape" and that the Scale has been set up to 70% (maximum)

WATER EFFICIENCY CALCULATOR FOR NEW DWELLINGS - (BASIC CALCULATOR)

	House Type:	Type 1		Type 2		Type 3		Type 4		Type 5		Type 6		Type 7		Type 8		Type 9		Type 10	
	Description:	Typical Unit																			
Installation Type	Unit of measure	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day
Is a dual or single flush WC specified?		Dual		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Click to Select		Click to Select		Click to Select	
WC	Full flush volume	6	8.76		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
	Part flush volume	3	8.88		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Taps (excluding kitchen and external taps)	Flow rate (litres / minute)	5	9.48		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Are both a Bath & Shower Present?		Bath & Shower		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Bath	Capacity to overflow	178	19.58		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Shower	Flow rate (litres / minute)	9	39.33		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Kitchen sink taps	Flow rate (litres / minute)	5	12.56		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Has a washing machine been specified?		Yes		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Washing Machine	Litres / kg	7	14.70		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Has a dishwasher been specified?		Yes		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Dishwasher	Litres / place setting	1.25	4.50		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Has a waste disposal unit been specified?		No		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Water Softener	Litres / person / day		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Calculated Use		117.8			0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
Normalisation factor		0.91			0.91		0.91		0.91		0.91		0.91		0.91		0.91		0.91		0.91
Code for Sustainable Homes	Total Consumption	107.2			0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
	Mandatory level	Level 1/2			-		-		-		-		-		-		-		-		-
Building Regulations 17.K	External use	5.0			5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0
	Total Consumption	112.2			0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0
	17.K Compliance?	Yes			-		-		-		-		-		-		-		-		-

A3. SAP OUTPUTS

Building Regulations England Part L (BREL) Compliance Report

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

Date: Thu 03 Aug 2023 19:45:11

Project Information			
Assessed By	Matthew Fitzpatrick	Building Type	House, Semi-detached
OCDEA Registration	EES/004069	Assessment Date	2023-08-03

Dwelling Details			
Assessment Type	As designed	Total Floor Area	79 m ²
Site Reference	A 2.2.2	Plot Reference	001
Address	A 2.2.2 A 2.2.2, Chelmsford, CM2 0RG		

Client Details	
Name	Stonebond
Company	Stonebond Properties (Chelmsford) Ltd
Address	Stonebond House, Chelmsford, CM2 0RG

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	11.6 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	3.84 kgCO ₂ /m ²		OK

1b Target primary energy rate and dwelling primary energy			
Target primary energy	60.68 kWh _{PE} /m ²		
Dwelling primary energy	40.3 kWh _{PE} /m ²		OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	36.2 kWh/m ²		
Dwelling fabric energy efficiency	34.0 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	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.12	Suspended Ground Floor (0.12)	OK
Roofs	0.16	0.08	Roof (1) (0.08)	OK
Windows, doors, and roof windows	1.6	1.31	D02 (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)	81.2433	0.18	
Party wall: Party Wall (1)	45.93	0 (!)	
Ground floor: Suspended Ground Floor, Suspended Ground Floor	39.63	0.12	
Exposed roof: Roof (1)	39.63	0.08 (!)	

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]
D01, Front Door Side Panel	2.1483	North	N/A	1.2
D02, Patio Door	3.801	South	1.0	1.4
W01, Window	1.07415	North	1.0	1.3
W02, Window	2.172	North	1.0	1.3
W03, Window	2.172	South	1.0	1.3
W04, Window	0.71925	East	1.0	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	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.134	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.063	
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.05	
External wall	E3: Sill	Calculated by person with suitable expertise	0.046	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.051	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.056	
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 (!)	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.053	
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.062	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.043	
Party wall	P2: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.041	

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

4 Space heating

Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	247.8%
Emitter type	Both radiators and underfloor
Flow temperature	45°C
System type	Heat Pump
Manufacturer	Vaillant Group UK Ltd
Model	aroTHERM plus 5kW + AI
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water

Cylinder/store - type: Cylinder	
Capacity	200 litres
Declared heat loss	1.2 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls

Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services		
Function		
Ecodesign class		
Manufacturer		
Model		

Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	75 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	0.17 W/(l/s)	OK
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model	Ultimate dMEV	
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		

Summary for Input Data

Property Reference	A 2.2.2		Issued on Date	03/08/2023
Assessment Reference	001	Prop Type Ref	A 2.2.2	
Property	A 2.2.2, A 2.2.2, Chelmsford, CM2 0RG			

SAP Rating	84 B	DER	3.84	TER	11.60
Environmental	97 A	% DER < TER			66.90
CO ₂ Emissions (t/year)	0.28	DFEE	33.97	TFEE	36.19
Compliance Check	See BREL	% DFEE < TFEE			6.14
% DPER < TPER	33.59	DPER	40.30	TPER	60.68

Assessor Details	Mr. Matthew Fitzpatrick	Assessor ID	7601-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	North	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Semi-Detached	
Which Floor	0	
2.0 Number of Storeys	2	
3.0 Date Built	2023	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements			
	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	17.88 m	39.63 m ²	2.46 m
1st Storey:	17.88 m	39.63 m ²	2.76 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	33.09	m ²
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9.0 External Walls											
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation	Type
Brickwork	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	93.33	81.24	0.00	None	12.09	Calculate Wall Area	

9.1 Party Walls									
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter		
Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill	0.00	110.00	45.93	0.00	None		

9.2 Internal Walls				
Description	Construction	Kappa (kJ/m ² K)	Area (m ²)	
Metal GF	Plasterboard on timber frame	9.00	59.83	
Metal FF	Plasterboard on timber frame	9.00	66.88	

10.0 External Roofs

Summary for Input Data



Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Cold Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.08	9.00	39.63	0.00	None	0.00	Calculate Wall Area	0.00

10.2 Internal Ceilings

Description	Storey	Construction	Area (m²)
Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	39.63

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Suspended Ground Floor	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	39.63

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1		Plasterboard ceiling, carpeted chipboard floor	9.00	39.63

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Front Door Side Panel Window	Manufacturer BFRC, BSI or CERTASS data	Half Glazed Door Window	Double Low-E Soft 0.1 Double Low-E Soft 0.1		Air Filled Air Filled	0.63 0.41	Wood Wood	0.70 1.00	1.20 1.30
Patio Door	BFRC, BSI or CERTASS data	Window	Double Low-E Soft 0.1		Air Filled	0.39	Wood	1.00	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
D01	Front Door Side Panel	Brickwork	North	2.15	0
D02	Patio Door	Brickwork	South	3.80	0
W01	Window	Brickwork	North	1.07	0
W02	Window	Brickwork	North	2.17	0
W03	Window	Brickwork	South	2.17	0
W04	Window	Brickwork	East	0.72	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E10 Eaves (insulation at ceiling level)	Independently assessed	9.06	0.13	0.13	No
E12 Gable (insulation at ceiling level)	Independently assessed	8.82	0.06	0.06	No
E1 Steel lintel with perforated steel base plate	Independently assessed	8.16	0.05	0.05	No
E3 Sill	Independently assessed	5.33	0.05	0.05	No
E4 Jamb	Independently assessed	17.40	0.05	0.05	No
E5 Ground floor (normal)	Independently assessed	17.88	0.06	0.06	No
E6 Intermediate floor within a dwelling	Independently assessed	17.88	0.00	0.00	No
E16 Corner (normal)	Independently assessed	10.44	0.05	0.05	Yes
E18 Party wall between dwellings	Independently assessed	10.44	0.06	0.06	Yes
P1 Party wall - Ground floor	Independently assessed	8.82	0.04	0.04	No
P2 Party wall - Intermediate floor within a dwelling	Independently assessed	8.82	0.00	0.00	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	8.82	0.04	0.04	No

Y-value W/m²K

18.0 Pressure Testing

Designed AP ₅₀	4.50	m³/(h.m²) @ 50 Pa
Property Tested?	Yes	
Test Method	Blower Door	
As Built AP ₅₀	0.10	m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation	
Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Mechanical extract ventilation - decentralised
MV Reference Number	500755
Duct Type	Rigid

Summary for Input Data



MVHR Efficiency	0.00
Wet Rooms	2
SFP from Installer Commissioning Certificate	No

19.1 Mechanical extract ventilation - Decentralised

SFP	Fan/Room Type	Count
0.15	In Room Fan Kitchen	1
0.11	In Room Fan Other Wet Room	2
0.00	In Duct Fan Kitchen	0
0.00	In Duct Fan Other Wet Room	0
0.11	Through Wall Fan Kitchen	0
0.09	Through Wall Fan Other Wet Room	0

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System	No
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22.0 Lighting

No Fixed Lighting	No				
	Name	Efficacy	Power	Capacity	Count
	Pendant	75.00	10	750	6
	Downlight	75.00	10	750	9

24.0 Main Heating 1

	Database	
Percentage of Heat	100.00	%
Database Ref. No.	104416	
Fuel Type	Electricity	
SAP Code	0	
In Winter	0.00	
In Summer	0.00	
Model Name	aroTHERM plus 5kW + AI	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2207	
Delayed Start Stat	Yes	
Burner Control	Modulating	
HETAS approved System	No	
Oil Pump Inside	No	
FI Case	0.00	
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	45.00	
Boiler Interlock	Yes	
Combi boiler type	Storage Combi	
Combi keep hot type	None	

25.0 Main Heating 2	None
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26.0 Heat Networks	None
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Summary for Input Data

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Bathroom	Combi boiler or unvented hot water system	9.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Insulation Thickness Type	Other	
Insulation Thickness	15	
Cylinder Volume	200.00	L
Loss	1.20	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

