Stonehouse Farm, Lake Investments Limited

Energy and Sustainability Statement

AES Sustainability Consultants Ltd

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Rev 0	Jonathan Platt	12/02/2025	Initial Issue
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This statement has been commissioned by Lake Investments Limited to detail the proposed approach to sustainable construction, energy and CO_2 reduction to be employed at the Stonehouse Farm development. It should be noted that the details presented, including the proposed specifications, are subject to change as the detailed design of the dwellings progresses, whilst ensuring that the overall commitments will be achieved.

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1. Introduction

Preface

1.1. This Energy and Sustainability Statement has been prepared on behalf of Lake Investments Limited, in support of the application for the mixed-use development at Stonehouse Farm.

Development Description

1.2. The development site is located between Handcross and Hammerpond Roads, to the east of Horsham, within the administrative boundary of Horsham District Council.

1.3. The development will be delivered in three phases. The proposed site layout is shown in Figure 1, with the location of each phase denoted by white circles. Each phase is detailed as followed;

- Rationalisation and enhancement of existing commercial facilities (Use Classes E(g) B2 and B8 at Stonehouse Business Park including demolition of two buildings and their replacement with new Class E(g), B2 and B8 facilities. Extension of existing building to form a new office and wardens' accommodation. Existing mobile home removed.
- Decommissioning of the Anaerobic Digester and re-use of the existing 2no buildings for storage and office uses (Class E (g) and B8) and the diversion of a public footpath.
- Residential redevelopment of the Jacksons Farm site including the demolition of existing barns to provide 3no. dwellings with access, parking, and landscaping.

Purpose and Scope of the Statement

1.4. The statement has been prepared to address national and local policy relating to sustainable design and construction of dwellings, including relevant policies within the Horsham District Planning Framework, adopted in November 2015.

1.5. This statement demonstrates that by following a fabric first approach and with the implementation of renewable technology, the development will reduce carbon emissions over the Part L 2021 baseline, which in itself presents a 31% reduction over previous regulatory standards. The development will incorporate sustainable design considerations and ensure that a significant proportion of the energy demand of the development is met through renewable energy provision.

Figure 1. Proposed Site Layout

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2. Planning Policy

Local Planning Policy

2.1. On 27 November 2015 Horsham District Council adopted the Horsham District Planning Framework (HDPF). With the exception of land within the South Downs National Park, the HDPF replaces the policies contained in The Core Strategy and General Development Control Policies which were both adopted in 2007.

2.2. The HDPF sets out the planning strategy for the years up to 2031 to deliver the social, economic and environmental needs for the district (outside the South Downs National Park).

2.3. This statement will address requirements set out in within the Horsham District Planning Framework.

> Policy 35
> Strategic Policy: Climate Change
>
> Development will be supported where it makes a clear contribution to mitigating and adapting to the impacts of climate change and to meeting the district's carbon reduction targets as set out in the Council's Acting Together on Climate Change Strategy, 2009.
>
> Measures which should be used to mitigate the effects of climate change include:
>
> 1. Reduced energy use in construction.
> 2. Improved energy efficiency in new developments, including influencing the behaviour of occupants to reduce energy use.
> 3. The use of decentralised, renewable and low carbon energy supply systems.
> 4. The use of patterns of development which reduce the need to travel, encourage walking and cycling and include good accessibility to public transport and other forms of sustainable transport.
> 5. Measures which reduce the amount of biodegradable waste sent to landfill.

> Policy 35 continued...
>
> Development must be designed so that it can adapt to the impacts of climate change, reducing vulnerability, particularly in terms of flood risk, water supply and changes to the district's landscape. Developments should adapt to climate change using the following measures:
>
> 1. Provision of appropriate flood storage capacity in new building development.
> 2. Use of green infrastructure and dual use SuDS to help absorb heat, reduce surface water runoff, provide flood storage capacity and assist habitat migration.
> 3. Use of measures which promote the conservation of water and/or grey water recycling.
> 4. Use of site layout, design measures and construction techniques that provide resilience to climate change (opportunities for natural ventilation and solar gain). If it is not possible to incorporate the adaption and mitigation measures proposed, an explanation should be provided as to why this is the case.

Policy 36
Strategic Policy: Appropriate Energy Use

Energy hierarchy
All development will be required to contribute to clean, efficient energy in Horsham based on the following hierarchy:

1. Lean – use less energy – e.g. through demand reduction
2. Clean – supply energy efficiently – e.g. through heat networks
3. Green – use renewable energy sources

District Heating and Cooling
Commercial and residential developments in Heat Priority Areas or the strategic development locations will be expected to connect to district heating networks where they exist using the following hierarchy or incorporate the necessary infrastructure for connection to future network.

Development should demonstrate that the heating and cooling systems have been selected in accordance with the following heating and cooling hierarchy:

1. Connection to existing (C)CHP distribution networks
2. Site wide renewable (C)CHP
3. Site wide gas-fired (C)CHP
4. Site wide renewable community heating/cooling
5. Site wide gas-fired community heating/cooling
6. Individual building renewable heating
7. Individual building heating, with the exception of electric heating

All (C)CHP must be of a scale and operated to maximise the potential for carbon reduction. Where site-wide (C)CHP is proposed, consideration must be given to extending the network to adjacent sites.

