

Land West of Ravenscroft, Storrington

A2Dominion Developments Ltd

Energy and Sustainability Statement

AES Sustainability Consultants Ltd

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This statement has been commissioned A2Dominion Developments Ltd to detail the proposed approach to sustainable construction to be employed at Petworth Road, Witley 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 Sustainability Statement has been prepared on behalf of A2Dominion Developments Ltd in support of the development of Land West of Ravenscroft, Storrington

Development Description

- 1.2. The proposed development site is located on land West of Ravenscroft, Storrington. The site lies within Horsham District Council & South Downs
- 1.3. This statement has been prepared to support the outline planning application. The proposals would deliver approximately 78 dwellings including an apartment block and two-to-four-bedroom houses. The proposed site layout is shown in Figure 1.

Purpose and Scope of the Statement

- 1.4. This statement has been prepared to address relevant national and local policies relating to the sustainable design and construction of dwellings, whilst addressing a range of additional sustainable design considerations and policies contained within the Horsham District Planning Framework (November 2015) & South Downs Local Plan 2019
- 1.5. This statement demonstrates that through a combination of fabric measures and with the implementation of low carbon renewable energy systems, the development will deliver a level of energy performance beyond a Part L 2021 baseline.
- 1.6. A range of additional sustainable design considerations will be addressed including resource efficiency, waste reduction and water efficiency, both during and after construction.



Figure 1 – Site Layout

2. Planning Policy

- 2.1. This statement will address requirements as set out within the Horsham District Planning Framework 2015, in particular, policies 35, 36 & 37
- 2.2. South Downs Local Plan 2019, strategic policy SD48 Climate Change & Sustainable use of resources

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; and
5. Measures which reduce the amount of biodegradable waste sent to landfill.

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;

Policy 35 - Strategic Policy: Climate Change - Continued

3. Use of measures which promote the conservation of water and/or greywater recycling; and

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 adaptation 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 heat wave 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.

Renewable energy schemes

The Council will permit schemes for renewable energy (e.g. solar) where they do not have a significant adverse effect on landscape and townscape character, biodiversity, heritage or cultural assets or amenity value. Community initiatives which seek to deliver renewable and low carbon energy will be encouraged.

Strategic Policy SD48: Climate Change and Sustainable Use of Resources

The Authority will encourage all new development to incorporate sustainable design features, as appropriate to the scale and type of development.

All development proposals will be required to achieve the minimum standards as set out below unless it can be demonstrated that doing so is not technically feasible or would make the scheme unviable:

Residential:

- i. Energy efficiency: 19% carbon dioxide reduction improvement against Part L (2013)⁹⁶ through the energy efficiency of the building and;
- ii. Water: Total mains consumption of no more than 110 litres per person per day⁹⁷.

Non-residential and Multi-residential

- i. Major: Building Research Establishment Environmental Assessment Method (BREEAM) Excellent⁹⁸

All development proposals, including retrofitting, will be required to demonstrate, proportionately, how the development addresses climate change mitigation and adaptation through the on-site use of zero and/or low carbon technologies, sustainable design and construction, and low carbon materials.

- 4. Major development proposals should also include an energy assessment to demonstrate how carbon dioxide emissions are to be minimised on-site.

National Planning Policy Framework

- 2.3. The National Planning Policy Framework (NPPF) sets out the Government's policies for plan-making and for making decisions on development proposals in England.
- 2.4. In August 2026, the Ministry for Housing, Communities and Local Government (MHCLG) published a new NPPF to replace the previous version (December 2024) with immediate effect.
- 2.5. Chapter 5 of the 2026 NPPF (Meeting the challenge of climate change) includes guidance which is particularly relevant to the proposed energy performance and climate resilience of this

The objective of the policies in this chapter is to support the transition to net zero by 2050 and to shape places in ways which are more resilient to the effects of climate change.

It does this by setting out policies to shape places in ways that contribute to radical reductions in greenhouse gas emissions and adapt to the full range of current and potential impacts of climate change, by minimising vulnerability and improving resilience.