Thermal Store Pipework	within a single casing
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34.0 Small-scale Hydro

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000 £3,500 - £5,500	£42 £238	B 86 A 95 0	A 97 A 99 0

Overview Report

Dwelling Address	A 2.2.2, A 2.2.2, Chelmsford, CM2 0RG
Report Date	03/08/2023
Property Type	House, Semi-Detached
Floor Area [m ²]	79

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

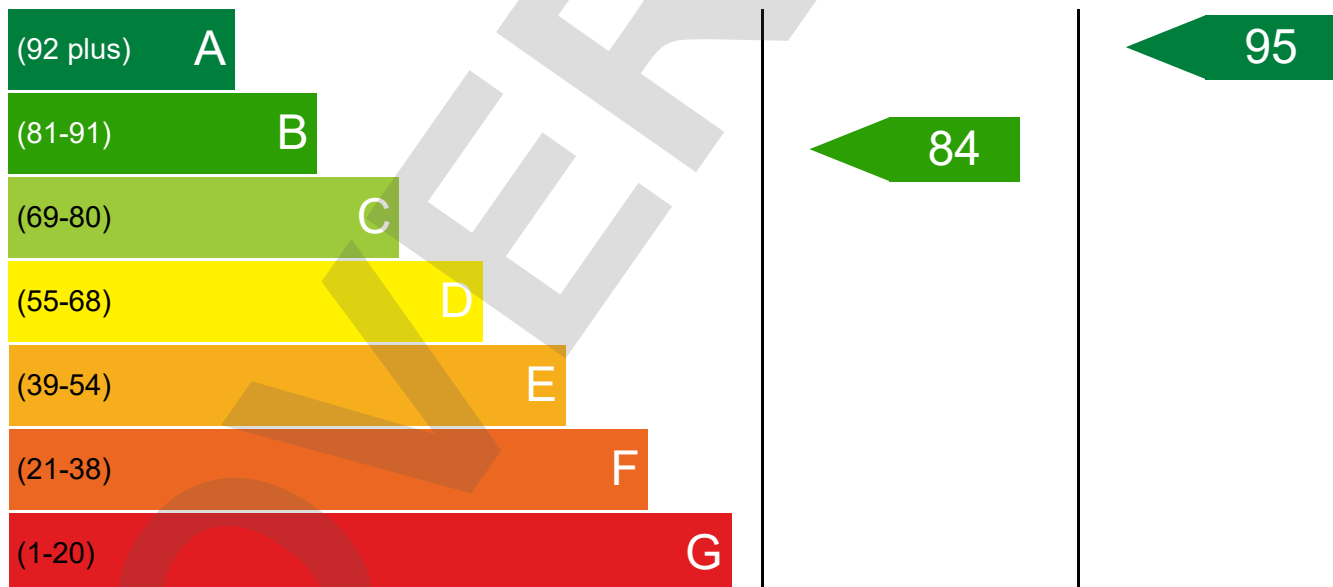
Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.

Most energy efficient - lower running costs

CURRENT

POTENTIAL



Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
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Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.08 W/m ² K	Very Good
Floor	Average thermal transmittance 0.12 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, radiators and underfloor, electric	Average
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Good lighting efficiency	Good
Air tightness	Air permeability [AP50] = 4.5 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 38 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is: **0.3** per year

Overview Report

With the recommended measures the potential CO emissions could be: **0.0** per year

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical Yearly Saving	Potential Rating after measure installed	Cumulative savings (per year)	Cumulative Potential Rating
Solar water heating	£42	 2	£42	 B 86
Photovoltaic	£238	 9	£280	 A 95

Estimated energy use and potential savings

Estimated energy cost for this property over a year

£417

Over a year you could save

£280

The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details

Assessor name	Mr. Matthew Fitzpatrick
Assessor's accreditation number	EES/004069
Email Address	sap-epc@abbey-consultants.com

Accreditation scheme contact details

Accreditation scheme	Elmhurst Energy Systems Ltd
Telephone	01923 274427
Email Address	sap-epc@abbey-consultants.com

Assessment details

Related party disclosure	No related party
Date of assessment	03/08/2023
Date of certificate	03/08/2023
Type of assessment	SAP, new dwelling

Building Regulations England Part L (BREL) Compliance Report

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

Date: Thu 03 Aug 2023 19:45:15

Project Information			
Assessed By	Matthew Fitzpatrick	Building Type	House, Detached
OCDEA Registration	EES/004069	Assessment Date	2023-08-03

Dwelling Details			
Assessment Type	As designed	Total Floor Area	127 m ²
Site Reference	P 4.13	Plot Reference	001
Address	P 4.13 P 4.13, Chelmsford, CM2 0RG		

Client Details	
Name	Stonebond
Company	Stonebond Properties (Chelmsford) Ltd
Address	Stonebond House, Chelmsford, CM2 0RG

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	9.88 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	3.33 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	51.63 kWh _{PE} /m ²		
Dwelling primary energy	34.65 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	39.0 kWh/m ²		
Dwelling fabric energy efficiency	37.5 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	0.18	Walls (1) (0.18)	OK
Party walls	0.2	N/A	N/A	N/A
Curtain walls	1.6	N/A	N/A	N/A
Floors	0.18	0.12	Suspended Ground Floor (0.12)	OK
Roofs	0.16	0.08	Roof (1) (0.08)	OK
Windows, doors, and roof windows	1.6	1.31	D02 (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)	146.7727	0.18
Ground floor: Suspended Ground Floor, Suspended Ground Floor	63.56	0.12
Exposed roof: Roof (1)	63.560001373291016	0.08 (!)

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]
D01, Front Door Side Panel	3.0933	North	N/A	1.2
D02, Patio Door	6.1635	South	1.0	1.4
W01, Window	1.902	North	1.0	1.3
W02, Window	0.71925	North	1.0	1.3
W03, Window	0.71925	West	1.0	1.3
W04, Window	1.66425	South	1.0	1.3
W05, Window	0.71925	East	1.0	1.3
W06, Window	1.902	North	1.0	1.3
W07, Window	1.902	North	1.0	1.3
W08, Window	0.71925	West	1.0	1.3
W09, Window	1.902	South	1.0	1.3
W10, Window	1.902	South	1.0	1.3

Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
W11, Window	0.71925	East	1.0	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	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.134	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.063	
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.05	
External wall	E3: Sill	Calculated by person with suitable expertise	0.046	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.051	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.056	
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 (!)	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.053	
External wall	E17: Corner (inverted - internal area greater than external area)	Calculated by person with suitable expertise	-0.054	

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

4 Space heating	
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity	
Efficiency	273.1%
Emitter type	Both radiators and underfloor
Flow temperature	45°C
System type	Heat Pump
Manufacturer	Vaillant Group UK Ltd
Model	aroTHERM plus 7kW + AI
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	250 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	Yes
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services	
Function	
Ecodesign class	
Manufacturer	
Model	

Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	75 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	0.16 W/(l/s)	OK
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model	Ultimate dMEV	
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		

Summary for Input Data

Property Reference	P 4.13	Issued on Date	03/08/2023
Assessment Reference	001	Prop Type Ref	P 4.13
Property	P 4.13, P 4.13, Chelmsford, CM2 0RG		

SAP Rating	85 B	DER	3.33	TER	9.88
Environmental	97 A	% DER < TER			66.30
CO ₂ Emissions (t/year)	0.39	DFEE	37.49	TFEE	39.04
Compliance Check	See BREL	% DFEE < TFEE			3.98
% DPER < TPER	32.88	DPER	34.65	TPER	51.63

Assessor Details	Mr. Matthew Fitzpatrick	Assessor ID	7601-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	North	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
Which Floor	0	
2.0 Number of Storeys	2	
3.0 Date Built	2024	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	32.72 m	63.56 m ²	2.46 m
1st Storey:	32.72 m	63.56 m ²	2.76 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	16.33	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Brickwork	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	170.80	146.77	0.00	None	24.03	Calculate Wall Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill	0.00	110.00	26.55	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Metal GF	Plasterboard on timber frame	9.00	59.27
	Metal FF	Plasterboard on timber frame	9.00	159.30
	Block GF	Dense block, plasterboard on dabs	75.00	58.95

10.0 External Roofs

Summary for Input Data

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Cold Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.08	9.00	63.56	0.00	None	0.00	Calculate Wall Area	0.00

10.2 Internal Ceilings

Description	Storey	Construction	Area (m²)
Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	63.56

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Suspended Ground Floor	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	63.56

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1		Plasterboard ceiling, carpeted chipboard floor	9.00	50.71

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Front Door Side Panel Window	Manufacturer BFRFC, BSI or CERTASS data	Half Glazed Door Window	Double Low-E Soft 0.1 Double Low-E Soft 0.1		Air Filled Air Filled	0.63 0.41	Wood Wood	0.70 1.00	1.20 1.30
Patio Door	BFRFC, BSI or CERTASS data	Window	Double Low-E Soft 0.1		Air Filled	0.39	Wood	1.00	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
D01	Front Door Side Panel	Brickwork	North	3.09	0
D02	Patio Door	Brickwork	South	6.16	0
W01	Window	Brickwork	North	1.90	0
W02	Window	Brickwork	North	0.72	0
W03	Window	Brickwork	West	0.72	0
W04	Window	Brickwork	South	1.66	0
W05	Window	Brickwork	East	0.72	0
W06	Window	Brickwork	North	1.90	0
W07	Window	Brickwork	North	1.90	0
W08	Window	Brickwork	West	0.72	0
W09	Window	Brickwork	South	1.90	0
W10	Window	Brickwork	South	1.90	0
W11	Window	Brickwork	East	0.72	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E10 Eaves (insulation at ceiling level)	Independently assessed	13.30	0.13	0.13	No
E12 Gable (insulation at ceiling level)	Independently assessed	19.42	0.06	0.06	No
E1 Steel lintel with perforated steel base plate	Independently assessed	17.34	0.05	0.05	No
E3 Sill	Independently assessed	12.94	0.05	0.05	No
E4 Jamb	Independently assessed	33.00	0.05	0.05	No
E5 Ground floor (normal)	Independently assessed	32.72	0.06	0.06	No
E6 Intermediate floor within a dwelling	Independently assessed	32.72	0.00	0.00	No
E16 Corner (normal)	Independently assessed	26.10	0.05	0.05	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	5.22	-0.05	-0.05	No

