

JOSTEC

BUILDING REGULATIONS COMPLIANCE SERVICES



SUSTAINABILITY STATEMENT

George Street, Caversham, Reading, RG4 8BY

JosTec Ref: 23796
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Prepared for: The Keen Partnership

Version:SS1

Contents

1. Introduction	5
2. Planning Policy	6
2.1. National Policy Framework – Policy 14. (December 2023)	6
2.2. Local Policy – Reading Borough Local Plan.....	7
2.3. Reading Borough Local Plan – Policy H5: Standards For New Housing.....	7
2.4. Reading Borough Local Plan – Policy CC2: Sustainable Design and Construction	7
2.5. Reading Borough Local Plan – Policy CC3: Adaptation To Climate Change	8
2.6. Building Regulations – England Approved Document L.....	8
2.7. Assessment Methodology Domestic (SAP)	9
3. Proposed Development.....	10
4. Energy	11
4.1. Baseline Calculation	12
4.2. Building Fabric - Residential	13
4.3. HVAC - Residential	13
4.4. Green Energy – Use of Renewable Technology.....	14
5. Overheating	16
5.1. Common Causes.....	17
5.2. Location.....	17
5.3. Building Design.....	17
5.4. Occupants.....	18
5.5. Mitigation.....	18
5.6. Solar shading	19
5.7. Thermal Mass.....	19
5.8. Ventilation	20
5.9. Calculating Overheating Risk	20
5.10. Part O Outline	21
5.11. Buildings Covered by Part O	21
5.12. Part O Calculation	21
5.13. Simplified Method:	21
5.14. Dynamic Thermal Modelling:	21

6. Water	22
6.1. Water consumption targets	23
6.2. Reusing water	23
6.3. Metering	23
6.4. Surface Water Flooding.....	23
6.5. Flooding Resilience and Resistance.....	23
7. Pollution & Diversity	25
6.6. Nature Conservation and Biodiversity	26
6.6.1. Protecting Species and Promoting the Protection and planting of Trees.	26
6.6.2. Designing development proposals	26
6.7. Air Pollution	26
6.7.1. Assessment Requirements.....	26
6.7.2. Construction and Demolition.....	26
6.7.3. Design and Occupation	26
6.8. Noise.....	26
6.8.1. Sources of Noise	26
6.8.2. Mitigation of Noise emitted by the development	26
6.8.3. Mitigation of Noise impacts on the development.....	26
6.9. Light Pollution	27
6.9.1. Type of Light Pollution	27
6.9.2. Potential Effects	27
6.9.3. Lighting Design to minimize the impacts	27
6.10. Water Pollution.....	27
6.10.1. How Sustainable Drainage contributes to water quality	27
6.10.2. Connection of New Developments to the Sewer Network.....	27
7. Conclusion	28

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1. Introduction

This Sustainability Statement has been prepared by JosTec in support of the planning application for the proposed construction of a new residential development to contain five dwellings at George Street, Caversham, RG4 8BY.

Using approved calculation methods (SAP 2012) we can produce predicted carbon reductions above the minimum baseline rates through enhanced building fabric and by exploring the use of low and zero carbon technologies, including potential local decentralised energy projects.

2. Planning Policy

This Sustainability Statement has been prepared by JosTec in support of the planning application for the proposed construction of a new residential development to contain six dwellings over three floors at 59 Elm Avenue, Ruislip, HA4 8PE.

Using approved calculation methods (SAP 2012) we can produce predicted carbon reductions above the minimum baseline rates through enhanced building fabric and by exploring the use of low and zero carbon technologies, including potential local decentralised energy projects.

2.1. National Policy Framework – Policy 14. (December 2023)

160. To help increase the use and supply of renewable and low carbon energy and heat, plans should:

- a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);
- b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
- c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

162. In determining planning applications, local planning authorities should expect new development to:

- a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and
- b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

163. When determining planning applications⁵⁷ for renewable and low carbon development, local planning authorities should:

- a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to significant cutting greenhouse gas emissions;
- b) approve the application if its impacts are (or can be made) acceptable⁵⁸. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas; and
- c) in the case of applications for the repowering and life-extension of existing renewable sites, give significant weight to the benefits of utilising an established site, and approve the proposal if its impacts are or can be made acceptable.

164. In determining planning applications, local planning authorities should give significant weight to the need to support energy efficiency and low carbon heating improvements to existing buildings, both domestic and non-domestic (including

2.2. Local Policy – Reading Borough Local Plan

The three planning policies affecting the sustainable design are:

- Policy H5 – Standards For New Housing
- Policy CC2 – Sustainable Design and Construction
- Policy CC3 – Adaption To Climate Change

2.3. Reading Borough Local Plan – Policy H5: Standards For New Housing

New build housing should be built to the following standards, unless it can be clearly demonstrated that this would render a development unviable:

- a. All new build housing outside the Central Area as defined on the Proposals Map will comply with the nationally-described space standard.
- b. All new build housing will be built to the higher water efficiency standard under Regulation 36(3) of the Building Regulations⁷⁹
- c. All major new-build residential development should be designed to achieve zero carbon homes.
- d. All other new build housing will achieve at a minimum a 19% improvement in the dwelling emission rate over the target emission rate, as defined in the 2013 Building Regulations.
- e. All new build housing will be accessible and adaptable in line with M4(2) of the Building Regulations, unless it is built in line with M4(3) (see below).
- f. On developments of 20 or more new build dwellings, at least 5% of dwellings will be wheelchair user dwellings in line with M4(3) of the Building Regulations. Any market homes provided to meet this requirement will be 'wheelchair adaptable' as defined in part M, whilst homes where the Council is responsible for allocating or nominating an individual may be 'wheelchair accessible'.