Energy Statements
All applications for residential or commercial development must include an Energy Statement demonstrating and quantifying how the development will comply with the Energy Hierarchy.

Developments in Heat Priority Areas and strategic developments should demonstrate and quantify how the development will comply with the heating and cooling hierarchy. Horsham District Council will work proactively with applicants on major developments to ensure these requirements are met...

Policy 37
Sustainable Construction

Proposals must seek to improve the sustainability of development. To deliver sustainable design, development should incorporate the following measures where appropriate according to the type of development and location:

1. Maximise energy efficiency and integrate the use of decentralised, renewable and low carbon energy.
2. Limit water use to 110 litres/person/day.
3. Use design measures to minimise vulnerability to flooding and heatwave events.
4. Be designed to encourage the use of natural lighting and ventilation.
5. Be designed to encourage walking, cycling, cycle storage and accessibility to sustainable forms of transport.
6. Minimise construction and demolition waste and utilise recycled and low-impact materials.
7. Be flexible to allow future modification of use or layout, facilitating future adaptation, refurbishment and retrofitting.
8. Incorporate measures which enhance the biodiversity value of development.

All new development will be required to provide satisfactory arrangements for the storage of refuse and recyclable materials as an integral part of design.

New homes and workplaces should include the provision of high-speed broadband access and enable provision of future technologies where available.

2.4. Horsham District Council are currently working on a revised Local Plan, which was released as a draft for comments in February 2020. The new Local Plan will cover the period from 2019 to 2036 (an 18-year period).

2.5. Just like the current HDPF, it aims to deliver the social, economic and environmental needs of Horsham District and looks to provide a robust stance on climate change, including further commitments for reduction in carbon emissions.

2.6. *it is important to note that the Draft Local Plan was released for consultation purposes only and does not represent Council policy at this time.*

National Planning Policy Framework

2.7. In December 2024, the Government published the updated National Planning Policy Framework (NPPF), which sets out the Government's planning policies for England and how these are expected to be applied.

2.8. The planning process has been identified as a system to support the transition to a low carbon future in response to climate change by assisting in the reduction of greenhouse gas emissions and supporting renewable and low carbon energy. Paragraph 164 sets out what is expected from new developments when considering strategies to mitigate and adapt to climate change:

> 164. New development should be planned for in ways that:
>
> Avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaption measures, including through the planning of green infrastructure.
>
> Can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.

Current National Policy Standards

2.9. The government introduced the next revision in Building Regulations, known as Part L 2021 in December 2021, to come into effect for buildings where construction commenced after 15th June 2023. The new standards provide a 31% reduction in CO_2 emissions compared with the 2013 Building Regulations standard. The uplifts to Part L 2021 incorporate:

Higher Standards for Carbon Dioxide Emissions

2.10. This is to be delivered through what is expressed as a 'fabric' approach to deliver a 31% reduction over Part L 2013 standards.

Introduction of Primary Energy Demand Compliance Metric

2.11. The regulations have introduced a primary energy demand compliance metric. This is to align the regulations with the amended EU Energy Performance of Building Directive (2018), which states:

"The energy performance of a building shall be expressed by a numeric indicator of primary energy use in kWh/ (m^2.y) for the purpose of both energy performance certification and compliance with minimum energy performance requirements."

2.12. Primary energy is an expression of the energy content available in a fuel / fuel source which has not undergone any conversion or transformation process. Individual factors are assigned to all fuel types to take account of upstream processes and energy use – e.g., mains electricity has a higher factor due to the additional transformation and distribution processes that the energy undergoes before it reaches the home, compared with gas where the fuel is burned directly within the dwelling.

2.13. Dwellings will therefore be assessed based on their primary energy consumption in a similar way to current carbon compliance.

Proposed Strategy

2.14. The development will be designed to meet national standards with respect to Part L 2021 requirements as a minimum and will deliver additional carbon reductions.

2.15. This statement will detail the proposed approach to delivering CO_2 emissions reductions significantly greater than those of a Part L 2021 compliant baseline, through higher fabric standards and the incorporation of low carbon renewable energy systems, in the form of Air Source Heat Pumps (ASHP) and with the potential addition of Solar PV Systems.

2.16. This statement provides an indicative fabric specification and a strategy which would enable the dwellings to meet these higher standards, with the precise strategy to achieve this being subject to change.

2.17. Additional sustainable construction considerations are addressed, including overheating risk and climate resilience, sustainable and responsible materials usage and water consumption.

3. Climate Change Resilience

3.1. Dwellings constructed today may be operating in a substantially different climate over the coming decades and therefore should be designed to ensure that they are resilient to future climate change impacts such as increases in temperature, rainfall, wind and sea level. Climate resilience is important to homeowners against a backdrop of increasingly extraordinary weather events.