CC1: Planning for climate change

1. Development plans should take a proactive approach to mitigating climate change and supporting the transition to net zero, in accordance with the objectives and provisions of the Climate Change Act 2008. They should also take a proactive approach to adapting to climate change, taking into account the implications of extreme weather and long-term climate trends including overheating, wildfires, drought, flood risk, coastal change, water supply, biodiversity and landscapes. They should do this by:

- a. Proposing development patterns through their spatial strategy and allocations which
 - i. Can help contribute to radical reductions in greenhouse gas emissions (which can be informed by an assessment of baseline carbon emissions and the potential effect of development options on future emissions and their mitigation); and
 - ii. Avoid increased vulnerability and improve resilience to the effects of climate change.
- b. Addressing any specific risks from climate change in their proposed allocations for development, and necessary adaptations, both of which should be considered for the anticipated lifetime of the development.
- c. Setting local water efficiency standards for new developments where these are justified
- d. Identifying opportunities for green infrastructure provision and nature based solutions which can safeguard and improve carbon storage, support nature recovery and resilience, and which take account of Local Nature Recovery Strategies.

CC2: Mitigation of climate change

1. In order to contribute to climate change mitigation and the transition to net zero, development proposals should, where relevant to the proposal:
 - a. Accord with policies TR3 and TR4 [*Promoting sustainable transport*] so that sustainable patterns of movement are prioritised, and infrastructure is provided to support the transition to zero emission vehicles;
 - b. Support good access to facilities in order to limit the need to travel;
 - c. Use design approaches which conserve energy and other resources;
 - d. Take advantage of opportunities to re-use existing structures and materials;
 - e. Take advantage of opportunities to draw low carbon energy from decentralised networks (such as district heat networks), where these are available, and to co-locate energy and heat generators and users, especially to take advantage of suppliers of surplus heat and energy;
 - f. Contribute to the creation and restoration of habitats, while avoiding harm to habitats
 - g. Not involve the extraction of fossil fuels
2. Substantial weight should be given to the benefits of improving the energy efficiency of existing buildings and/or drawings energy from district heat networks, renewable and low carbon sources (including through the installation of heat pumps and solar panels.

CC3: Adaptation of climate change

1. Development proposals should take into account the current and potential impacts of climate change over the lifetime of the scheme, and in order to minimise vulnerability to these impacts should, where relevant to the proposal:
 - a. Be located where the risk of flooding is minimised
 - b. Comply with Policy F9 [*Coastal Change Management Areas*] where development would be located in an area vulnerable to coastal change

- c. Incorporate sustainable drainage systems to manage surface water flow rates and reduce volumes of runoff
 - d. Use design approaches which minimise risks from overheating in accordance with policy DP3 [*Key principles for well designed places*]
 - e. Incorporate proportionate measures against wildfires
2. Substantial weight should be given to the benefits of improving the resilience of existing buildings and public spaces to anticipated climate change impacts where this would be achieved through proposals for development.

Plan-Making Policies

- 2.6. Section 2 of the 2026 NPPF (*Plan-Making Policies*) requires local planning authorities produce and maintain key documentation, so the planning process allows residents to influence in how development and growth is prioritised in their area.
- 2.7. Required documents include spatial development strategies, a local plan, a policies map, and may also include supplementary and neighbourhood specific plans for future development.
- 2.8. Policy PM13 is relevant to this document, as locally written council policies are expected not to contradict nationally approved standards