2.4. Reading Borough Local Plan – Policy CC2: Sustainable Design and Construction

Proposals for new development, including the construction of new buildings and the redevelopment and refurbishment of existing building stock, will be acceptable where the design of buildings and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.

To meet these requirements:

- All major non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Excellent' standards, where possible;
- All minor non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Very Good' standard as a minimum;
- All non-residential development or conversions to residential should incorporate water conservation measures so that predicted per capita consumption does not exceed the appropriate levels set out in the applicable BREEAM standard. Both residential and non-residential development should include recycling grey water and rainwater harvesting where systems are energy and cost effective.

2.5. Reading Borough Local Plan – Policy CC3: Adaptation To Climate Change

All developments will demonstrate how they have been designed to incorporate measures to adapt to climate change. The following measures shall be incorporated into development:

- Wherever possible, new buildings shall be orientated to maximise the opportunities for both natural heating and ventilation and reducing exposure to wind and other elements;
- Proposals involving both new and existing buildings shall demonstrate how they have been designed to maximise resistance and resilience to climate change for example by including measures such as solar shading, thermal mass, heating and ventilation of the building and appropriately coloured materials in areas exposed to direct sunlight, green and brown roofs, green walls, etc;
- Use of trees and other planting, where appropriate as part of a landscape scheme, to provide shading of amenity areas, buildings and streets and to help to connect habitat, designed with native plants that are carefully selected, managed and adaptable to meet the predicted changed climatic conditions; and
- All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change.

2.6. Building Regulations – England Approved Document L

Approved document L1 – Conservation of Fuel and Power sets the standard for carbon emissions for new dwellings. Residential development will need to comply with the criteria set out in the document, as follows:

1. The predicted Dwelling Emission Rate of CO₂ emissions from dwellings (DER) are not greater than the Target Emission Rate (TER).
2. The predicted Dwelling Primary Energy Rate from dwellings (DPER) are not greater than the Target Primary Energy Rate (TPER)
3. The performance of the building fabric and fixed building services should be no worse than the design limits set out in the Approved Document.
4. The dwellings will have appropriate passive control measures to limit the effect of solar gains on indoor temperatures in summer.
5. That the performance of dwellings as built comply with the DER values achieved, including site testing of a representative sample of dwellings demonstrating that the 'air permeability' rate achieved is as per that specified, or better.
6. The necessary provisions for energy-efficient operation of dwellings are put in place, including operation and maintenance instructions aimed at achieving economy in the use of fuel and power in a way that householders can understand.

Compliance with the Approved Document Parts L1 should be demonstrated at the detailed design stage, prior to construction. The Keen Partnership have stressed they do not want SAP calculations carried out to support this sustainability statement.

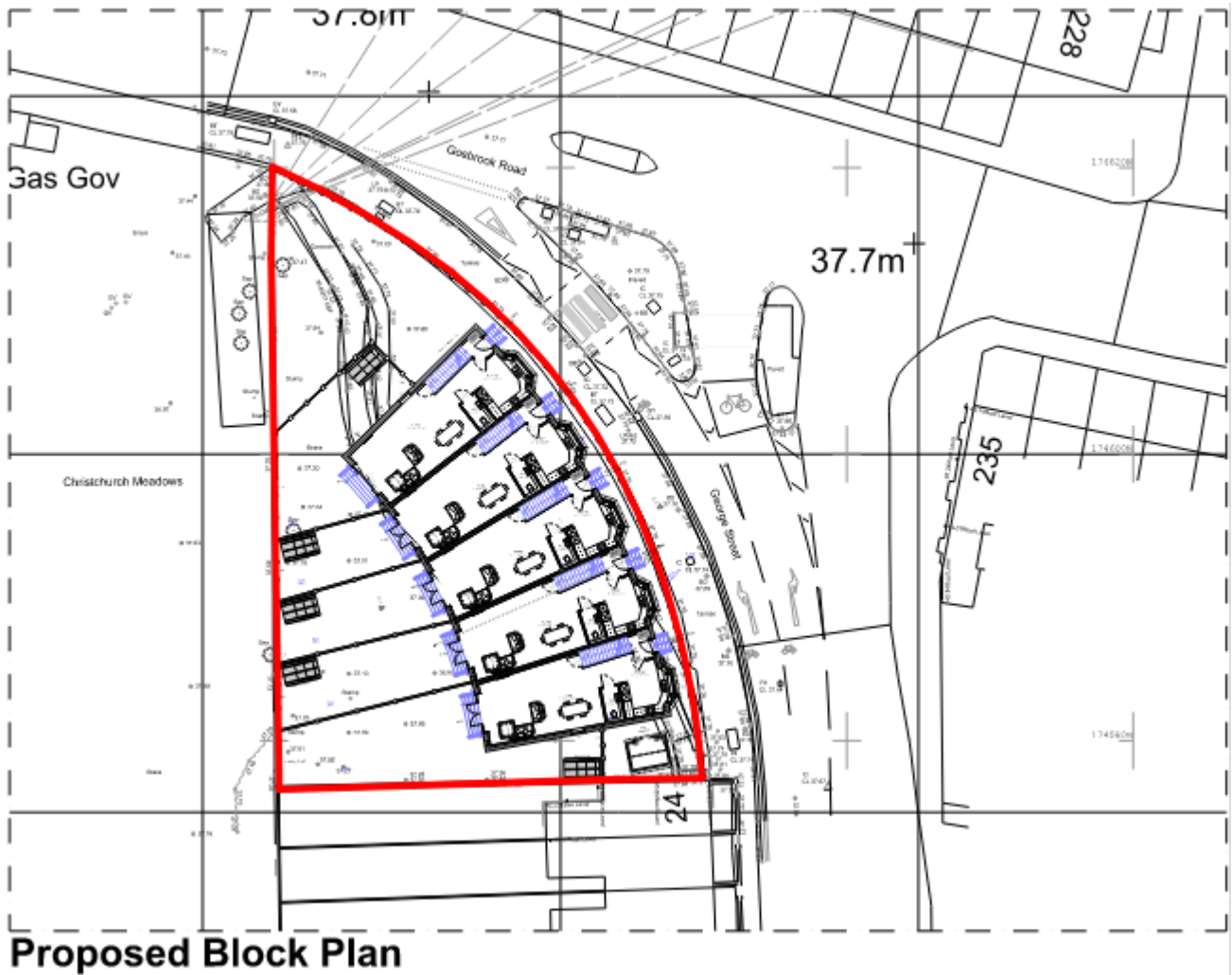
2.7. Assessment Methodology Domestic (SAP)