Y-value W/m²K

18.0 Pressure Testing

Designed AP ₅₀	4.50	m³/(h.m²) @ 50 Pa
Property Tested?	Yes	
Test Method	Blower Door	
As Built AP ₅₀	0.10	m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation	
Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database

Summary for Input Data

Type	Mechanical extract ventilation - decentralised
MV Reference Number	500755
Duct Type	Rigid
MVHR Efficiency	0.00
Wet Rooms	3
SFP from Installer Commissioning Certificate	No

19.1 Mechanical extract ventilation - Decentralised

SFP	Fan/Room Type	Count
0.15	In Room Fan Kitchen	1
0.11	In Room Fan Other Wet Room	3
0.00	In Duct Fan Kitchen	0
0.00	In Duct Fan Other Wet Room	0
0.11	Through Wall Fan Kitchen	0
0.09	Through Wall Fan Other Wet Room	0

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System	No
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22.0 Lighting

No Fixed Lighting	No				
	Name	Efficacy	Power	Capacity	Count
	Pendant	75.00	10	750	18
	Downlight	75.00	10	750	14

24.0 Main Heating 1

0 Main Heating 1	Database	
Percentage of Heat	100.00	%
Database Ref. No.	104432	
Fuel Type	Electricity	
SAP Code	0	
In Winter	0.00	
In Summer	0.00	
Model Name	aroTHERM plus 7kW + AI	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2207	
Delayed Start Stat	Yes	
Burner Control	Modulating	
HETAS approved System	No	
Oil Pump Inside	No	
FI Case	0.00	
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	45.00	
Boiler Interlock	Yes	
Combi boiler type	Standard Combi	
Combi keep hot type	None	

Summary for Input Data

25.0 Main Heating 2

26.0 Heat Networks

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Bathroom	Combi boiler or unvented hot water system	9.00		No	
Ensuite	Combi boiler or unvented hot water system	9.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Insulation Thickness Type	Other	
Insulation Thickness	15	
Cylinder Volume	250.00	L
Loss	1.40	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

Thermal Store	None
Thermal Store Pipework	within a single casing

34.0 Small-scale Hydro

Small-scale Hydro	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

Summary for Input Data



	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar water heating	£3,500 - £5,500	£256	B 85 B 91 0	A 97 A 99 0

Overview Report

Dwelling Address	P 4.13, P 4.13, Chelmsford, CM2 0RG
Report Date	03/08/2023
Property Type	House, Detached
Floor Area [m ²]	127

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

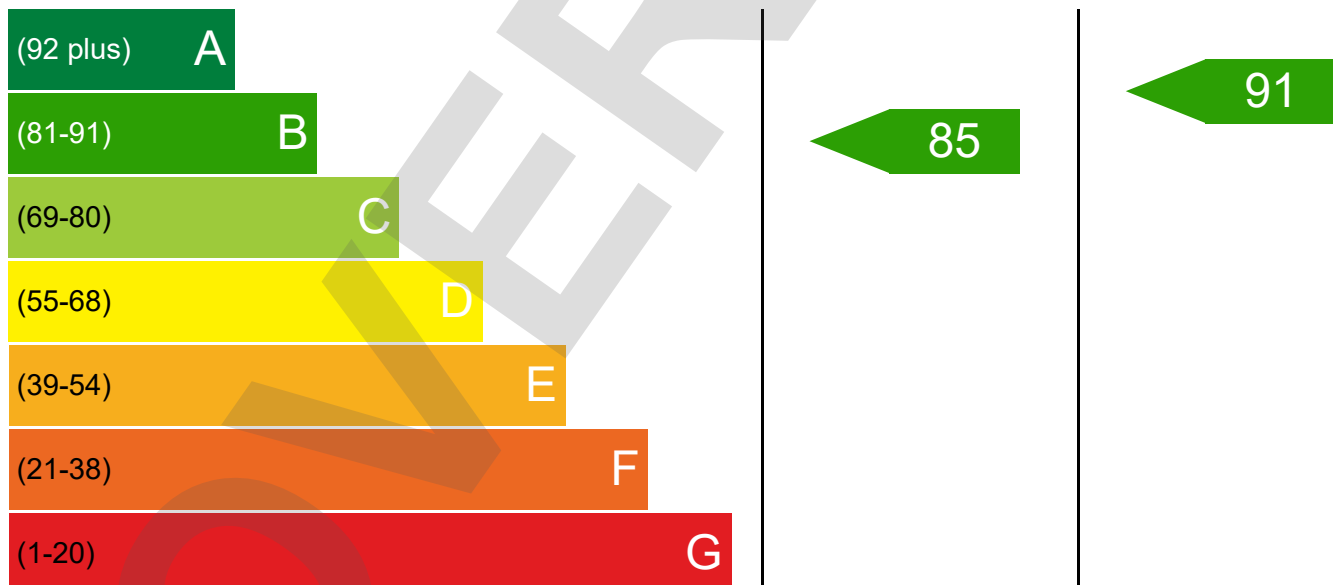
Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.

Most energy efficient - lower running costs

CURRENT

POTENTIAL



Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
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Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.08 W/m ² K	Very Good
Floor	Average thermal transmittance 0.12 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, radiators and underfloor, electric	Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Good lighting efficiency	Good
Air tightness	Air permeability [AP50] = 4.5 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 32 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is: **0.4** per year

Overview Report

With the recommended measures the potential CO emissions could be: **0.2** per year

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical Yearly Saving	Potential Rating after measure installed	Cumulative savings (per year)	Cumulative Potential Rating
Solar water heating		 0	£41	 B 85
Photovoltaic	£256	 6	£297	 B 91

Estimated energy use and potential savings

Estimated energy cost for
this property over a year

£571

Over a year you could
save

£256

The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details

Assessor name	Mr. Matthew Fitzpatrick
Assessor's accreditation number	EES/004069
Email Address	sap-epc@abbey-consultants.com

Accreditation scheme contact details

Accreditation scheme	Elmhurst Energy Systems Ltd
Telephone	01923 274427
Email Address	sap-epc@abbey-consultants.com

Assessment details

Related party disclosure	No related party
Date of assessment	03/08/2023
Date of certificate	03/08/2023
Type of assessment	SAP, new dwelling

Building Regulations England Part L (BREL) Compliance Report

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

Date: Thu 03 Aug 2023 19:45:22

Project Information			
Assessed By	Matthew Fitzpatrick	Building Type	House, Semi-detached
OCDEA Registration	EES/004069	Assessment Date	2023-08-03

Dwelling Details			
Assessment Type	As designed	Total Floor Area	97 m ²
Site Reference	A 3.3	Plot Reference	001
Address	A 3.3 A 3.3, Chelmsford, CM2 0RG		

Client Details	
Name	Stonebond
Company	Stonebond Properties (Chelmsford) Ltd
Address	Stonebond House, Chelmsford, CM2 0RG

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	10.22 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	3.64 kgCO ₂ /m ²		OK

1b Target primary energy rate and dwelling primary energy			
Target primary energy	53.33 kWh _{PE} /m ²		
Dwelling primary energy	38.09 kWh _{PE} /m ²		OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	34.4 kWh/m ²		
Dwelling fabric energy efficiency	32.4 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	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.12	Suspended Ground Floor (0.12)	OK
Roofs	0.16	0.08	Roof (1) (0.08)	OK
Windows, doors, and roof windows	1.6	1.32	D02 (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)	88.86625	0.18
Party wall: Party Wall (1)	48.86	0 (!)
Ground floor: Suspended Ground Floor, Suspended Ground Floor	48.48	0.12
Exposed roof: Roof (1)	48.48	0.08 (!)