3.2. Passive design measures will be considered and incorporated to enhance resilience to climate change impacts throughout the lifetime of the development.

Rising Temperatures and Overheating

3.3. With the risk of potentially higher summer temperatures and longer hot spells in the future, it is important to consider the thermal comfort of the dwelling. Passive design measures are proposed to mitigate future overheating.

Approved Document O

3.4. To more robustly address overheating risk, the Government has introduced a new Approved Document, 'Part O', into the Building Regulations.

3.5. This document requires a more in-depth assessment of the risk of overheating, taking into account site location, dwelling orientation, glazing proportions and openable window areas for natural ventilation.

3.6. This assessment will be undertaken at the start of detailed design and any mitigation measures that may be required will be built in.

Addressing Overheating Risk

3.7. The development is proposed to use traditional masonry construction, which has a relatively high thermal mass, compared with timber or steel construction. A construction with a high thermal mass can help to reduce overheating risk as it absorbs heat during the day and slowly releases it during cooler night-time hours, effectively smoothing out temperature fluctuations within the property.

3.8. Within the development layout, orientation and massing has been considered to maximise useful passive solar gain. Glazing will be specified with a solar transmittance value (g-value) to strike the balance between useful solar gain in the winter and unwanted solar gain in the summer.

3.9. Wherever possible dwellings will be able to benefit from cross-ventilation to effectively purge warm air from the properties during periods of hot weather. Window opening areas will be considered and guided by the Part O assessment, with increased opening areas being designed in as required. Efficient mechanical extract ventilation will also be considered in the background to assist in effectively extracting warm air from different rooms where required if window openings cannot be relied upon for both houses and apartments.

4. Energy Consumption and CO_2 Emissions

4.1. As one of the key areas of ongoing impact of any development, the energy demand of the dwellings to be constructed is a key consideration in the overall sustainability strategy.

4.2. The development is to be designed and constructed to meet the requirements of Part L1 and Part L2 of the Building Regulations 2021, therefore compliance with these standard forms the first stage in the sustainable construction approach.

4.3. Part L1 compliance is assessed through the Standard Assessment Procedure (SAP), which uses the 'Target Emission Rate' (TER) – expressed in kilograms CO_2 per meter squared of total useful floor area, per annum – as the benchmark. The calculated performance of the residential unit as designed - the Residential unit Emission Rate (DER) – is required to be lower than this benchmark level.

4.4. Similarly, Part L2 compliance is assessed via a design stage Simplified Building Energy Model (SBEM) calculation, in line with the National Calculation Methodology. A TER is again calculated as the benchmark.

4.5. As set out within the policy review section of this statement, it is considered that Building Regulations form the minimum requirement for new dwellings in terms of energy performance.

4.6. As shown in Table 1, the CO_2 standards contained within Part L were increased in 2010 and 2013, reducing the TER by approximately 25% and a further 6% (9% for non-domestic) respectively. Part L 2021, mandatory from June 2023, constitutes a much larger step change of a 31% reduction in emissions.

Table 1. CO_2 Emissions improvements from successive Part L editions

Building Regulations	CO_2 emissions improvements preceding regulations
L1 2006	-
L1 2010	25%
L1 2013	6%
L1 2021	31%

Energy Reduction Strategy – Fabric First

4.7. It is proposed that the energy demand reduction strategy for the development incorporates further improvements beyond a Part L compliant specification and initially concentrates finance and efforts on reducing energy demand as the first stage of the Energy Hierarchy.

Figure 2. The Energy Hierarchy

Be Lean – reduce energy demand

4.8. The design of a development - from the masterplan to individual building design - will assist in reducing energy demand in a variety of ways, with a focus on minimising heating, cooling and lighting loads. Key considerations include:

- Building orientation – maximise passive solar gain and daylight
- Building placement – control overshading and wind sheltering
- Landscaping – control daylight, glare and mitigate heat island effects
- Building design – minimise energy demand through fabric specification

Be Clean – supply energy efficiently

4.9. The design and specification of building services to utilise energy efficiently is the next stage of the hierarchy, taking into account:

- High efficiency heating and cooling systems
- Ventilation systems (with heat recovery where applicable)
- Low energy lighting
- High efficiency appliances and ancillary equipment

Be Green – use low carbon / renewable energy

4.10. Low carbon and renewable energy systems form the final stage of the energy hierarchy and can be used to directly supply energy to buildings, or offset energy carbon emissions arising from unavoidable demand. This may be in the form of:

- Low carbon fuel sources – e.g., biomass
- Heat pump technologies
- Building scale renewable energy systems
- Small-scale heat networks
- Development-scale heat networks

4.11. As this hierarchy demonstrates, designing out energy use is weighted more highly than the generation of low-carbon or renewable energy to offset unnecessary demand. Applied to the development, this approach is referred to as 'fabric first' and concentrates finance and efforts on improving U-values, reducing thermal bridging, improving airtightness and installing energy efficient ventilation and heating services.