PM 13: Setting Standards

1. Quantitative standards set through development plan policies for infrastructure provision, affordable housing requirements, parking, density, and design and placemaking should provide clarity and a high degree of certainty about the requirements that relevant development proposals are expected to meet. Such standards should:
 - a. Be justified, drawing upon relevant evidence of local characteristics and needs, while utilising or adapting relevant national standards where it is appropriate to do so. Evidence in support of standards should be proportionate, in accordance with policy PM8, especially where relevant national standards already exist; and
 - b. Not cover matters which are already addressed by Building Regulations, other than in relation to:
 - i. Accessibility standards, for which local standards in relation to requirement M4(2) and/or M4(3) of the Building Regulations should be set in accordance with policy HO5 [*Meeting the needs of different groups*]; or
 - ii. Water efficiency, for which it may be appropriate to apply the tighter Building Regulations optional requirement when justified, or exceptionally a more stringent local standard in areas of serious water stress; or
 - iii. Energy efficiency, for which any standards that go beyond the current or proposed Building Regulations should have a clear and robustly costed rationale which shows that there will not be an adverse impact on the viability and deliverability of development. Any such standards should be expressed as a percentage uplift of a dwelling's Target Emissions Rate (TER) calculated using a specified version of the Standard Assessment Procedure (SAP) or other approved calculation methodology.
2. Quantitative standards should not cover other matters, or relate solely to the internal layout of buildings, unless:
 - a. They are to implement the nationally described space standard; or
 - b. They have a clear and robustly costed rationale, are proportionate and will not have an adverse impact on the viability and deliverability of development.

Current National Policy Standards

- 2.9. The government introduced the next revision in Building Regulations, known as Part L 2021 in December 2021, which came into effect for buildings where construction commenced after 15th June 2023. The new standards require a 31% reduction in CO₂ emissions compared with the previous Building Regulations standard.
- 2.10. In 2016, the UK government ratified the Paris Agreement, which provides a framework for governments to pursue the target of limiting global warming below 2°C.
- 2.11. In June 2019, the Government announced it had set a new net zero greenhouse gas emission target for the UK by 2050, compared with the previous target of at least 80% reduction from 1990 levels.
- 2.12. The built environment has a key role to play in delivering these international commitments, as it accounts for approximately a third of overall CO₂ emissions. These commitments have been translated into national policies within the built environment driven by, amongst other mechanisms, the EU Energy Performance of Buildings Directive and the 2012 Energy Efficiency Directive.
- 2.13. Following the introduction of the 2021 edition of Building Regulations Part L, the successive updates now require regulated CO₂ emissions levels from new-build domestic buildings to be approximately 50% lower than 2006 levels. Similarly, non-domestic buildings have also seen significant updates with a 27% reduction in CO₂ emissions over Part L2A 2013 Building Regulations now being required.
- 2.14. The Government proposes that the Building Regulations are the appropriate mechanism to drive future standards with respect to energy consumption, with local authorities able to apply the optional requirements of the national technical standards with respect to water consumption and space

Future Homes Standard

- 2.15. In 2019, the UK Government committed to making significant changes to the energy and emission targets required by Building Regulations for all new residential development.
- 2.16. As well as setting the foundations for new standards in energy efficiency and readiness to adopt a zero-carbon future, the policy also introduced objectives to:
 - ensure new homes are comfortable to live in during spells of hot water,

- to be suitably ventilated with sufficient air flow to mitigate against damp or mould,
- to remove the need for fossil fuels when heating homes, and
- to ensure newly built homes do not have high running costs

2.17. Six years later, the interim Future Homes Standard introduced changes to Approved Documents Part L (conservation of fuel) and Part F (ventilation) and led to the creation of a new volume to Building Regulations - Part O - which sets mandatory requirements to limit the risk of overheating in new homes.

2.18. The conclusion of the FHS policy has now been announced and any new sites (which include new build houses and low-rise apartments) submitted to the Building Authority on or after the 24th of March 2027 are required to be designed to FHS regulations across England. FHS has brought the arrival of stricter energy and emission targets through a further revision to Approved Document Part L.

2.19. Introduction of the Future Homes Standard sees a further reduction in Carbon emissions over Part L 2021, mandatory use of photovoltaic panels and an effective ban on the use of fossil fuel heating systems i.e. gas and oil.

2.20. There are two compliance routes under the Future Homes Standard: SAP 10.3 and the Home Energy Model (HEM). Whilst SAP 10.3 is currently available for use, the HEM has been delayed with this expected to be released in late 2026. In due course, the use of SAP will be phased out meaning all new developments will eventually be modelled using the HEM.