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]
D01, Front Door	2.6208	North	N/A	1.2
D02, Patio Door	5.2185	South	1.0	1.4
W01, Window	1.428	North	1.0	1.3
W02, Window	0.71925	North	1.0	1.3
W03, Window	1.632	North	1.0	1.3
W04, Window	1.2276	South	1.0	1.3
W05, Window	1.2276	South	1.0	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	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.134	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.063	
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.05	
External wall	E3: Sill	Calculated by person with suitable expertise	0.046	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.051	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.056	
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 (!)	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.062	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.043	
Party wall	P2: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.041	

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

4 Space heating

Main heating system 1: Heat pump with radiators or underfloor heating - Electricity		
Efficiency	241.7%	
Emitter type	Both radiators and underfloor	
Flow temperature	45°C	
System type	Heat Pump	
Manufacturer	Vaillant Group UK Ltd	
Model	aroTHERM plus 5kW + AI	
Commissioning		
Secondary heating system: N/A		
Fuel	N/A	
Efficiency	N/A	
Commissioning		

5 Hot water

Cylinder/store - type: Cylinder		
Capacity	200 litres	
Declared heat loss	1.2 kWh/day	
Primary pipework insulated	Yes	
Manufacturer		
Model		
Commissioning		
Waste water heat recovery system 1 - type: N/A		
Efficiency		
Manufacturer		
Model		

6 Controls

Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services		
Function		
Ecodesign class		
Manufacturer		
Model		

Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	75 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	0.08 W/(l/s)	OK
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model	Ultimate dMEV	
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		

Summary for Input Data

Property Reference	A 3.3	Issued on Date	03/08/2023
Assessment Reference	001	Prop Type Ref	A 3.3
Property	A 3.3, A 3.3, Chelmsford, CM2 0RG		

SAP Rating	84 B	DER	3.64	TER	10.22
Environmental	97 A	% DER < TER			64.38
CO ₂ Emissions (t/year)	0.33	DFEE	32.43	TFEE	34.36
Compliance Check	See BREL	% DFEE < TFEE			5.60
% DPER < TPER	28.58	DPER	38.09	TPER	53.33

Assessor Details	Mr. Matthew Fitzpatrick	Assessor ID	7601-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	North	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Semi-Detached	
Which Floor	0	
2.0 Number of Storeys	2	
3.0 Date Built	2023	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements			
	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	19.72 m	48.48 m ²	2.46 m
1st Storey:	19.72 m	48.48 m ²	2.76 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	27.56	m ²
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9.0 External Walls											
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type	
Brickwork	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	102.94	88.87	0.00	None	14.07	Calculate Wall Area	

9.1 Party Walls									
Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter		
Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill	0.00	110.00	48.86	0.00	None		

9.2 Internal Walls				
Description	Construction	Kappa (kJ/m ² K)	Area (m ²)	
Metal GF	Plasterboard on timber frame	9.00	85.09	
Metal FF	Plasterboard on timber frame	9.00	103.64	

10.0 External Roofs

Summary for Input Data



Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Cold Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.08	9.00	48.48	0.00	None	0.00	Calculate Wall Area	0.00

10.2 Internal Ceilings

Description	Storey	Construction	Area (m²)
Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	48.48

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Suspended Ground Floor	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	48.48

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1		Plasterboard ceiling, carpeted chipboard floor	9.00	48.48

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Front Door	Manufacturer	Solid Door	Double Low-E Soft 0.1		Air Filled	0.63	Wood	0.70	1.20
Window	BFRC, BSI or CERTASS data	Window	Double Low-E Soft 0.1		Air Filled	0.41	Wood	1.00	1.30
Patio Door	BFRC, BSI or CERTASS data	Window	Double Low-E Soft 0.1		Air Filled	0.39	Wood	1.00	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
D01	Front Door	Brickwork	North	2.62	0
D02	Patio Door	Brickwork	South	5.22	0
W01	Window	Brickwork	North	1.43	0
W02	Window	Brickwork	North	0.72	0
W03	Window	Brickwork	North	1.63	0
W04	Window	Brickwork	South	1.23	0
W05	Window	Brickwork	South	1.23	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E10 Eaves (insulation at ceiling level)	Independently assessed	10.36	0.13	0.13	No
E12 Gable (insulation at ceiling level)	Independently assessed	9.36	0.06	0.06	No
E1 Steel lintel with perforated steel base plate	Independently assessed	8.96	0.05	0.05	No
E3 Sill	Independently assessed	6.47	0.05	0.05	No
E4 Jamb	Independently assessed	19.80	0.05	0.05	No
E5 Ground floor (normal)	Independently assessed	19.72	0.06	0.06	No
E6 Intermediate floor within a dwelling	Independently assessed	19.72	0.00	0.00	No
E16 Corner (normal)	Independently assessed	10.44	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	10.44	0.06	0.06	No
P1 Party wall - Ground floor	Independently assessed	9.36	0.04	0.04	No
P2 Party wall - Intermediate floor within a dwelling	Independently assessed	9.36	0.00	0.00	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	9.36	0.04	0.04	No

Y-value	0.03	W/m²K
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18.0 Pressure Testing

Designed AP ₅₀	4.50	m³/(h.m²) @ 50 Pa
Property Tested?	Yes	
Test Method	Blower Door	
As Built AP ₅₀	0.10	m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation	
Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Mechanical extract ventilation - decentralised
MV Reference Number	500755
Duct Type	Rigid

Summary for Input Data

MVHR Efficiency	0.00
Wet Rooms	2
SFP from Installer Commissioning Certificate	No

19.1 Mechanical extract ventilation - Decentralised

SFP	Fan/Room Type	Count
0.15	In Room Fan Kitchen	0
0.11	In Room Fan Other Wet Room	2
0.00	In Duct Fan Kitchen	1
0.00	In Duct Fan Other Wet Room	0
0.11	Through Wall Fan Kitchen	0
0.09	Through Wall Fan Other Wet Room	0

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System	No
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22.0 Lighting

Lighting

No Fixed Lighting

No

Name	Efficacy	Power	Capacity	Count
Pendant	75.00	10	750	11
Downlight	75.00	18	1350	11

24.0 Main Heating 1

	Database	
Percentage of Heat	100.00	%
Database Ref. No.	104416	
Fuel Type	Electricity	
SAP Code	0	
In Winter	0.00	
In Summer	0.00	
Model Name	aroTHERM plus 5kW + AI	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2207	
Delayed Start Stat	Yes	
Burner Control	Modulating	
HETAS approved System	No	
Oil Pump Inside	No	
FI Case	0.00	
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in Concrete	
Flow Temperature	Enter value	
Flow Temperature Value	45.00	
Boiler Interlock	Yes	
Combi boiler type	Standard Combi	
Combi keep hot type	None	

25.0 Main Heating 2	None
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26.0 Heat Networks	None
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Summary for Input Data

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Bathroom	Combi boiler or unvented hot water system	9.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.20	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

34.0 Small-scale Hydro

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000 £3,500 - £5,500	£43 £245	B 86 A 93 0	A 97 A 99 0

Overview Report

Dwelling Address	A 3.3, A 3.3, Chelmsford, CM2 0RG
Report Date	03/08/2023
Property Type	House, Semi-Detached
Floor Area [m ²]	97

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.

Most energy efficient - lower running costs

CURRENT

POTENTIAL

(92 plus)

A

(81-91)

B

(69-80)

C

(55-68)

D

(39-54)

E

(21-38)

F

(1-20)

G

84

93

Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
-----------	------	---------	------	-----------

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.08 W/m ² K	Very Good
Floor	Average thermal transmittance 0.12 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, radiators and underfloor, electric	Average
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Good lighting efficiency	Good
Air tightness	Air permeability [AP50] = 4.5 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 36 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is: **0.3** per year

Overview Report

With the recommended measures the potential CO emissions could be: **0.1** per year

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical Yearly Saving	Potential Rating after measure installed	Cumulative savings (per year)	Cumulative Potential Rating
Solar water heating	£43	 2	£43	 B 86
Photovoltaic	£245	 7	£288	 A 93

Estimated energy use and potential savings

Estimated energy cost for this property over a year

£479

Over a year you could save

£288

The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details

Assessor name	Mr. Matthew Fitzpatrick
Assessor's accreditation number	EES/004069
Email Address	sap-epc@abbey-consultants.com

Accreditation scheme contact details

Accreditation scheme	Elmhurst Energy Systems Ltd
Telephone	01923 274427
Email Address	sap-epc@abbey-consultants.com

Assessment details

Related party disclosure	No related party
Date of assessment	03/08/2023
Date of certificate	03/08/2023
Type of assessment	SAP, new dwelling

Building Regulations England Part L (BREL) Compliance Report

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

Date: Wed 02 Aug 2023 09:03:32

Project Information			
Assessed By	Matthew Fitzpatrick	Building Type	House, Semi-detached
OCDEA Registration	EES/004069	Assessment Date	2023-08-02

Dwelling Details			
Assessment Type	As designed	Total Floor Area	65 m ²
Site Reference	A 1.2	Plot Reference	001
Address	A 1.2 A 1.2, Chelmsford, CM2 0RG		

Client Details	
Name	Stonebond
Company	Stonebond Properties (Chelmsford) Ltd
Address	Stonebond House, Chelmsford, CM2 0RG

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	12.55 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	4.25 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	65.84 kWh _{PE} /m ²		
Dwelling primary energy	44.67 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	36.6 kWh/m ²		
Dwelling fabric energy efficiency	34.5 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	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.12	Suspended Ground Floor (0.12)	OK
Roofs	0.16	0.08	Roof (1) (0.08)	OK
Windows, doors, and roof windows	1.6	1.31	D02 (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)	73.222	0.18
Party wall: Party Wall (1)	39.08	0 (!)
Ground floor: Suspended Ground Floor, Suspended Ground Floor	32.38	0.12
Exposed roof: Roof (1)	32.38	0.08 (!)