4.12. This approach has been widely supported by industry and government for some time, particularly in the residential sector, with the Zero Carbon Hub[1] and the Energy Savings Trust[2] having both stressed the importance of prioritising energy demand as a key factor in delivering resilient, low energy buildings.

4.13. The benefits to prospective homeowners of following the Fabric First approach are summarised in Table 2.

Table 2. Benefits of the Fabric First approach

	Fabric energy efficiency measures	Bolt-on renewable energy technologies
Energy/CO_2/fuel bill savings applied to all dwellings	✓	×
Savings built-in for life of dwelling	✓	×
Highly cost-effective	✓	×
Increases thermal comfort	✓	×
Potential to promote energy conservation	✓	✓
Minimal ongoing maintenance / replacement costs	✓	×
Significant disruption to retrofit post occupation	✓	×

[1] Zero Carbon Hub, Zero Carbon Strategies for tomorrow's new homes, Feb 2013

[2] Energy Savings Trust, Fabric first: Focus on fabric and services improvements to increase energy performance in new homes, 2010

5. Baseline CO_2 Emissions

5.1. The development is to be designed and constructed to meet the requirements of Part L1 and Part L2 of the Building Regulations 2021, therefore compliance with these standard forms the first stage in the sustainable construction approach.

5.2. Calculations have been undertaken to an indicative sample of house types to assess the estimated carbon emissions of the development. These dwellings have then been used to calculate a representative model of the site to establish overall estimated energy demand and CO_2 emissions from the development.

5.3. To assess baseline CO_2 emissions for Building Regulations compliance for the commercial properties, an indicative Simplified Building Energy Model (SBEM) calculation has been carried out using IESVE software to measure the estimated energy demand of the buildings.

5.4. SBEM is the methodology used by the Government to analyse the energy and environmental performance of non-domestic buildings. Its purpose is to provide accurate and reliable assessments of buildings' energy performances that are needed to underpin energy and environmental policy initiatives.

5.5. SBEM assesses buildings against a target emission rate (TER), expressed in kilograms of carbon dioxide per metre squared of total useful floor area per annum, as the benchmark for Part L Building Regulations compliance. The building emission rate (BER) must meet or exceed this level of performance in order to comply with Part L requirements.

5.6. The energy uses regulated by the Building Regulations are those most directly influenced by the structure and design of the buildings. These are the energy used for space heating, water heating, lighting and ventilation. Un-regulated energy uses are those in connection with the building user process/equipment small power loads.

5.7. The calculations and specifications detailed within this assessment have been based on the details / specification at the time of submission, any change to the specification or distribution of the house types will impact the energy / carbon performance.

5.8. The Part L1 2021 compliant indicative baseline carbon emissions for the site are reported in Table 3.

Table 3. Indicative Site wide Part L compliant CO_2 emissions

Building	Part L 2021 compliant development emissions (kgCO2/yr)
Residential	5,310
Non-domestic	2,826
TOTAL	8,136

6. Proposed Fabric Specification

6.1. In order to ensure that the energy demand of the development is reduced, the design should help to minimise heat loss through the fabric wherever possible, particularly for the residential buildings. Table 4, Table 5 and Table 6 detail the proposed fabric specification of the major building elements, with the first column in these tables setting out the Part L limiting fabric parameters to demonstrate the improvements to be delivered.

Residential

6.2. Table 4 details the proposed fabric specification of the major building elements, with the first column in this table setting out the Part L1 limiting fabric parameters in order to demonstrate the improvements delivered.

Table 4. Proposed construction specification - Residential main elements

	Part L1 Limiting Parameters	Design Specification
External wall – u-value	0.26 W/m²K	0.19 W/m²K
Plane roof – u-value	0.16 W/m²K	0.10 W/m²K
Pitched roof – u-value	0.16 W/m²K	0.16 W/m²K
Flat roof – u-value	0.16 W/m²K	0.16 W/m²K
Ground floor – u-value	0.18 W/m²K	0.15-0.16 W/m²K
Windows – u-value	1.60 W/m²K	1.30 W/m²K
Doors – u-value	1.60 W/m²K	1.10 W/m²K
Air Permeability	8.0 m³/h.m² at 50 Pa	4.5 m³/h.m² at 50 Pa
Thermal Bridging	Y = 0.150 (default)	Y = ≤ 0.040 (estimated average)

Passive Design Measures

6.3. To ensure energy use is minimised from the outset, where practical the buildings have been designed with regard to the principles of passive design, including consideration of building orientation and site placement to maximise the potential for solar gain.

6.4. Within the proposed development layout, orientation and massing have been designed to maximise (within reason) passive solar gain, other design considerations have also been considered within the layout and orientation, minimising the overshading from adjacent buildings and vegetation to maximise solar gains where possible.

6.5. Glazing will be specified to strike a balance between reducing the heating demand in winter by taking advantage of useful solar gain and reducing the cooling demand in summer.

6.6. Through optimising for solar gain, the building will additionally benefit from good daylighting levels, thereby reducing the use of internal lighting and promoting well-being.