The Standard Assessment Procedure (SAP) is the official methodology endorsed by the Government for evaluating the projected energy consumption and carbon dioxide emissions of new constructions. The outcomes are determined based on the building's floor area and account for energy usage (kWh/m²/yr) as well as the associated CO₂ emissions (kg.CO₂/m²/yr). These calculations encompass the following factors:

- Space heating
- Domestic hot water
- Ventilation
- Lighting
- Ancillary pumps and fans
- Energy generating technology.

A trained and accredited Elmhurst Energy Assessor has used Elmhurst Design SAP 2012 (4.14r19) & SAP 10 software to assess compliance and generate the necessary results data.

3. Proposed Development



The Proposed Development consists of five 2 storey residential houses located south-west of the intersection of Gosbrook Road and George Street.

4. Energy

The Keen Partnership has asked JosTec to prepare this report without carrying out any SAP calculations.

The 2013 Building Regulations referred to within Reading Borough Local Plan are the Approved Document L1A 2012: Conservation of Fuel and Power – Edition 2013 incorporating 2016 amendments. For the ease of this document, we will refer to this as “Part L 2012 Building Regulations or ADL: 2012”.

4.1. Baseline Calculation

The development is subject to 19% Carbon Emissions Reduction compared to the notional building described above. This is as per the latest Reading Borough Local Plan.

A fabric-first approach will be followed, incorporating passive design measures such as low u-values, low air leakage and low thermal bridging.

Active design measures have then been incorporated via energy-efficient building services, such as 100% low-energy lighting, and an air source heat pump.

We can suggest several options to reduce the Dwelling Emission Rates (DER) in order to comply with the Reading Borough Local Plan target requirements.

This section outlines the proposals for specifying building fabric and services beyond the requirements of Building Regulations (the baseline).

Fundamental to achieving energy efficiency in any new building is the specification of a thermally efficient building envelope. Passive design features such as high levels of insulation, designing to maximise solar gain and limiting heat loss through reduced air leakage and enhanced thermal bridging are all proven techniques to reduce energy consumption and emissions.

The baseline “compliant” case for emissions will be determined by using the Target Emissions Rates (TER) from the compliance calculations. These figures provide an emission rate, and hence a figure for acceptable total regulated emissions from a dwelling.

The emissions saving from efficiency measures will be determined by comparing the total emissions based on the TER figures with the predicted emissions based on the actual proposed specification. The emissions saving from the low and zero-carbon technologies will be calculated separately and incorporated into the final residential results using the SAP methodology.

4.2. Building Fabric - Residential

Limited assumptions have been made on this development to meet the fabric efficiency targets for Building Regulations 2013 as the majority of the specification has been provided by the client.

Compliance has been achieved by aiming for values corresponding to the prescribed notional U-values specified in Table 1.1: Summary of concurrent notional dwelling specification, as outlined in Approved Document L 2012. The Target Fabric Energy Efficiency (TFEE) has been successfully met by targeting a thermal bridging Y Value lower than 0.150. This will likely entail incorporating improved thermal bridging details into the design to minimize heat losses.

Table 2 shows the proposed building fabric specification applied to the SAP calculations with respect to the upper limits stipulated by Part L: 2012. The values represent in some areas a significant bettering of the mandatory requirements set out in the current Building Regulations

Fabric	ADL:2012 Limiting U-Values W/m²K	Proposed Values W/m²K
Walls	0.30	0.17
Roof	0.20	0.09 – 0.13
Floor	0.25	0.11
Windows	2.00	1.0 – 1.2
Doors	2.00	1.20
Air Permeability	10.0 m³ / (h. m²) at 50 Pa	5.0 m³ / (h. m²) at 50 Pa
Ventilation	Natural Ventilation (openable windows + trickle vents)	Natural Ventilation (openable windows + trickle vents)
Thermal bridging	Default Psi Values Y = 0.05	Psi Values Calculated

Table 2. Suggested Building Fabric Specification

4.3. HVAC - Residential

For the early design stage, space heating and domestic hot water (DHW) will be supplied by an 89.5% efficient combi boiler, adhering to the guidance provided. To ensure energy efficiency, heating controls will be implemented, including a programmer with independent time and temperature zone controls, in accordance with Part L 2012 Approved Document. These controls will enable effective management of heating requirements based on specific zones and desired temperature settings.

The dwelling will be ventilated primarily through natural means, utilizing openable windows and trickle vents. Additionally, in the wet room areas and kitchen, demand-controlled mechanical extract ventilation (dMEV) systems will be installed. These systems will provide efficient and targeted extraction of air in specific areas where moisture and pollutants are likely to be generated, ensuring a healthy and comfortable indoor environment.