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]
D01, Front Door Side Panel	2.856	North	N/A	1.2
D02, Patio Door	3.801	South	1.0	1.4
W01, Window	0.71925	North	1.0	1.3
W02, Window	0.71925	North	1.0	1.3
W03, Window	0.822	North	1.0	1.3
W04, Window	1.9005	South	1.0	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	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.134	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.063	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.043	
Party wall	P2: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.041	
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.05	
External wall	E3: Sill	Calculated by person with suitable expertise	0.046	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.051	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.056	
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 (!)	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.054	
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.06	

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

4 Space heating

Main heating system 1: Heat pump with radiators or underfloor heating - Electricity		
Efficiency	252.5%	
Emitter type	Both radiators and underfloor	
Flow temperature	45°C	
System type	Heat Pump	
Manufacturer	Vaillant Group UK Ltd	
Model	aroTHERM plus 3.5kW + AI	
Commissioning		
Secondary heating system: N/A		
Fuel	N/A	
Efficiency	N/A	
Commissioning		

5 Hot water

Cylinder/store - type: Cylinder		
Capacity	150 litres	
Declared heat loss	1 kWh/day	
Primary pipework insulated	Yes	
Manufacturer		
Model		
Commissioning		
Waste water heat recovery system 1 - type: N/A		
Efficiency		
Manufacturer		
Model		

6 Controls

Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services		
Function		
Ecodesign class		
Manufacturer		
Model		

Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	75 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	0.17 W/(l/s)	OK
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model	Ultimate dMEV H	
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		

Summary for Input Data

Property Reference	A 1.2	Issued on Date	02/08/2023
Assessment Reference	001	Prop Type Ref	A 1.2
Property	A 1.2, A 1.2, Chelmsford, CM2 0RG		

SAP Rating	84 B	DER	4.25	TER	12.55
Environmental	97 A	% DER < TER			66.14
CO ₂ Emissions (t/year)	0.26	DFEE	34.53	TFEE	36.64
Compliance Check	See BREL	% DFEE < TFEE			5.77
% DPER < TPER	32.16	DPER	44.67	TPER	65.84

Assessor Details	Mr. Matthew Fitzpatrick	Assessor ID	7601-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	North	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Semi-Detached	
Which Floor	0	
2.0 Number of Storeys	2	
3.0 Date Built	2023	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	16.10 m	32.30 m ²	2.46 m
1st Storey:	16.10 m	32.38 m ²	2.76 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	25.73	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Brickwork	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	84.04	73.22	0.00	None	10.82	Calculate Wall Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill	0.00	110.00	39.08	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Metal GF	Plasterboard on timber frame	9.00	36.75
	Metal FF	Plasterboard on timber frame	9.00	47.92

10.0 External Roofs

Summary for Input Data



Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Cold Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.08	9.00	32.38	0.00	None	0.00	Calculate Wall Area	0.00

10.2 Internal Ceilings

Description	Storey	Construction	Area (m²)
Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	32.38

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Suspended Ground Floor	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	32.38

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1		Plasterboard ceiling, carpeted chipboard floor	9.00	32.38

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Front Door Side Panel Window	Manufacturer BFRC, BSI or CERTASS data	Half Glazed Door Window	Double Low-E Soft 0.1 Double Low-E Soft 0.1		Air Filled Air Filled	0.63 0.41	Wood Wood	0.70 1.00	1.20 1.30
Patio Door	BFRC, BSI or CERTASS data	Window	Double Low-E Soft 0.1		Air Filled	0.39	Wood	1.00	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
D01	Front Door Side Panel	Brickwork	North	2.86	0
D02	Patio Door	Brickwork	South	3.80	0
W01	Window	Brickwork	North	0.72	0
W02	Window	Brickwork	North	0.72	0
W03	Window	Brickwork	North	0.82	0
W04	Window	Brickwork	South	1.90	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E10 Eaves (insulation at ceiling level)	Independently assessed	8.32	0.13	0.13	No
E12 Gable (insulation at ceiling level)	Independently assessed	7.79	0.06	0.06	No
P1 Party wall - Ground floor	Independently assessed	7.79	0.04	0.04	No
P2 Party wall - Intermediate floor within a dwelling	Independently assessed	7.79	0.00	0.00	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	7.79	0.04	0.04	No
E1 Steel lintel with perforated steel base plate	Independently assessed	7.04	0.05	0.05	Yes
E3 Sill	Independently assessed	3.87	0.05	0.05	No
E4 Jamb	Independently assessed	17.10	0.05	0.05	Yes
E5 Ground floor (normal)	Independently assessed	16.10	0.06	0.06	Yes
E6 Intermediate floor within a dwelling	Independently assessed	16.10	0.00	0.00	Yes
E16 Corner (normal)	Independently assessed	10.44	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	10.44	0.06	0.06	No

Y-value W/m²K

18.0 Pressure Testing

Designed AP ₅₀	4.50	m³/(h.m²) @ 50 Pa
Property Tested?	Yes	
Test Method	Blower Door	
As Built AP ₅₀	0.10	m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation	
Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Mechanical extract ventilation - decentralised
MV Reference Number	500756
Duct Type	Rigid

Summary for Input Data

MVHR Efficiency	0.00
Wet Rooms	2
SFP from Installer Commissioning Certificate	No

19.1 Mechanical extract ventilation - Decentralised

SFP	Fan/Room Type	Count
0.15	In Room Fan Kitchen	1
0.11	In Room Fan Other Wet Room	2
0.00	In Duct Fan Kitchen	0
0.00	In Duct Fan Other Wet Room	0
0.11	Through Wall Fan Kitchen	0
0.09	Through Wall Fan Other Wet Room	0

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System	No
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22.0 Lighting

No Fixed Lighting	No				
	Name	Efficacy	Power	Capacity	Count
	Pendant	75.00	10	750	6
	Downlight	75.00	10	750	9

24.0 Main Heating 1

	Database	
Percentage of Heat	100.00	%
Database Ref. No.	104959	
Fuel Type	Electricity	
SAP Code	0	
In Winter	0.00	
In Summer	0.00	
Model Name	aroTHERM plus 3.5kW + AI	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2207	
Delayed Start Stat	Yes	
Burner Control	Modulating	
HETAS approved System	No	
Oil Pump Inside	No	
FI Case	0.00	
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	45.00	
Boiler Interlock	Yes	
Combi boiler type	No Combi	
Combi keep hot type	None	

25.0 Main Heating 2	None
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26.0 Heat Networks	None
--------------------	-----------------------------------

Summary for Input Data

Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None								
Heat source 2	None								
Heat source 3	None								
Heat source 4	None								
Heat source 5	None								

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Bathroom	Combi boiler or unvented hot water system	9.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.00	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

None

34.0 Small-scale Hydro

Electricity Generated	0.00	kWh/Year
Apportioned	0.00	
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000 £3,500 - £5,500	£46 £172	B 86 A 92 0	A 97 A 98 0

Overview Report

Dwelling Address	A 1.2, A 1.2, Chelmsford, CM2 0RG
Report Date	02/08/2023
Property Type	House, Semi-Detached
Floor Area [m ²]	65

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

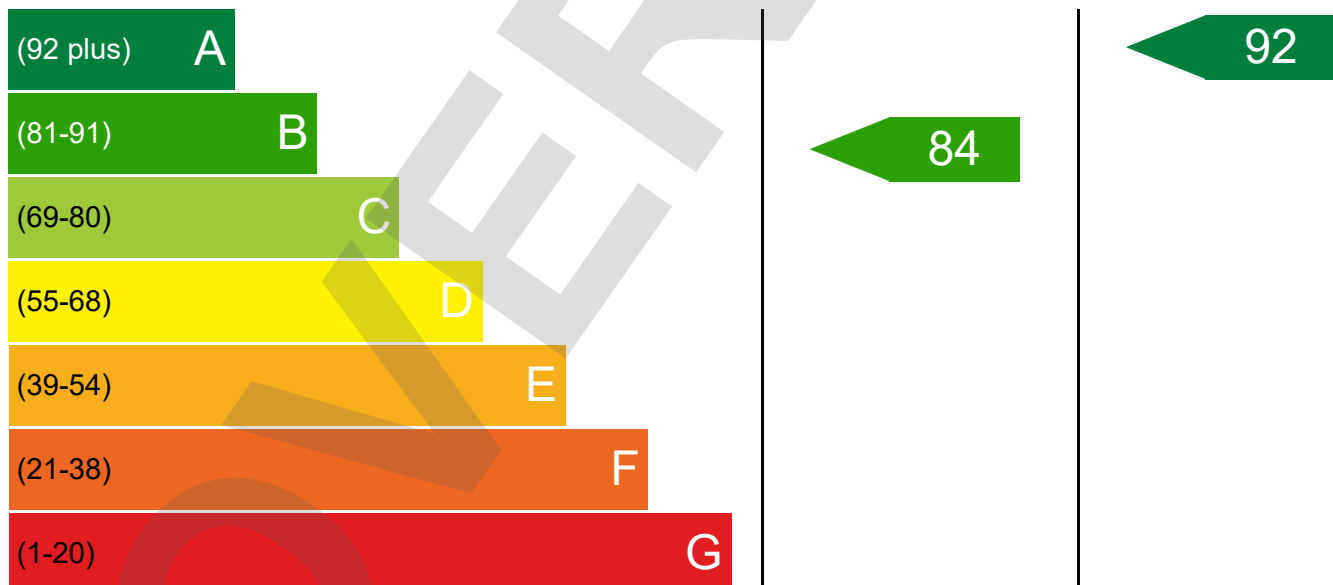
Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.