2.21. Initial modelling indicates that Future Homes Standard compliant dwellings will achieve close to net zero regulated CO₂ emissions.

Proposed Strategy

2.22. This statement is intended to establish the proposed approach to sustainable construction and reduction in CO₂ emissions to be delivered at the development.

2.23. The proposed energy strategy has been developed with regard to the Horsham District Planning & South Downs Local Plan. The strategy prioritises a fabric-first approach to minimise energy demand, supported by the use of low-carbon heating systems.

2.24. The development will be designed to achieve compliance with Building Regulations Part L (2021), demonstrating that regulated CO₂ emissions are reduced through a combination of enhanced building fabric performance and efficient building services.

2.25. The development also considers the changing future climate and seeks to build in resilience through appropriate construction techniques and materials to avoid future risks of overheating.

2.26. There are many other aspects of sustainability which relate to new housing development and will be considered further within this statement including water use and the environmental impacts of materials, construction, and household waste.

3. Climate Change Resilience

- 3.1. Climate resilience measures have been considered in accordance with the guidance set out in Chapter 7 of the South Downs Local Plan 2019
- 3.2. 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.

Cooling hierarchy

- 3.3. In common with sustainable heating strategies, it is possible to apply a sustainable 'cooling hierarchy' which sets out the priorities to ensure overheating risk is minimised:
 - Minimise internal heat gain
 - Manage heat through internal thermal mass and design of spaces
 - Passive ventilation strategies
 - Mechanical ventilation systems
 - Active cooling systems
- 3.4. In line with the above hierarchy Passive design measures will be prioritised to enhance resilience to climate change impacts throughout the lifetime of the development.

Addressing overheating risk

- 3.5. 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.
- 3.6. Dwellings will be able to benefit from cross-ventilation wherever possible 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.
- 3.7. Ventilation will be provided through a combination of natural ventilation via openable windows and mechanical extract ventilation where required to ensure compliance with the requirements of Building Regulations Part F.

- 3.8. Heat build-up in the surroundings will be reduced by a layout which incorporates significant green space and sustainable urban drainage features such as attenuation areas and allotments around the site and in rear gardens, increasing evaporative cooling and reducing the potential for heat build-up in enclosed and low albedo external areas.

Approved Document O

- 3.9. In order to more robustly address overheating risk, the Government introduced a new Approved Document, 'Part O', into the Building Regulations.
- 3.10. 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.
- 3.11. This assessment will be undertaken at the start of detailed design and any mitigation measures that may be required will be built in.

4. Energy Consumption and CO₂ 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. 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.
- 4.3. As shown in Table 1, the CO₂ standards contained within Part L were increased in 2010 and 2013, reducing the TER by approximately 25% and a further 6% (9% for non-residential) respectively. Part L 2021 became mandatory from June 2023, constituting a much larger step change of a 31% reduction in emissions.

Table 1. CO₂ Emissions improvements from successive Part L editions

Building Regulations	CO ₂ emissions improvements preceding regulations
L1A 2006	-
L1A 2010	25%
L1A 2013	6%
L1 2021	31%

Energy Reduction Strategy – Fabric First

- 4.4. 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.

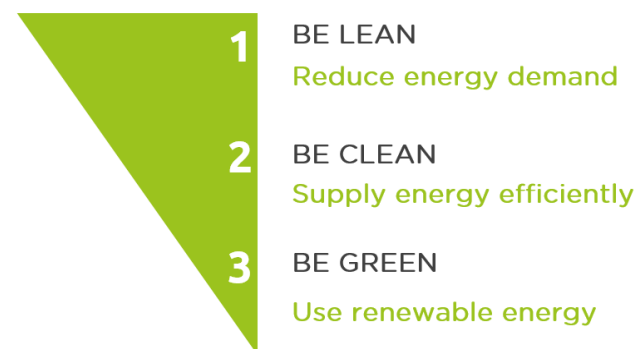


Figure 2. The Energy Hierarchy

Be Lean – reduce energy demand

- 4.5. 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 overshadowing 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

4.6. 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

4.7. 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 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

4.8. 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.