6.7. Where possible, ventilation will be provided naturally, via a mixture of cross ventilation, stack effect and openable windows.

Non-domestic

6.8. Table 5 details an indicative fabric specification of the major building elements, with the first column in this table setting out the Part L limiting fabric parameters to demonstrate the improvements that will be made.

6.9. Within the calculation methodology of Approved Document L, applicable to non-domestic development, more emphasis is placed on building services and lighting as these generally have a significantly greater impact on the overall performance of the unit.

Table 5. Proposed new construction specification - commercial building main elements

	Part L2 Limiting Parameters	Design Specification
External wall – u-value	0.26 W/m²K	0.20 W/m²K
Pitched roof – u-value	0.16 W/m²K	0.16 W/m²K
Flat roof – u-value	0.18 W/m²K	0.18 W/m²K
Ground floor – u-value	0.18 W/m²K	0.18 W/m²K
Windows – u-value	1.60 W/m²K	1.40 W/m²K
Doors – u-value	1.60 W/m²K	1.40 W/m²K
Air Permeability	8.0 m³/h.m² at 50 Pa	5.0 m³/h.m² at 50 Pa

6.10. Table 6 details the fabric requirements applied to a conversion or refurbishment, as will be the case for existing barns converted into office and warehouse facilities.

Table 6. Proposed refurbishment specification - commercial building main elements

	Part L2 Limiting Parameters	Design Specification
External wall – u-value	0.30 W/m²K	0.30 W/m²K
Pitched roof – u-value	0.18 W/m²K	0.18 W/m²K
Ground floor – u-value	0.25 W/m²K	0.18 W/m²K
Windows – u-value	1.60 W/m²K	1.40 W/m²K
Doors – u-value	1.60 W/m²K	1.40 W/m²K
Rooflights – u-value	2.20 W/m2K	1.40 W/m2K
Vehicle Access Doors	1.30 W/m2K	1.20 W/m2K

Active Measures – Non-domestic

6.11. Low energy lighting will be used with a lighting efficacy of 120 lumens per circuit Watt. Space lighting will be low energy and fitted with Passive Infrared Sensor (PIR) and daylight sensors where appropriate where appropriate.

6.12. Time and temperature zoning controls will be included in each zone to avoid unnecessary heating of uninhabited spaces when not required.

Thermal bridging

6.13. The significance of thermal bridging as a potentially major source of fabric heat losses is increasingly understood. Improving the U-values for the main building fabric without accurately addressing the thermal bridging will not achieve the desired energy and CO_2 reduction targets.

6.14. The specification will seek to minimise unnecessary bridging of the insulation layers, with avoidable heat loss therefore being reduced wherever possible. Calculated y-values for the residential units vary between 0.045 and 0.061 and are based on reference PSI values from Table R2 of the SAP10.2 methodology, or best practice PSI values, where deemed applicable to the scheme. Accurate calculation of these heat losses for all main junctions will be required at the technical design stage.

Air leakage

6.15. After conductive heat losses through building elements are reduced, convective losses through draughts are the next major source of energy wastage. The proposal adopts an airtightness standard of 4.50-5.00m3/h.m2 at 50Pa, with pressure testing of all dwellings to be undertaken on completion to confirm that the design figure has been met.

Fabric Energy Efficiency

6.16. Table 7 demonstrates that the dwellings will improve upon the uplifted Fabric Energy Efficiency targets within Part L 2021 through the proposed specification.

Table 7. Fabric Energy Efficiency of proposed dwellings

	Target Fabric Energy Efficiency (kWh/m²/year)	Design Fabric Energy Efficiency (kWh/m²/year)	Improvement %
5 Bed Det	43.09	41.51	3.66

Provisions for Energy-Efficient Operation of the Dwelling

6.17. The occupants of the dwellings should be provided with all necessary literature and guidance relating to the energy efficient operation of fixed building services. Currently it is assumed that all dwellings will be provided with air source heat pumps (ASHP), fully insulated primary pipework and controls including programmers, thermostats and Thermostatic Radiator Valves to avoid unnecessary heating of spaces when not required – for example, bedrooms and living rooms with differing hours of occupancy.

7. Low Carbon and Renewable Energy Systems

7.1. A range of low carbon and renewable energy systems have been assessed for their potential to deliver suitable emission savings.

Combined Heat and Power (CHP) and District Energy Networks

7.2. A CHP unit can generate heat and electricity from a single fuel source. The electricity generated by the CHP unit is used to displace electricity that would otherwise be supplied from the national grid, with the heat generated as effectively a by-product utilised for space and water heating.

7.3. The economic and technical viability of a CHP system is largely reliant on a consistent demand for heat throughout the day to ensure that it operates for over 5000 hours per year. Heat demand from mainly residential schemes is not conducive to efficient system operation, with a defined heating season and intermittent daily profile, with peaks in the morning and the evening. For this reason, the use of a CHP system is considered unfeasible for this development.