To promote energy efficiency, low-energy lighting will be selected for the development. In accordance with the Domestic Building Services Compliance Guide (DBSCG), the specified lighting will possess a luminous efficacy exceeding 45 lumens per circuit watt and an output greater than 400 lamp lumens. This requirement is typically met by utilizing LED or compact fluorescent lights, rather than low-voltage Halogen variants. By opting for these energy-saving lighting options, the development can reduce its overall electricity consumption and contribute to sustainability objectives.

Element	Specification
Boilers	89.5% Efficiency
Heating emitter	Radiators
Heating control	Time and temperature zone control.
Domestic hot water	From the main heating system
Water consumption	≤125 litres/person/day
Internal fixed lighting	100% low energy
Ventilation	Natural Ventilation (openable windows + trickle vents) + Intermittent extract
Thermal bridging	Psi Values Calculated
Thermal mass parameter	Calculated

Table 3. Building HVAC/TMP

4.4. Green Energy – Use of Renewable Technology

The CO₂ emissions resulting from the implementation of 'Fabric First' measures have been evaluated and compared to the baseline CO₂ emissions. Reductions in CO₂ emissions have been observed at each stage, to tackle the next stage – 'Green Energy' where the impact of renewable energy generation will be assessed.

Renewable energy is characterized as energy derived from naturally occurring and replenishable energy sources in the environment. Unlike fossil fuels or nuclear power, which can be depleted, renewable energy sources are sustained by ongoing natural processes. Therefore, the term "equipment to generate renewable energy" is somewhat contradictory, as the primary function of such technology is to harness and utilize natural energy flows.

Most renewable energy technologies, with a few exceptions, rely on energy derived from the sun, either directly or indirectly. The exceptions include true geothermal energy, which utilizes heat from the Earth's core, and tidal/marine current electricity generation, which capitalizes on gravitational forces between the Earth and the Moon (although solar energy also affects some marine currents). However, since this report focuses on practical on-site renewable energy options, these exceptions will not be further explored. Instead, the focus will be on the broad range of technologies listed below, some of which may not appear solar-related at first glance. These technologies can be summarized as follows: [Further details on the specific solar technologies can be provided if desired.

- Solar thermal – direct heating of water for space heating or domestic hot water
- Photovoltaic – direct generation of electricity from sunlight
- Hydroelectricity – use of solar (water cycle) driven water flows to generate electricity.
- Wind turbines – use of solar-driven air movement to generate electricity.
- Heat pumps – extraction of solar heat from the earth, atmosphere, or water bodies
- Bio-fuels – combustion of solid or liquid biofuels to produce heat or electricity.

While the technologies and their potential application to this site will be discussed in more detail in the subsequent sections, it is important to address another crucial point. The adoption of renewable energy

technologies aims to reduce greenhouse gas emissions, primarily carbon dioxide. However, it is important to recognise that none of these technologies can be considered completely "zero carbon." This is because when considering the entire life cycle of these systems, energy is required for manufacturing, maintenance, and operation, and this energy is often sourced from non-renewable sources. For instance, the production and processing of silicon for manufacturing photovoltaic panels, the transportation of wood pellets using diesel fuel, and the energy used to produce fertilisers for biofuels are all examples of energy inputs derived from non-renewable sources.

Furthermore, it should be noted that the renewable energy technology industry is dynamic and innovative, and even seemingly similar products can vary significantly in practical details. As a result, the detailed design of installations must be carried out by experts, often in collaboration with product manufacturers. Virtually no two products are identical or interchangeable in this field.

Elements	Specification
Heating	Brand Name: Samsung Electronics Model Name: AE160JXYDEH
Secondary Heating	Log Burner within Living space
Hot Water Cylinder	Size: 400 Litre Declared Heat loss kWh/24hr: 1.77
Ventilation	Natural Ventilation with Intermittent Extract in wet rooms

5.Overheating

In recent years, the impacts of overheating have been extensively studied and qualified, in part, to climate change and modern construction practices. The industry has developed various guidelines to assess and predict the risk of overheating. However, it is crucial to address design considerations during the concept stage to implement effective measures for adequate mitigation.

By acknowledging the potential risks of overheating early in the design process, appropriate strategies can be incorporated to prevent or minimise excessive heat build-up within buildings. These strategies may include optimising building orientation, incorporating effective shading systems, implementing natural ventilation techniques, utilising thermal insulation, and integrating efficient cooling systems.

Considering these design considerations ensures that the development can effectively mitigate the adverse effects of overheating and create comfortable and sustainable indoor environments for occupants.

5.1. Common Causes

The Zero Carbon Hub states three factors most associated with overheating risk: location, building design and occupational usage.

5.2. Location

A specific site's climate, or microclimate, is influenced by its geographic location. Factors such as sunlight, wind patterns, and rainfall intensity vary based on the site, and the design approach must be tailored accordingly. For instance, average summertime temperatures are typically higher in the southeast of England compared to the northeast. Therefore, in the southeast, increasing ventilation levels may have a limited impact on reducing internal temperatures.

Dense urban developments with limited open green spaces may be susceptible to the "urban heat island" effect. This phenomenon occurs when heat is absorbed by dense man-made structures during the day and then radiated at night, leading to elevated local temperatures. To mitigate this effect, increasing the amount of green space and incorporating solar reflective materials and coatings can help reduce heat absorption and minimise heat retention.

By recognising and addressing the specific climate characteristics and potential risks associated with a site, the design can be optimised to create comfortable and sustainable environments that mitigate the effects of climate-related factors such as high temperatures and urban heat islands.

5.3. Building Design

There are multiple aspects of building design that impact its performance in terms of overheating. The orientation of a building, along with the size and placement of glazing areas, plays a significant role in determining the amount of solar heat gain. If solar gain cannot be effectively absorbed or removed, it can lead to increased internal temperatures. While harnessing "free" solar energy for heating purposes can be beneficial, controlling the amount of solar energy entering the building is essential to prevent overheating.