4.9. This approach has been widely supported by industry and government for some time, particularly in the residential sector, with the Zero Carbon Hub¹ and the Energy Savings Trust² having both stressed the importance of prioritising energy demand as a key factor in delivering resilient, low energy buildings.

4.10. 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	✓	✗

Building Regulations Standards – Fabric Energy Efficiency

4.11. In addition to the CO₂ reduction targets, the importance of energy demand reduction was further supported by the introduction of a minimum fabric standard into Part L1A 2013, based on energy use for heating and cooling a dwelling. This is referred to as the 'Target Fabric Energy Efficiency' (TFEE) and expressed in kWh/m²/year.

4.12. This standard enables the decoupling of energy use from CO₂ emissions and serves as an acknowledgement of the importance of reducing demand, rather than simply offsetting CO₂ emissions through low carbon or renewable energy technologies.

4.13. The TFEE is calculated based on the specific dwelling being assessed with reference values for the fabric elements contained within Approved Document L1. These reference values are described as 'statutory guidance' as opposed to mandatory requirements, allowing full flexibility in design approach and balances between different aspects of dwelling energy performance to be struck so that the ultimate goal of achieving the TFEE is met.

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

Proposed Fabric Specification

- 4.14. In line with the guidance set out in the Horsham District Planning Framework 2015, the development adopts a fabric-first approach to minimise energy demand prior to the integration of low-carbon technologies. Table 3 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 3. Proposed construction specification – main elements

	Part L1 Limiting Fabric Parameters	Proposed Specification
External wall – u-value	0.26 W/m ² K	≤ 0.20 W/m ² K
Party wall – u-value	0.20 W/m ² K	0.00 W/m ² K
Plane roof – u-value	0.16 W/m ² K	≤ 0.09 W/m ² K
Ground floor – u-value	0.18 W/m ² K	≤ 0.11 W/m ² K
Windows – u-value	1.60 W/m ² K	≤ 1.30 W/m ² K
Doors – u-value	1.60 W/m ² K	≤ 1.20 W/m ² K
Air Permeability	8.00 m ³ /h.m ² at 50 Pa	<4.50 m ³ /h.m ² at 50 Pa

Thermal bridging

- 4.15. 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 CO₂ reduction targets.
- 4.16. The specification will seek to minimise unnecessary bridging of the insulation layers, with avoidable heat loss therefore being reduced wherever possible. Accurate calculation of these heat losses forms an integral part of the SAP calculations undertaken to establish energy demand of the dwellings, and as such thermal modelling will be undertaken to assess the performance of all main building junctions.

Air leakage

- 4.17. 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 m³/h.m² at 50Pa, with pressure testing of all dwellings to be undertaken on completion to confirm that the design figure has been met.
- 4.18. In addition, appropriate draught proofing measures will be incorporated including sealing of service penetrations, draught strips to external doors and improved floor sealing to reduce uncontrolled air leakage.

Fabric Energy Efficiency

- 4.19. Table 4 demonstrates that the dwellings will exceed the uplifted Fabric Energy Efficiency targets within Part L 2021 through the proposed specification.

Table 4. Fabric Energy Efficiency of sample dwellings

	Target Fabric Energy Efficiency (kWh/m ² /year)	Design Fabric Energy Efficiency (kWh/m ² /year)	Improvement %
2 Bed Semi	40.24	38.27	4.88
3 Bed Semi	37.23	35.43	4.84
4 Bed Semi	37.31	35.39	5.15
4 Bed Det	41.80	40.28	3.63
GF Apt	35.31	34.57	2.10
FF Apt	24.87	25.22	-1.41
SF Apt	31.62	31.11	1.63

Note: For apartments block compliance will be utilised for Part L DFEE/TFEE this allows multiple plots to perform as a block where they are directly connected via party walls, floor or ceilings, averaging the compliance metrics.