Most energy efficient - lower running costs

CURRENT

POTENTIAL



Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor

Poor

Average

Good

Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.08 W/m ² K	Very Good
Floor	Average thermal transmittance 0.12 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, radiators and underfloor, electric	Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Good lighting efficiency	Good
Air tightness	Air permeability [AP50] = 4.5 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 42 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is: **0.3** per year

Overview Report

With the recommended measures the potential CO emissions could be: **0.1** per year

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical Yearly Saving	Potential Rating after measure installed	Cumulative savings (per year)	Cumulative Potential Rating
Solar water heating	£46	 2	£46	 B 86
Photovoltaic	£172	 6	£218	 A 92

Estimated energy use and potential savings

Estimated energy cost for this property over a year

£380

Over a year you could save

£218

The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details

Assessor name	Mr. Matthew Fitzpatrick
Assessor's accreditation number	EES/004069
Email Address	sap-epc@abbey-consultants.com

Accreditation scheme contact details

Accreditation scheme	Elmhurst Energy Systems Ltd
Telephone	01923 274427
Email Address	sap-epc@abbey-consultants.com

Assessment details

Related party disclosure	No related party
Date of assessment	02/08/2023
Date of certificate	02/08/2023
Type of assessment	SAP, new dwelling

Building Regulations England Part L (BREL) Compliance Report

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

Date: Thu 03 Aug 2023 19:45:25

Project Information			
Assessed By	Matthew Fitzpatrick	Building Type	House, Semi-detached
OCDEA Registration	EES/004069	Assessment Date	2023-08-03

Dwelling Details			
Assessment Type	As designed	Total Floor Area	81 m ²
Site Reference	A 2.7	Plot Reference	001
Address	A 2.7 A 2.7, Chelmsford, CM2 0RG		

Client Details	
Name	Stonebond
Company	Stonebond Properties (Chelmsford) Ltd
Address	Stonebond House, Chelmsford, CM2 0RG

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	11.47 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	3.54 kgCO ₂ /m ²		OK

1b Target primary energy rate and dwelling primary energy			
Target primary energy	59.91 kWh _{PE} /m ²		
Dwelling primary energy	37.14 kWh _{PE} /m ²		OK

1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	36.8 kWh/m ²		
Dwelling fabric energy efficiency	34.7 kWh/m ²		OK

2a Fabric U-values				
Element	Maximum permitted average U-Value [W/m ² K]	Dwelling average U-Value [W/m ² K]	Element with highest individual U-Value	
External walls	0.26	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.12	Suspended Ground Floor (0.12)	OK
Roofs	0.16	0.08	Roof (1) (0.08)	OK
Windows, doors, and roof windows	1.6	1.31	D02 (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)	80.11345	0.18
Party wall: Party Wall (1)	45.88	0 (!)
Ground floor: Suspended Ground Floor, Suspended Ground Floor	40.6	0.12
Exposed roof: Roof (1)	40.6	0.08 (!)

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]
D01, Front Door	2.1483	North	N/A	1.2
D02, Patio Door	3.801	South	1.0	1.4
W01, Window	2.172	North	1.0	1.3
W02, Window	0.71925	South	1.0	1.3
W03, Window	2.172	North	1.0	1.3
W04, Window	2.172	South	1.0	1.3
W05, Window	0.822	East	1.0	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	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.134	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.063	
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.05	
External wall	E3: Sill	Calculated by person with suitable expertise	0.046	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.051	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.056	
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 (!)	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.053	
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.062	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.043	
Party wall	P2: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.041	

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

4 Space heating

Main heating system 1: Heat pump with radiators or underfloor heating - Electricity		
Efficiency	281.6%	
Emitter type	Both radiators and underfloor	
Flow temperature	45°C	
System type	Heat Pump	
Manufacturer	Vaillant Group UK Ltd	
Model	aroTHERM plus 7kW + AI	
Commissioning		
Secondary heating system: N/A		
Fuel	N/A	
Efficiency	N/A	
Commissioning		

5 Hot water

Cylinder/store - type: Cylinder		
Capacity	150 litres	
Declared heat loss	1 kWh/day	
Primary pipework insulated	Yes	
Manufacturer		
Model		
Commissioning		
Waste water heat recovery system 1 - type: N/A		
Efficiency		
Manufacturer		
Model		

6 Controls

Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services		
Function		
Ecodesign class		
Manufacturer		
Model		

Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	75 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	0.2 W/(l/s)	OK
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model	Ultimate dMEV	
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		

Summary for Input Data

Property Reference	A 2.7	Issued on Date	03/08/2023
Assessment Reference	001	Prop Type Ref	A 2.7
Property	A 2.7, A 2.7, Chelmsford, CM2 0RG		

SAP Rating	86 B	DER	3.54	TER	11.47
Environmental	97 A	% DER < TER			69.14
CO ₂ Emissions (t/year)	0.27	DFEE	34.67	TFEE	36.77
Compliance Check	See BREL	% DFEE < TFEE			5.69
% DPER < TPER	38.00	DPER	37.14	TPER	59.91

Assessor Details	Mr. Matthew Fitzpatrick	Assessor ID	7601-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	North	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Semi-Detached	
Which Floor	0	
2.0 Number of Storeys	2	
3.0 Date Built	2023	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	18.03 m	40.60 m ²	2.46 m
1st Storey:	18.03 m	40.60 m ²	2.76 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	37.41	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Brickwork	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	94.12	80.11	0.00	None	14.01	Calculate Wall Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill	0.00	110.00	45.88	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Metal GF	Plasterboard on timber frame	9.00	35.67
	Metal FF	Plasterboard on timber frame	9.00	67.32

10.0 External Roofs

Summary for Input Data



Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Cold Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.08	9.00	40.60	0.00	None	0.00	Calculate Wall Area	0.00

10.2 Internal Ceilings

Description	Storey	Construction	Area (m²)
Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	40.60

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Suspended Ground Floor	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	40.60

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1		Plasterboard ceiling, carpeted chipboard floor	9.00	40.60

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Front Door	Manufacturer	Half Glazed Door	Double Low-E Soft 0.1		Air Filled	0.63	Wood	0.70	1.20
Window	BFRC, BSI or CERTASS data	Window	Double Low-E Soft 0.1		Air Filled	0.41	Wood	1.00	1.30
Patio Door	BFRC, BSI or CERTASS data	Window	Double Low-E Soft 0.1		Air Filled	0.39	Wood	1.00	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
D01	Front Door	Brickwork	North	2.15	0
D02	Patio Door	Brickwork	South	3.80	0
W01	Window	Brickwork	North	2.17	0
W02	Window	Brickwork	South	0.72	0
W03	Window	Brickwork	North	2.17	0
W04	Window	Brickwork	South	2.17	0
W05	Window	Brickwork	East	0.82	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E10 Eaves (insulation at ceiling level)	Independently assessed	9.23	0.13	0.13	No
E12 Gable (insulation at ceiling level)	Independently assessed	7.90	0.06	0.06	No
E1 Steel lintel with perforated steel base plate	Independently assessed	9.63	0.05	0.05	No
E3 Sill	Independently assessed	6.80	0.05	0.05	No
E4 Jamb	Independently assessed	20.10	0.05	0.05	No
E5 Ground floor (normal)	Independently assessed	18.03	0.06	0.06	No
E6 Intermediate floor within a dwelling	Independently assessed	18.03	0.00	0.00	No
E16 Corner (normal)	Independently assessed	10.44	0.05	0.05	Yes
E18 Party wall between dwellings	Independently assessed	10.44	0.06	0.06	Yes
P1 Party wall - Ground floor	Independently assessed	8.79	0.04	0.04	No
P2 Party wall - Intermediate floor within a dwelling	Independently assessed	8.79	0.00	0.00	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	8.79	0.04	0.04	No

Y-value	0.04	W/m²K
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18.0 Pressure Testing

Designed AP ₅₀	Yes	
Property Tested?	4.50	m³/(h.m²) @ 50 Pa
Test Method	Yes	
As Built AP ₅₀	Blower Door	
	0.10	m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation	
Mechanical Ventilation System Present	Yes
Approved Installation	No
Mechanical Ventilation data Type	Database
Type	Mechanical extract ventilation - decentralised
MV Reference Number	500755
Duct Type	Rigid

Summary for Input Data

MVHR Efficiency	0.00
Wet Rooms	2
SFP from Installer Commissioning Certificate	No

19.1 Mechanical extract ventilation - Decentralised

SFP	Fan/Room Type	Count
0.15	In Room Fan Kitchen	1
0.15	In Room Fan Other Wet Room	2
0.00	In Duct Fan Kitchen	0
0.00	In Duct Fan Other Wet Room	0
0.11	Through Wall Fan Kitchen	0
0.14	Through Wall Fan Other Wet Room	0

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System	No
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22.0 Lighting

No Fixed Lighting	No				
	Name	Efficacy	Power	Capacity	Count
	Pendant	75.00	10	750	6
	Downlight	75.00	10	750	11

24.0 Main Heating 1

	Database	
Percentage of Heat	100.00	%
Database Ref. No.	104432	
Fuel Type	Electricity	
SAP Code	0	
In Winter	0.00	
In Summer	0.00	
Model Name	aroTHERM plus 7kW + AI	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2207	
Delayed Start Stat	Yes	
Burner Control	Modulating	
HETAS approved System	No	
Oil Pump Inside	No	
FI Case	0.00	
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	45.00	
Boiler Interlock	Yes	
Combi boiler type	Standard Combi	
Combi keep hot type	None	

25.0 Main Heating 2	None
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26.0 Heat Networks	None
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28.0 Water Heating

Summary for Input Data

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Bathroom	Combi boiler or unvented hot water system	9.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Insulation Thickness Type	Other	
Insulation Thickness	15	
Cylinder Volume	150.00	L
Loss	1.00	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

Thermal Store Pipework	within a single casing
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34.0 Small-scale Hydro

Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000 £3,500 - £5,500	£38 £238	B 87 A 95 0	A 97 A 100 0

Overview Report

Dwelling Address	A 2.7, A 2.7, Chelmsford, CM2 0RG
Report Date	03/08/2023
Property Type	House, Semi-Detached
Floor Area [m ²]	81