7.4. There are currently no heat networks which extend near the proposed development. High network heat losses associated with distribution to individual houses, as opposed to large high-rise apartment blocks and commercial developments mean that a new heat network to serve the area is not considered viable or an environmentally preferred option. Due to these reasons, the provision for future connection to a district heating system is also not proposed.

Wind Power

7.5. Locating wind turbines adjacent to areas with buildings presents several potential obstacles to deployment. These include the area of land onsite required for effective operation, installation and maintenance access, environmental impact from noise and vibration, visual impact on landscape amenity and potential turbulence caused by adjacent obstacles, including the significant amount of woodland on and around the development.

7.6. A preliminary examination of the BERR wind speed database indicates that average wind speeds at 10m above ground level are around 4.80m/s [3]. Wind turbines at this site are therefore unlikely to generate enough electrical energy to be cost effective[4]. For these reasons wind power is not considered feasible.

Building Scale Systems

7.7. The remaining renewable or low carbon energy systems considered potentially feasible are at a building scale. These are as follows:

- Individual biomass heating
- Solar thermal
- Solar photo-voltaic (PV)
- Air Source Heat Pumps (ASHPs)
- Ground Source Heat Pump (GSHPs)

7.8. The advantages and disadvantages of these technologies are evaluated in Tables 8-12.

[3] NOABL Wind Map (http://www.rensmart.com/Weather/BERR)

[4] CIBSE TM38:2006. Renewable energy sources for buildings.

Table 8. Individual Biomass Heating feasibility appraisal

Potential Advantages	Risks & Disadvantages
• Potential to significantly reduce CO_2 emissions as the majority of space and water heating will be supplied by a renewable fuel • Decreased dependence on fossil fuel supply	• A local fuel supply is required to avoid increased transport emissions • Fuel delivery, management and security of supply are critical • Space is required to store fuel, a thermal store and plant • A maintenance regime would be required even though modern systems are relatively low maintenance • Building users or a management company must be able to ensure fuel is supplied to the boiler as required. • Local environmental impacts potentially include increased NO_x and particulate emissions
Estimated costs and benefits	
• Cost £2,000 upwards for a wood-pellet boiler, not including cost of fuel	
Conclusions	
Sustainable and local fuel supply is critical to ensuring predicted CO2 emissions savings for biomass energy systems. Fuel storage capacity on site dictates the length of time required between deliveries and the volume of fuel delivery required. With limited space for access and storage of fuel more frequent deliveries would be required. Combustion of wood products would give rise to significant NOx and particulate emissions. For these reasons, biomass is not considered an appropriate fuel source for this proposed development.	

Table 9. Solar Thermal systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
• Mature and reliable technology offsetting the fuel required for heating water • Solar thermal systems require relatively low maintenance • Typically, ~50% of hot water demand in dwellings can be met annually	• Installation is restricted to favourable orientations on an individual building basis • The benefit of installation is limited to the water heating demand of the building • Safe access must be considered for maintenance and service checks • Buildings need to be able to accommodate a large solar hot water cylinder • Distribution losses can be high if long runs of hot water pipes are required • Visual impact may be a concern in special landscape designations (e.g. AONB)
Estimated costs and benefits	
• Cost £2,000 - 5,000 for standard installation • Ongoing offset of heating fuel, minimal maintenance requirements	
Conclusions	
Solar thermal systems are considered technically feasible on all buildings with suitable roof orientations. However, due to the intermittent and unknown level of water usage within some building uses, especially during periods of unoccupancy, this option is not considered favourable. For the residential dwellings to reduce energy demand water cylinders are to be kept to a minimum therefore solar thermal is only feasible for larger dwellings with separate cylinder. At this stage of the design, it is therefore not considered feasible.	

Table 10. Solar Photovoltaic systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
• The technology offsets grid supplied electricity used for lighting, pumps and fans, appliances and equipment • Mature and well proven technology that is relatively easily integrated into building fabric • Adaptable to future system expansion • Solar resource is not limited by energy loads of the dwelling as any excess generation can be transferred to the national grid • PV systems generally require very little maintenance • Service and maintenance requirement minimal and 2-3 storey buildings should not require significant additional safety measures (fall protection systems etc) for roof access	• Poor design and installation can lead to lower-than-expected yields (e.g. from shaded locations) • Installation is restricted to favourable orientations • Feed in Tariff support mechanism has been discontinued • Safe access must be considered for maintenance and service checks • Visual impact may be a concern in special landscape designations (e.g. AONB) or conservation areas • Reflected light may be a concern in some locations
Estimated costs and benefits	
• Cost £1,300 upwards (1kWp+) and scalable • Ongoing offset of electricity fuel costs, minimal maintenance requirements	
Conclusions	
PV panels are considered technically feasible for all buildings with suitable roof orientations. The relatively low cost and limited additional impacts mean that PV is considered a feasible option for this development.	