- 4.20. Heat generation and distribution systems will be designed to give the occupants a high level of control over their use, encouraging and allowing energy-efficient behaviour. Primary pipework should be fully insulated, and time and temperature zoning controls installed in all dwellings.
- 4.21. Internal lighting should be low energy wherever possible, and areas of infrequent use may be fitted with occupancy sensors. External security and space lighting should be low energy and fitted with PIR and daylight sensors where appropriate.

5. Low Carbon and Renewable Energy Systems

- 5.1. A range of technologies have been assessed for potential incorporation into the scheme in accordance with Regulation 25A of the Building Regulations (2013) and with the intent of delivering compliance with the carbon reduction targets contained within Part L 2021.

Combined Heat and Power (CHP) and District Energy Networks

- 5.2. A CHP unit is capable of generating 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.
- 5.3. 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.
- 5.4. 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

- 5.5. 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.
- 5.6. A preliminary examination of the BERR wind speed database indicates that average wind speeds at 10m above ground level are around 4.6 m/s³. Wind turbines at this site are therefore unlikely to generate sufficient quantities of electrical energy to be cost effective⁴. For these reasons wind power is not considered feasible.

³ NOABL Wind Map (<http://www.rensmart.com/Weather/BERR>)

Building Scale Systems

- 5.7. 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)
 - Hot water heat pumps

- 5.8. The advantages and disadvantages of these technologies are evaluated in Tables 5-10.

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

Table 5. Individual Biomass Heating feasibility appraisal

Potential Advantages	Risks & Disadvantages
• Potential to significantly reduce CO₂ 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
Conclusions	
Biomass heating is considered technically feasible in large dwellings provided sufficient space can be accommodated for fuel supply, delivery and management.	

Table 6. Solar Thermal systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
• Mature and reliable technology offsetting the fuel required for heating water (typically gas) • 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)
Conclusions	
Solar thermal systems are considered technically feasible on all buildings with suitable roof orientations.	

Table 7. 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 (mansafe systems etc) for roof access • Future residents may be able to benefit from Smart Export Guarantee payments	• Poor design and installation can lead to lower than expected yields (e.g. from shaded locations) • Installation is restricted to favourable orientations • 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
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 8. 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 • Very low carbon heating source based on Part L 2021 carbon factor of 0.136kgCO₂/kWh	• Air source heat pumps are powered by electricity, potentially increasing fuel bills for residents compared with gas heating systems • 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
Conclusions	
Air source heat pumps are technically feasible for the buildings in this scheme, delivering very low carbon heating. However, in comparison, ground source heat pumps benefit from the relatively stable temperatures of the ground, allowing them to operate with higher and more consistent seasonal efficiencies. On this basis, whilst technically feasible, air source heat pumps are not considered the preferred low carbon heating technology for the proposed development.	

Table 9. 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 - Very low carbon heating source based on Part L 2021 carbon factor of 0.136kgCO₂/kWh	- 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 - Ground source heat pumps are powered by electricity, potentially increasing fuel bills for residents compared with gas heating systems - 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
Conclusions	
Ground source heat pumps are considered technically feasible for buildings in this scheme and represent an efficient low carbon heating solution. Whilst the installation of vertical boreholes can introduce additional capital cost compared to conventional systems, the technology offers significant carbon reductions and aligns with the objectives of current Building Regulations and local planning policy. On this basis, ground source heat pumps are considered a preferred low carbon heating technology for the proposed development, subject to detailed design and installation to ensure optimal system performance.	