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

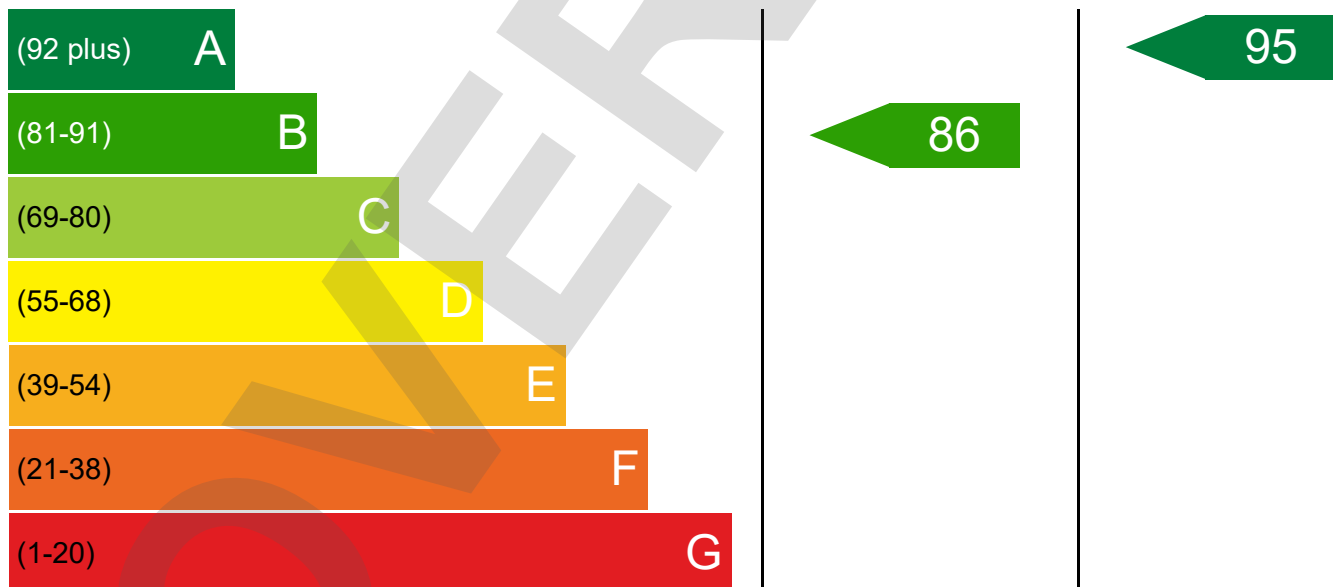
Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.

Most energy efficient - lower running costs

CURRENT

POTENTIAL



Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor

Poor

Average

Good

Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.08 W/m ² K	Very Good
Floor	Average thermal transmittance 0.12 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, radiators and underfloor, electric	Good
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Good lighting efficiency	Good
Air tightness	Air permeability [AP50] = 4.5 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 35 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is: **0.3** per year

Overview Report

With the recommended measures the potential CO emissions could be: **0.0** per year

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical Yearly Saving	Potential Rating after measure installed	Cumulative savings (per year)	Cumulative Potential Rating
Solar water heating	£38	 1	£38	 B 87
Photovoltaic	£238	 8	£277	 A 95

Estimated energy use and potential savings

Estimated energy cost for this property over a year

£394

Over a year you could save

£277

The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details

Assessor name	Mr. Matthew Fitzpatrick
Assessor's accreditation number	EES/004069
Email Address	sap-epc@abbey-consultants.com

Accreditation scheme contact details

Accreditation scheme	Elmhurst Energy Systems Ltd
Telephone	01923 274427
Email Address	sap-epc@abbey-consultants.com

Assessment details

Related party disclosure	No related party
Date of assessment	03/08/2023
Date of certificate	03/08/2023
Type of assessment	SAP, new dwelling

Building Regulations England Part L (BREL) Compliance Report

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

Date: Thu 03 Aug 2023 19:45:22

Project Information			
Assessed By	Matthew Fitzpatrick	Building Type	House, Semi-detached
OCDEA Registration	EES/004069	Assessment Date	2023-08-03

Dwelling Details			
Assessment Type	As designed	Total Floor Area	94 m ²
Site Reference	A 3.6	Plot Reference	00.1
Address	A 3.3 A 3.3, Chelmsford, CM2 0RG		

Client Details	
Name	Stonebond
Company	Stonebond Properties (Chelmsford) Ltd
Address	Stonebond House, Chelmsford, CM2 0RG

This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.

1a Target emission rate and dwelling emission rate			
Fuel for main heating system	Electricity		
Target carbon dioxide emission rate	11.24 kgCO ₂ /m ²		
Dwelling carbon dioxide emission rate	4.03 kgCO ₂ /m ²		OK
1b Target primary energy rate and dwelling primary energy			
Target primary energy	58.67 kWh _{PE} /m ²		
Dwelling primary energy	42.02 kWh _{PE} /m ²		OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency			
Target fabric energy efficiency	39.5 kWh/m ²		
Dwelling fabric energy efficiency	38.0 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	0.18	Walls (1) (0.18)	OK
Party walls	0.2	0	Party Wall (1) (0)	N/A
Curtain walls	1.6	0	N/A	N/A
Floors	0.18	0.12	Suspended Ground Floor (0.12)	OK
Roofs	0.16	0.08	Roof (1) (0.08)	OK
Windows, doors, and roof windows	1.6	1.31	D02 (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)	80.11685	0.18
Party wall: Party Wall (1)	46.52	0 (!)
Ground floor: Suspended Ground Floor, Suspended Ground Floor	46.87	0.12
Exposed roof: Roof (1)	46.87	0.08 (!)

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]
D01, Front Door	2.6208	North	N/A	1.2
D02, Patio Door	5.2185	East	1.0	1.4
W01, Window	1.428	North	1.0	1.3
W02, Window	0.71925	North	1.0	1.3
W03, Window	1.632	North	1.0	1.3
W04, Window	1.902	West	1.0	1.3
W05, Window	1.07415	East	1.0	1.3
W06, Window	1.632	North	1.0	1.3
W07, Window	0.71925	North	1.0	1.3
W08, Window	1.2276	North	1.0	1.3
W09, Window	1.902	West	1.0	1.3
W10, Window	1.2276	East	1.0	1.3

Name	Area [m ²]	Orientation	Frame factor	U-Value [W/m ² K]
2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part 1 - Main Dwelling: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E10: Eaves (insulation at ceiling level)	Calculated by person with suitable expertise	0.134	
External wall	E12: Gable (insulation at ceiling level)	Calculated by person with suitable expertise	0.063	
External wall	E1: Steel lintel with perforated steel base plate	Calculated by person with suitable expertise	0.05	
External wall	E3: Sill	Calculated by person with suitable expertise	0.046	
External wall	E4: Jamb	Calculated by person with suitable expertise	0.051	
External wall	E5: Ground floor (normal)	Calculated by person with suitable expertise	0.056	
External wall	E6: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 (!)	
External wall	E16: Corner (normal)	Calculated by person with suitable expertise	0.05	
External wall	E18: Party wall between dwellings	Calculated by person with suitable expertise	0.062	
Party wall	P1: Ground floor	Calculated by person with suitable expertise	0.043	
Party wall	P2: Intermediate floor within a dwelling	Calculated by person with suitable expertise	0 (!)	
Party wall	P4: Roof (insulation at ceiling level)	Calculated by person with suitable expertise	0.041	
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		4.5 m ³ /hm ² , Design value		OK
Air permeability test certificate reference				
4 Space heating				
Main heating system 1: Heat pump with radiators or underfloor heating - Electricity				
Efficiency	239.2%			
Emitter type	Both radiators and underfloor			
Flow temperature	45°C			
System type	Heat Pump			
Manufacturer	Vaillant Group UK Ltd			
Model	aroTHERM plus 5kW + AI			
Commissioning				
Secondary heating system: N/A				
Fuel	N/A			
Efficiency	N/A			
Commissioning				
5 Hot water				
Cylinder/store - type: Cylinder				
Capacity	200 litres			
Declared heat loss	1.2 kWh/day			
Primary pipework insulated	Yes			
Manufacturer				
Model				
Commissioning				
Waste water heat recovery system 1 - type: N/A				
Efficiency				
Manufacturer				
Model				

6 Controls		
Main heating 1 - type: Time and temperature zone control by arrangement of plumbing and electrical services		
Function		
Ecodesign class		
Manufacturer		
Model		
Water heating - type: Cylinder thermostat and HW separately timed		
Manufacturer		
Model		
7 Lighting		
Minimum permitted light source efficacy	75 lm/W	
Lowest light source efficacy	75 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	0.08 W/(l/s)	OK
Minimum permitted heat recovery efficiency	N/A	
Heat recovery efficiency	N/A	N/A
Manufacturer/Model	Ultimate dMEV	
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		

Summary for Input Data

Property Reference	A 3.6	Issued on Date	03/08/2023
Assessment Reference	00.1	Prop Type Ref	A 3.3
Property	A 3.3, A 3.3, Chelmsford, CM2 0RG		

SAP Rating	83 B	DER	4.03	TER	11.24
Environmental	96 A	% DER < TER			64.15
CO ₂ Emissions (t/year)	0.35	DFEE	37.98	TFEE	39.52
Compliance Check	See BREL	% DFEE < TFEE			3.89
% DPER < TPER	28.38	DPER	42.02	TPER	58.67

Assessor Details	Mr. Matthew Fitzpatrick	Assessor ID	7601-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	North	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Semi-Detached	
Which Floor	0	
2.0 Number of Storeys	2	
3.0 Date Built	2023	
3.0 Property Age Band	L	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m ²	0.00 m
Ground floor:	19.43 m	46.87 m ²	2.46 m
1st Storey:	19.43 m	46.87 m ²	2.76 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	15.94	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Brickwork	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	101.42	80.12	0.00	None	21.30	Calculate Wall Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall 1	Filled Cavity with Edge Sealing	Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill	0.00	110.00	46.52	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Metal GF	Plasterboard on timber frame	9.00	83.68
	Metal FF	Plasterboard on timber frame	9.00	101.73