Modern structures are frequently built with high levels of energy efficiency in mind, resulting in improved insulation and airtightness. However, these design features, combined with reduced levels of thermal mass compared to older buildings, can limit the ability to absorb or naturally dissipate heat. As a result, modern buildings may be more prone to overheating if not properly designed and equipped with appropriate mitigation strategies.

To address these challenges, designers need to consider various factors such as building orientation, glazing design, solar shading systems, insulation techniques, and ventilation strategies. By integrating these elements effectively, the building's ability to manage solar gain and control internal temperatures can be optimised, ensuring a comfortable and energy-efficient indoor environment.

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5.4. Occupants

While occupants' specific use and behaviour cannot be controlled in new construction projects, it is important to consider the impact of room use type and location when planning a building. The arrangement of spaces should consider the potential solar and other incident heat gains. The risk of overheating is influenced by factors such as occupant density and the anticipated activity type within a particular zone.

For instance, rooms with glazed perimeter areas that are predominantly occupied in the afternoon may benefit from being situated in east-facing locations. The direct solar heat gain can be minimised by positioning them where the sun has already passed its peak. This thoughtful placement considers the potential heat load and aims to create a more comfortable indoor environment.

Considering the occupant activities and their corresponding heat generation patterns, along with the solar exposure of different spaces, allows for better design decisions that help mitigate the risk of overheating and enhance occupant comfort.

5.5. Mitigation

When it comes to new-build construction projects, it is crucial to consider design considerations for reducing the risk of overheating at the earliest opportunity. While performance measures can be incorporated at later stages, the most effective and robust techniques are often inherent to the building's design.

The "cooling hierarchy," outlines the preferred approach to mitigating overheating risks and minimising reliance on mechanical cooling. The hierarchical steps include:

1. Minimizing heat generation through energy-efficient design.
2. Reducing the amount of heat entering the building in summer through considerations such as orientation, shading, albedo, fenestration, insulation, and the incorporation of green roofs and walls.
3. Managing heat within the building using exposed thermal mass and high ceilings.
4. Implementing passive ventilation strategies.
5. Considering mechanical cooling as a last resort.

In addition to appropriate siting and orientation, several properties and functions influence the performance of overheating mitigation measures. One such consideration is the location, proportion, and specification of glazing. It is important to strike a balance between the benefits of natural light and "free heat" while ensuring that the levels of solar gain are not excessive. Glass manufacturers offer a variety of products, including those with solar control coatings, which can help reduce the transmitted solar gain (measured by the "g-value") without significantly impacting visual performance. Different glass specifications may be more suitable for specific orientations, such as using lower g-value glass for south-facing facades compared to north-facing ones.

5.6. Solar shading

In line with solar control glass coatings, the use of external solar shading is another effective approach to prevent direct transmission of solar gain while allowing for the maintenance or maximisation of glazed areas. The selection of the appropriate type of external shading depends on the orientation of the windows and the sun angles at different times of the day.

Horizontal overhangs are typically more suitable for windows facing south, with higher sun angles. These overhangs can effectively block the high-angle summer sun while allowing the lower-angle winter sun to penetrate and provide natural daylight.

On the other hand, for windows facing east and west, where the sun angles are lower, vertical fins are often a better choice. These fins can help minimise the direct entry of the low-angle morning and afternoon sun, reducing the potential for overheating while allowing for views and daylight.

By carefully selecting and designing external solar shading devices based on the orientation of the windows and the specific solar angles, it is possible to achieve optimal control of solar heat gain and create comfortable indoor environments with ample natural light.

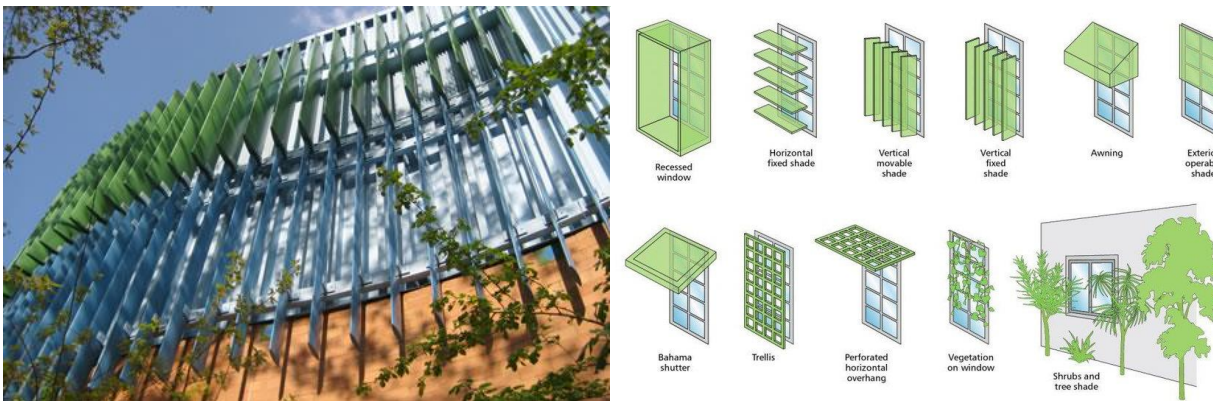


Figure 2. Examples of External Shading Systems

5.7. Thermal Mass

Thermal mass refers to the capacity of an object or construction to absorb and store heat energy. Objects with higher thermal mass can absorb heat during the day and release it at night. This characteristic can help reduce daytime temperatures and enhance the overall thermal stability of a building. However, it's important to note that increasing thermal mass may require more energy to heat the building fabric, potentially leading to increased energy consumption in certain cases. Therefore, achieving a balance is crucial when considering the use of thermal mass in building design.