Table 11. Air Source Heat Pump systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
• Heat pumps are relatively mature technology providing heat using the reverse vapor compression refrigeration cycle • Heat pumps are a highly efficient way of providing heat using electricity, with manufacturers reporting efficiencies from 250% • Can be of increased benefit where cooling is also required, therefore particularly relevant to commercial buildings	• It is critical that heat pump systems are designed and installed correctly to ensure efficient operation can be achieved. • Users must be educated in how heat pump systems should be operated for optimal efficiency • Air source heat pump plant should be integrated into the building design to mitigate concerns regarding the visual impact of bolt-on technology • Noise in operation may be an issue particularly when operating at high output, requires good system design
Estimated costs and benefits	
• Cost £5,000 - £7,000 for standard installation	
Conclusions	
Air source heat pumps may be technically feasible for this scheme; however, the visual impact and noise implications would need to be carefully considered. For commercial spaces where heating is predominately required during daytime hours ASHP can provide a cost effective and efficient solution for heating and cooling where required.	

Table 12. Ground Source Heat Pump systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
• Heat pumps are relatively mature technology providing heat using the reverse vapor compression refrigeration cycle • Heat pumps are a highly efficient way of providing heat using electricity, with manufacturers reporting efficiencies from 320% • Can be of increased benefit where cooling is also required, therefore particularly relevant to commercial buildings	• Low temperature heating circuits (underfloor heating) would be required to maximise the efficiency of heat pumps • A hot water cylinder would also be required for both space and water heating • It is critical that heat pump systems are designed and installed correctly to ensure efficient operation can be achieved • Ground source heat pumps either require significant land to incorporate a horizontal looped system or significant expense to drill a bore hole for a vertical looped system
Estimated costs and benefits	
• Cost circa £10,000+ • Estimated simple payback at circa 18 years (systems only) • Running cost linked to COP of heat pump, however likely to be higher than mains gas • Additional costs to upgrade electricity infrastructure currently unknown	
Conclusions	
Ground source heat pumps are considered technically feasible for buildings in this scheme. However, the cost and difficulty associated with vertical boreholes at this site means that they are not considered a preferred low carbon technology at this stage.	

Summary

7.9. Following this feasibility assessment, it is considered that there are a range of technically feasible low carbon or renewable energy systems, however a number of these may be discounted on the grounds of increased running costs for residents or other adverse effects:

- Biomass heating systems would require significant storage space for fuel as well as regular deliveries at different times to all dwellings. Local NO_x and particulate pollution is also an increasing concern and therefore they are not appropriate for this development.

- Ground source heat pump systems may be technically feasible; however, the ground conditions are unknown and the capital cost is likely to be prohibitive.

7.10. It is currently proposed that the whole site will incorporate air source heat pump heating systems supplemented with solar PV to meet Part L 2021 standards while reducing running costs for the dwelling occupants.

7.11. Where needed, PV will be apportioned depending on the specific characteristics of the homes and commercial buildings, making use of favourable roof pitches and orientations. Full PV system designs will be developed by a PV designer once full SAP calculations are completed.

8. As-Designed Performance

8.1. By following the strategy described, the dwellings will reduce energy demand and consequent CO_2 emissions beyond the level of a Part L compliant development.

8.2. For the new construction elements Indicative SAP and SBEM calculations have been undertaken on a sample dwelling and a representative non-domestic office building to provide an overview of the as-designed performance, in comparison with Building Regulations standards. The results of these calculations are shown in Table 13.

Table 13. Indicative non-domestic building performance - CO_2 emissions

	Target Carbon Emissions ($KgCO_2$/yr)	As-Designed Carbon Emissions ($KgCO_2$/yr)	Reduction %
Office	240	237	1.25
Warehouse	1,660	1,176	29.16
Dwelling	1,807	1,770	2.00

8.3. Table 14 demonstrates that the dwellings will exceed the uplifted Fabric Energy Efficiency targets within Part L 2021 through the proposed specification.

Table 14. Fabric Energy Efficiency of sample dwellings

	Target Fabric Energy Efficiency ($kWh/m^2/yr$)	Design Fabric Energy Efficiency ($kWh/m^2/yr$)	Improvement %
Sample Dwelling	43.09	41.51	3.66

9. Resource Efficiency

9.1. This section sets out details of additional resource efficiency and sustainable design principles to be applied at the development.

Materials

9.2. The impacts of construction materials range from the depletion of natural resources to the greenhouse gas emissions and water use associated with their manufacture and installation.

9.3. Within the development choices will be made to reduce the consumption of primary resources and using materials with fewer negative impacts on the environment, including but not limited to the following:

- Use fewer resources and less energy through designing buildings more efficiently.
- Specify and select materials and products that strike a responsible balance between social, economic and environmental factors.
- Incorporate recycled content, use resource-efficient products and give due consideration to end-of-life uses.
- Influence, specify and source increasing amounts of materials which can be reused and consider future deconstruction and recovery.

Waste

9.4. Sending waste to landfill has various environmental impacts, such as the release of local pollution, ecological degradation and methane emissions, in addition to exacerbating resource depletion. Waste in housing comes from two main streams: construction waste and domestic waste during occupation.