10.0 External Roofs

Summary for Input Data



Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
Cold Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.08	9.00	46.87	0.00	None	0.00	Calculate Wall Area	0.00

10.2 Internal Ceilings

Description	Storey	Construction	Area (m²)
Internal Ceiling 1	Lowest occupied	Plasterboard ceiling, carpeted chipboard floor	46.87

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Suspended Ground Floor	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	46.87

11.2 Internal Floors

Description	Storey Index	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Floor 1		Plasterboard ceiling, carpeted chipboard floor	9.00	46.87

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Front Door	Manufacturer	Solid Door	Double Low-E Soft 0.1		Air Filled	0.63	Wood	0.70	1.20
Window	BFRC, BSI or CERTASS data	Window	Double Low-E Soft 0.1		Air Filled	0.41	Wood	1.00	1.30
Patio Door	BFRC, BSI or CERTASS data	Window	Double Low-E Soft 0.1		Air Filled	0.39	Wood	1.00	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
D01	Front Door	Brickwork	North	2.62	0
D02	Patio Door	Brickwork	East	5.22	0
W01	Window	Brickwork	North	1.43	0
W02	Window	Brickwork	North	0.72	0
W03	Window	Brickwork	North	1.63	0
W04	Window	Brickwork	West	1.90	0
W05	Window	Brickwork	East	1.07	0
W06	Window	Brickwork	North	1.63	0
W07	Window	Brickwork	North	0.72	0
W08	Window	Brickwork	North	1.23	0
W09	Window	Brickwork	West	1.90	0
W10	Window	Brickwork	East	1.23	0

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E10 Eaves (insulation at ceiling level)	Independently assessed	8.92	0.13	0.13	No
E12 Gable (insulation at ceiling level)	Independently assessed	10.52	0.06	0.06	No
E1 Steel lintel with perforated steel base plate	Independently assessed	14.86	0.05	0.05	No
E3 Sill	Independently assessed	12.38	0.05	0.05	No
E4 Jamb	Independently assessed	31.20	0.05	0.05	No
E5 Ground floor (normal)	Independently assessed	19.43	0.06	0.06	No
E6 Intermediate floor within a dwelling	Independently assessed	19.43	0.00	0.00	No
E16 Corner (normal)	Independently assessed	10.44	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	10.44	0.06	0.06	No
P1 Party wall - Ground floor	Independently assessed	8.91	0.04	0.04	No
P2 Party wall - Intermediate floor within a dwelling	Independently assessed	8.91	0.00	0.00	No
P4 Party wall - Roof (insulation at ceiling level)	Independently assessed	8.91	0.04	0.04	No

Y-value W/m²K

18.0 Pressure Testing

Designed AP₅₀ m³/(h.m²) @ 50 Pa

Property Tested?

Test Method

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Summary for Input Data

Type	Mechanical extract ventilation - decentralised
MV Reference Number	500755
Duct Type	Rigid
MVHR Efficiency	0.00
Wet Rooms	2
SFP from Installer Commissioning Certificate	No

19.1 Mechanical extract ventilation - Decentralised

SFP	Fan/Room Type	Count
0.15	In Room Fan	0
	Kitchen	
0.11	In Room Fan Other	2
	Wet Room	
0.00	In Duct Fan Kitchen	1
0.00	In Duct Fan Other	0
	Wet Room	
0.11	Through Wall Fan	0
	Kitchen	
0.09	Through Wall Fan	0
	Other Wet Room	

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System	No
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22.0 Lighting

No Fixed Lighting	No				
Name	Efficacy	Power	Capacity	Count	
Pendant	75.00	10	750	8	
Downlight	75.00	18	1350	9	

24.0 Main Heating 1

Database		
Percentage of Heat	100.00	%
Database Ref. No.	104416	
Fuel Type	Electricity	
SAP Code	0	
In Winter	0.00	
In Summer	0.00	
Model Name	aroTHERM plus 5kW + AI	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2207	
Delayed Start Stat	Yes	
Burner Control	Modulating	
HETAS approved System	No	
Oil Pump Inside	No	
FI Case	0.00	
Flue Type	None or Unknown	
Fan Assisted Flue	No	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in Concrete	
Flow Temperature	Enter value	
Flow Temperature Value	45.00	
Boiler Interlock	Yes	
Combi boiler type	Standard Combi	
Combi keep hot type	None	

Summary for Input Data

25.0 Main Heating 2

26.0 Heat Networks

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1	None									
Heat source 2	None									
Heat source 3	None									
Heat source 4	None									
Heat source 5	None									

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Summer Immersion	No
Cold Water Source	From mains
Bath Count	1
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To
Bathroom	Combi boiler or unvented hot water system	9.00		No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder

Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.20	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store

34.0 Small-scale Hydro

	None	
Electricity Generated	0.00	
Apportioned	0.00	kWh/Year
Connected to dwelling's electricity meter	Yes	
Electricity Generation	Annual	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000 £3,500 - £5,500	£44 £244	B 84 A 92 0	A 97 A 99 0

Overview Report

Dwelling Address	A 3.3, A 3.3, Chelmsford, CM2 0RG
Report Date	03/08/2023
Property Type	House, Semi-Detached
Floor Area [m ²]	94

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

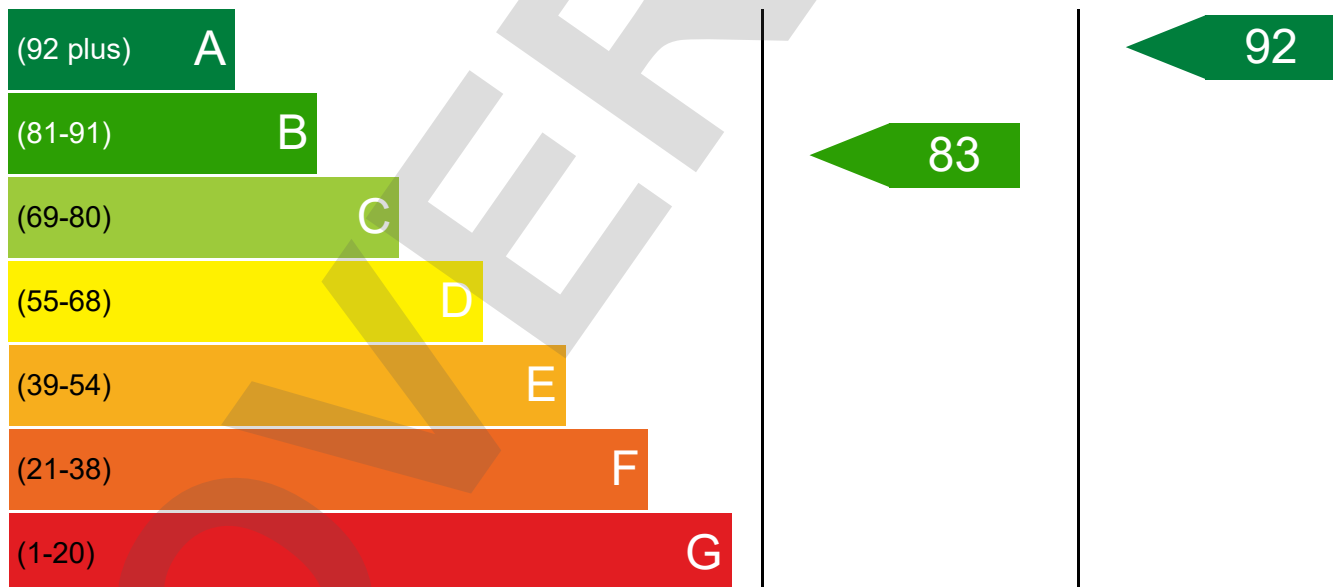
Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.

Most energy efficient - lower running costs

CURRENT

POTENTIAL



Least energy efficient - higher running costs

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor	Poor	Average	Good	Very Good
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Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.18 W/m ² K	Very Good
Roof	Average thermal transmittance 0.08 W/m ² K	Very Good
Floor	Average thermal transmittance 0.12 W/m ² K	Very Good
Windows	High performance glazing	Good
Main heating	Air source heat pump, radiators and underfloor, electric	Average
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	None	
Hot water	From main system	Good
Lighting	Good lighting efficiency	Good
Air tightness	Air permeability [AP50] = 4.5 m ³ /h.m ² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 39 kilowatt hour (kWh) per square metre

Estimated CO₂ emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is: **0.3** per year

Overview Report

With the recommended measures the potential CO emissions could be: **0.1** per year

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling. To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed. Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical Yearly Saving	Potential Rating after measure installed	Cumulative savings (per year)	Cumulative Potential Rating
Solar water heating	£44	 1	£44	 B 84
Photovoltaic	£244	 8	£288	 A 92

Estimated energy use and potential savings

Estimated energy cost for this property over a year

£506

Over a year you could save

£288

The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Assessor contact details

Assessor name	Mr. Matthew Fitzpatrick
Assessor's accreditation number	EES/004069
Email Address	sap-epc@abbey-consultants.com

Accreditation scheme contact details

Accreditation scheme	Elmhurst Energy Systems Ltd
Telephone	01923 274427
Email Address	sap-epc@abbey-consultants.com

Assessment details

Related party disclosure	No related party
Date of assessment	03/08/2023
Date of certificate	03/08/2023
Type of assessment	SAP, new dwelling

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- A4.1 The report is based on information available at the time of the writing and discussions with the client during any project meetings. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by Iceni Projects Ltd for inaccuracies in the data supplied by any other party.
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 - A4.3 No site visits have been carried out, unless otherwise specified.
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