There are various ways to increase thermal mass. One approach is to expose dense materials, such as concrete or masonry, which naturally possess higher thermal mass properties. Another method involves improving the physical connection between finishing materials and the building structure, ensuring efficient heat transfer between them. By increasing the physical connection, the thermal mass of the building elements can be effectively utilised.

By strategically incorporating thermal mass into the design, it is possible to optimise energy performance and enhance thermal comfort within the building. However, it's important to consider the project's specific requirements and strike a balance between the benefits of thermal mass and the potential energy implications to achieve the desired outcomes.

For example, plaster and the structural core, e.g., blockwork.

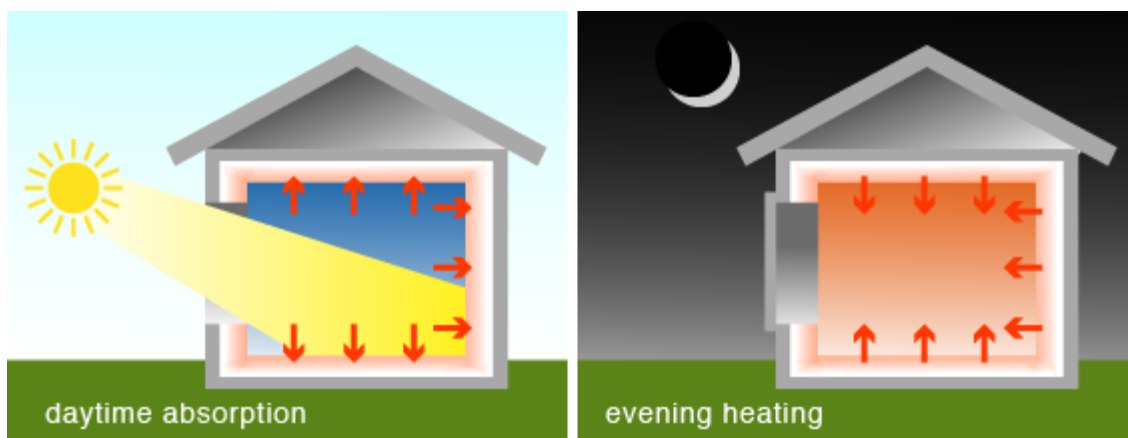


Figure 3. Thermal Mass Explained

5.8. Ventilation

The ventilation strategy plays a crucial role in managing overheating performance. While background ventilation levels are typically low, they may not be sufficient to purge excess heat from a building effectively. Therefore, the ventilation strategy must allow for significant air movement when required.

Several factors influence the potential rate of ventilation, including:

- Opening type, size, and duration: The design of ventilation openings, such as windows or vents, should consider maximising the size of the openings and their ability to remain open for an extended period, allowing for effective air exchange when needed.
- Building height and exposure: The height and exposure of the building to external factors such as wind can impact ventilation rates. Tall buildings or those in exposed locations may benefit from additional consideration in the ventilation strategy to ensure adequate air movement.
- Number of storeys and cross-ventilation opportunities: Buildings with multiple storeys offer cross-ventilation potential, where air can flow through the building from one side to the other. This design consideration can enhance ventilation rates and improve the cooling potential.

It is essential to balance the need for effective ventilation with considerations such as security and protection against water ingress. Ventilation openings should be designed to allow for the greatest possible opening size and duration without compromising the building's security or introducing the risk of water penetration.

By carefully considering these factors and incorporating an appropriate ventilation strategy, it is possible to optimise the ventilation rates and improve the building's ability to manage overheating, ensuring a comfortable and healthy indoor environment.

5.9. Calculating Overheating Risk

Numerous guidance documents are available that outline the assessment of overheating risk and establish acceptable thresholds. These include CIBSE Guide A, BB101, TM52, and TM59. To evaluate the risk, these methodologies involve conducting a Dynamic Simulation Modelling (DSM) exercise to estimate projected internal temperatures. These predicted temperatures are then compared to recommended limits to ascertain their acceptability or if they exceed the prescribed thresholds.

5.10. Part O Outline

The recently introduced Building Regulations Part O, 2021 edition, marks the first comprehensive effort to address overheating specifically in new residential buildings. The primary objective of Part O is to promote the design and construction of buildings that effectively mitigate excessive solar heat gain during summer periods and ensure occupants have suitable means to alleviate indoor heat levels. It is essential to understand that the measures implemented under Part O do not guarantee occupants' comfort but are primarily aimed at safeguarding their health and well-being.

5.11. Buildings Covered by Part O

Table 0.1 Residential buildings within the scope of this approved document	
Title	Purpose for which the building is intended to be used
Residential (dwellings)	Dwellings, which includes both dwellinghouses and flats.
Residential (institutional)	Home, school or other similar establishment, where people sleep on the premises. The building may be living accommodation for the care or maintenance of any of the following. a. Older and disabled people, due to illness or other physical or mental condition. b. People under the age of 5 years.
Residential (other)	Residential college, hall of residence and other student accommodation, and living accommodation for children aged 5 years and older.

Figure 4. Approved document Part O

5.12. Part O Calculation

Part O of the Approved Document is satisfied by utilising either of the following methods:

5.13. Simplified Method:

- This method considers factors such as risk location and the presence of cross ventilation.
- Risk location is categorised as high (e.g., Greater London and Manchester) or medium (other areas).
- Threshold tables in Part O are referenced to determine the maximum glazing area for the building and the most glazed room.
- In high-risk locations, specific shading requirements must be met, including external shutters with ventilation, glazing with specific g-values and light transmittance, or overhangs on due south-facing facades.