Household Waste

9.5. In this respect regard has been given to the policy advice contained in the NPPF together with the Council's current strategy in terms of waste and recycling to ensure that the new dwellings are provided with adequate storage facilities for both waste and recyclable materials.

9.6. Horsham District Council currently operate a household collection service through which households can recycle materials including paper and cardboard, plastic bottles, tins, glasses and metal foils, along with a separate collection for garden waste. Future occupiers of the dwellings will be provided with an information pack detailing the Council's current collection arrangements for waste and recycling and advising of the nearest recycling centres to the Application site.

Construction Waste

9.7. The development will additionally be designed to effectively and appropriately monitor and manage construction site waste. Target benchmarks for resource efficiency will be set in accordance with best practice – e.g. m^3 of waste per $100m^2$ / tonnes waste per m^2.

9.8. Wherever possible materials will be diverted from landfill through re-use on site, reclamation for re-use, returned to the supplier where a 'take-back' scheme is in place or recovered and recycled using an approved waste management contractor. A target to divert 85% by weight/volume of non-hazardous construction waste will be applied.

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10. Water Conservation

10.1. In line with current Building Regulations, water use will be managed effectively throughout the development through the incorporation of appropriate efficiency measures.

10.2. Water efficiency measures including the use of efficient dual flush WCs, low flow showers and taps and appropriately sized baths will be encouraged with the aim to limit the use of water during the operation of the development to limit water use.

10.3. Table 15 shows how the development could achieve a result significantly less than the required 125 litres/occupier/day calculated in accordance with Building Regulations.

10.4. The calculation results in a total water consumption of 84.9 Litres/Person/Day for the intended specification, well below the maximum of 125 Litres/Person/Day required by Building Regulations.

10.5. For new and refurbished commercial spaces, a figure of 28l/person per working day has been assumed in the Water Neutrality Statement dated Feb 2025 which will supplement this report.

Table 15. Typical Water Demand Calculation

Installation Type	Unit of measure	Capacity/ flow rate	Litres/Person/Day
WC (dual flush)	Full flush (l)	4	5.84
	Part flush (l)	2.6	7.70
Taps (excluding kitchen taps)	flow rate (l/min)	5	9.48
Bath	Capacity to overflow (l)	130	14.3
Shower	Flow rate (l/min)	8	34.96
Kitchen sink taps	Flow rate (l/min)	6	13
Calculated Use			101.39
Contribution from rainwater			13.54
Normalisation Factor			0.91
Total Internal Consumption (L)			79.94
External Use			5.0
Building Regulations 17. K			84.9

11. Conclusions

11.1. This Energy and Sustainability Statement has been prepared by AES Sustainability Consultants Ltd on behalf of Lake Investments Limited to detail the proposed approach to sustainable construction to be employed at the development at Stonehouse Farm.

11.2. The development site is located off Handcross and Hammerpond Road to the east of Horsham, within the administrative boundary of Horsham District Council

11.3. The development will be delivered in three phases:

- Rationalisation and enhancement of existing commercial facilities (Use Classes E(g) B2 and B8 at Stonehouse Business Park including demolition of two buildings and their replacement with new Class E(g), B2 and B8 facilities. Extension of existing building to form a new office and wardens' accommodation. Existing mobile home removed.
- Decommissioning of the Anaerobic Digester and re-use of the existing 2no buildings for storage and office uses (Class E (g) and B8) and the diversion of a public footpath.
- Residential redevelopment of the Jacksons Farm site including the demolition of existing barns to provide 3no. dwellings with access, parking, and landscaping.

11.4. All homes will be delivered to meet the minimum requirements of Part L1 2021 and will therefore deliver a minimum 31% reduction compared with previous regulatory standards, which equates to emission levels less than half of homes built to L1A 2006 standards.

11.5. All non-domestic spaces shall be delivered to meet the minimum requirements of Part L2 2021 and will therefore deliver a >27% reduction compared with previous regulatory standards.

11.6. This strategy focuses on a 'Fabric First' approach which prioritises improvements to the fabric of the dwellings to avoid unnecessary energy demand and consequent CO_2 emissions. Improvements in insulation specification, efficient building services, a reduction in thermal bridging and unwanted air leakage paths and further passive design measures will enable the relevant standards to be met, whilst building in low energy design and future climate resilience to the design and construction of the dwellings.

11.7. Low and zero carbon energy systems have been considered for their suitability and feasibility of delivering these reductions. Based on indicative SAP calculations, including the proposed fabric measures and low carbon renewable energy systems, it's concluded that the development will reduce emissions by an estimated 1,085 $kgCO_2$/year over Part L 2021 Regulatory Standards.

11.8. The statement additionally details the proposed approach to addressing overheating risk and climate resilience, sustainable and responsible materials usage and water consumption of the dwellings.

11.9. It has also been determined that the calculated water consumption could equate to a maximum water consumption of 84.9 litres/occupier/day and therefore meet the requirements of 125 litres per person per day, as detailed by Building Regulations.