5.14. Dynamic Thermal Modelling:

- This methodology is applicable to all residential buildings and offers greater design flexibility compared to the simplified method.
- CIBSE's TM59 methodology is used for predicting overheating risk, and the limits provided in Part O are applied during the assessment.
- Dynamic Thermal Modelling allows for a more detailed analysis of the building's thermal performance and can inform design decisions.

Our Team is committed to helping your project achieve compliance with Part O using either the simplified method or dynamic thermal modelling, ensuring that the proposed development meets the necessary criteria and guidelines to mitigate overheating risks in residential buildings.

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6. Water

In terms of water efficiency, there is a clear need to ensure that the highest possible standards are in place, particularly given the likely effects of climate change. The Thames Water area is classed as a 'water-stressed area' by the Environment Agency, and the demand management in the area is of primary importance. For clarity, the tighter water efficiency standard referred to here and set out in the Building Regulations is 110 litres per person per day.

Initial advice from the design team suggest the water savings measures can be incorporated in order to reduce water usage. It has been identified that there is the opportunity to have low flow rates and dual flush toilets.

6.1. Water consumption targets

The Proposed Development would be provided with water efficient fixtures, fittings, and appliances, and include measures to encourage efficient water use, including:

- Installation of water meters with pulsed or other open protocol communication output to enable connection to a utility monitoring and management system.
- A leak detection system on the mains water supply between the building and the utilities water meter.
- Processes to reduce unregulated water demand.

6.2. Reusing water

A preliminary feasibility study of the potential to include rainwater harvesting should be carried out. Further assessment with a drainage engineer would be needed. A rainwater butt could be installed and designed for the watering of the site green areas.

6.3. Metering

A water meter will be provided. During detailed design, consideration will be given to the provision of digital meter, rather than standard analogue meters.

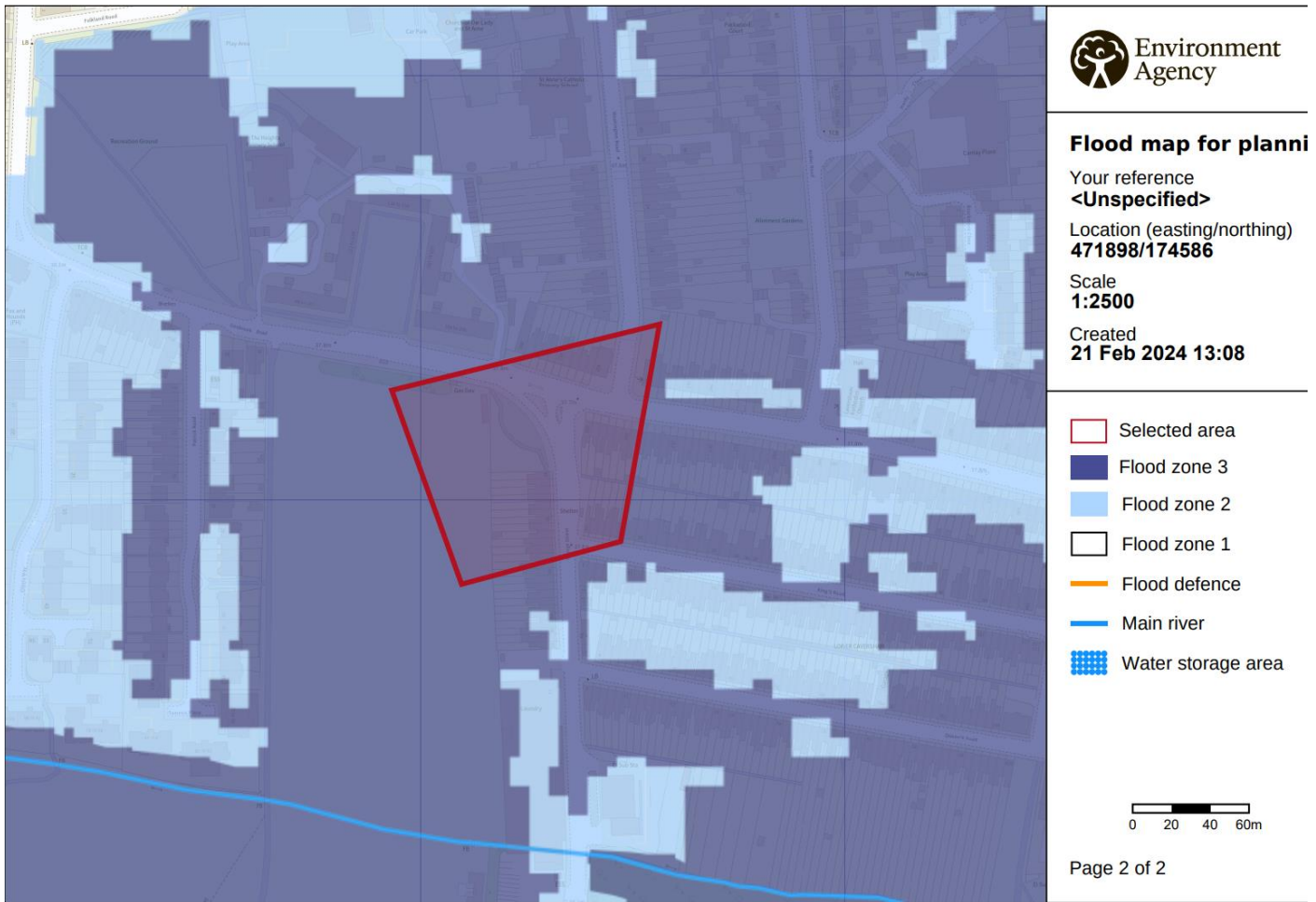
6.4. Surface Water Flooding

Surface water flooding is the most likely form of flooding that a development may be exposed to. All major developments must incorporate sustainable drainage systems (SuDS) as appropriate and in line with the Government's Technical Standards. Runoff rates should aim to reflect greenfield conditions and, in any case, must be no greater than the existing conditions of the site.

Wherever possible, SuDS provision should maximise ecological benefits, link into the existing Green Network, incorporate tree planting and landscaping and avoid damage to existing significant trees, including through changes to the site hydrology. All new developments in areas of flood risk should give priority to SuDS.

6.5. Flooding Resilience and Resistance

The development site is located within a flood zone 3 area, which is high probability of flooding from rivers and the sea. You need to carry out a flood risk assessment (FRA) as part of the planning application for this development.



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7. Pollution & Diversity

6.6. Nature Conservation and Biodiversity

6.6.1. Protecting Species and Promoting the Protection and planting of Trees.

There are no features of ecological significance (Trees) next to the proposed construction.

Whilst measures to enhance the ecological potential of the site will be investigated where possible, opportunities to enhance the ecological value of the site are limited to the garden at the rear elevation of the dwelling.

6.6.2. Designing development proposals

Efforts will be made to improve the ecological value of the site with planting of native plant species and bird boxes relevant to the native birds in the area.

Developers should adhere to the following hierarchy when considering biodiversity on their development by; firstly, avoiding adverse impact to the biodiversity interest, secondly minimising impact, then seek mitigation, and lastly seek appropriate compensation where the benefits of the proposal clearly outweigh the biodiversity impacts.

6.7. Air Pollution

6.7.1. Assessment Requirements

An air quality test could be considered for the proposed development however, the air quality in the area is excellent (with an AQI of 37 which is well below 50).

6.7.2. Construction and Demolition

To recognise and encourage construction-sites which are managed in an environmentally and socially considerate, responsible, and accountable manner.

For the proposed development, the contractor will comply with 'The Control of Dust and Emissions during Construction Demolition SPG'.

Control measures will be implemented by the contractor on site to prevent air and dust pollution. An example of this could be using dust sheets on materials and skips, damping down in waste areas.

6.7.3. Design and Occupation

Ventilation pathways will need to be designed to reduce the build-up of air pollutants in the dwelling, through cross ventilation, and either natural or mechanical ventilation. Where there is mechanical ventilation, exhaust flues will be positioned away from intake flues for fresh air.

In naturally ventilated buildings openable windows and/or ventilators are over 10m from sources of external pollution.

There is no requirement for mechanical ventilation for this development.

6.8. Noise

6.8.1. Sources of Noise

The proposed site is located within an existing built up residential area, with no commercial units in the vicinity. The area is identified having a low potential for noise pollution from residential dwellings.

6.8.2. Mitigation of Noise emitted by the development

Noise attenuation measures will be incorporated on-site where required, to ensure that any noise generated by equipment or services will not generate a source of noise pollution or negatively impact the surrounding area.

The developer will comply with the council's construction noise rules which states what hours of the day the site can work within.

6.8.3. Mitigation of Noise impacts on the development

For the occupiers of the dwelling, the specification of the partition walls, floors and external walls will be designed to go beyond Document E of the building regulations.

The following advice should be followed, and best efforts will be made here were possible to avoid impacts of external noise to the occupiers.

Locate noise sensitive areas/rooms away from the parts of the site most exposed to noises, create setbacks, design the building so its shape and orientation reflect noise and protect the most sensitive uses, position non-habitable uses closer to the noise source in mixed use developments, design in lobbies, balconies, winter

gardens and dual facades; and carefully locate noise generating equipment for the building such as plant and services away from sensitive uses.

6.9. Light Pollution

6.9.1. Type of Light Pollution

Light pollution comprises any adverse effect of lighting for building occupiers, and for this development includes Glare, 'Light Trespass' and 'Sky Glow' and Poor Artificial Lighting.

6.9.2. Potential Effects

Light pollution can have a detrimental impact on the quality of life of residents; by significantly changing the character of the locality, altering wildlife and ecological patterns, and wasting energy.

6.9.3. Lighting Design to minimize the impacts

To minimise obtrusive light where applicable, lights will be designed to be used only in appropriate areas, and that upward lighting is minimised, this will help to reduce light pollution and effect to neighbours.

Where there is external lighting, it will have to be designed to the following standards.

Firstly, to be energy efficient going beyond Part L of the building regulations, with the aim to achieve no less than 60 lumens per circuit watt.

Secondly, all external lights will be automatically controlled for the prevention of operation during daylight hours and presence detection in areas of intermitted pedestrian traffic. The ILP Guidance for the reduction of obtrusive light, 2001 will be used to design the lighting strategy. All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00. If safety or security lighting is provided and will be used between 23:00 and 07:00, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP's Guidance notes. Illuminated advertisements, where specified, must be designed in compliance with ILE Technical Report 5 – The Brightness of Illuminated Advertisements

6.10. Water Pollution

6.10.1. How Sustainable Drainage contributes to water quality

There are no activities on site which lead to pollutants accumulating on hardstanding areas, therefore traditional drainage systems should be sufficient.

Further detail is required by a drainage engineer.

6.10.2. Connection of New Developments to the Sewer Network

The site has already connection to the main sewer network therefore connection is not a problem.

7. Conclusion

The proposed development is to be located at George Street, Caversham, Reading, RG4 8BY
Proposals are for the construction of a residential development to contain five 2 storey dwellings. The specifications contained within this report are suggestions and cannot be relied upon. Once the SAP calculations have been carried out we can provide accurate specification.