Table 10. Hot Water Heat Pump Feasibility Appraisal

Potential Advantages	Risks & Disadvantages
- Hot water demand met through grid electricity with low effective emissions factor - Heat pump element increases efficiency over immersion heater, circa 200%+ - No external heat exchanger requirement, only intake and exhaust duct runs - Low noise levels - Compact solution in same footprint as hot water cylinder	- Maximum length of duct runs means that cylinder positioning needs to be considered within the dwelling - Less appropriate for larger dwellings with higher hot water demands due to potentially slower recharge rate - Some noise, however likely to be easily suppressed with appropriate cylinder location - Space heating must be met through separate system
Conclusions	
Hot water heat pumps are considered technically feasible for dwellings within this scheme where hot water demand is relatively modest and suitable cylinder positioning can be achieved to accommodate the required duct runs to the building façade. Given the compact nature of the system, low noise levels, and improved efficiency compared to direct electric immersion heating, hot water heat pumps represent an appropriate low carbon hot water solution for the proposed apartments, subject to detailed design.	

Summary

- 5.9. Following this feasibility assessment, a number of low and zero carbon technologies have been considered for the proposed development. Whilst several technologies are technically feasible, some are considered less appropriate due to operational constraints, site considerations, or reduced overall system efficiency.
- Biomass heating systems would require significant storage space for fuel and regular deliveries to the site. In addition, concerns regarding local air quality impacts from particulate and NO_x emissions mean that this technology is not considered appropriate for this development.
- 5.10. Based on the assessment undertaken, the following technologies are considered to provide the most appropriate low carbon solution for the development:
- Air Source heat pumps for both space heating and hot water for the houses
 - Hot water heat pumps (HWHP) for domestic hot water provision within the apartment units
 - Photovoltaic panels mounted to each plot (houses), at present PV has not been incorporated on the apartment blocks, however if needed it can be added in.

The current energy strategy proposes the use of air source heat pumps to provide space heating to the development, For the apartment units, domestic hot water demand will be met through the use of hot water heat pump cylinders, which provide an efficient solution within a compact footprint and improve efficiency compared to direct electric immersion systems.

Detailed SAP assessments at the design stage will confirm the final system specifications and demonstrate compliance with the requirements of Building Regulations Part L 2021.

6. Indicative As Designed CO₂ Emissions

- 6.1. The development is to be designed and constructed to meet the requirements of Part L 2021, therefore compliance with this standard forms the first stage in the sustainable construction approach.
- 6.2. Part L1 compliance is assessed through the Standard Assessment Procedure (SAP), which uses the 'Target Emission Rate' (TER) – expressed in kilograms CO₂ per meter squared of total useful floor area, per annum – as the benchmark. The calculated performance of the dwelling as designed – the Dwelling Emission Rate (DER) – is required to be lower than this benchmark level.
- 6.3. Calculations have been undertaken to an indicative sample of house types to assess the carbon emissions of the development. The proposed 2021 compliant calculated baseline carbon emissions are reported in Table 11.

Table 11. Part L compliant CO₂ emissions by house type

House type	DER CO ₂ emissions (kgCO ₂ /m ² /yr)	TER CO ₂ emissions (kgCO ₂ /m ² /yr)	% Reduction
2 Bed Semi	1.09	12.05	90.95
3 Bed Semi	-1.39	10.61	113.10
4 Bed Semi	-0.61	9.66	106.31
4 Bed Det	-0.34	10.58	103.21
GF Apt	6.13	12.77	52.00
FF Apt	4.80	10.67	55.01
SF Apt	5.52	12.05	54.19

Table 12. Estimated site-wide CO₂ emissions

	Part L 2021 CO ₂ emissions (kgCO ₂ /yr)	
Part L compliant	76,167	
As Designed	12,811	
	kgCO ₂ /yr	%
Total savings	63,356	83.2

7. Resource Efficiency and Materials

- 7.1. This section sets out details of additional resource efficiency and sustainable design principles to be applied at the development.
- 7.2. The proposed approach to material specification and waste reduction reflects the principles set out in the Waverley Climate Change and Sustainability SPD relating to resource efficiency and circular economy principles.

Materials

- 7.3. 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.
- 7.4. 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.
 - All insulating materials will have a Global Warming Potential (GWP) of < 5 in manufacture and installation.
 - All materials used in construction will be responsibly sourced, with certification obtained wherever possible. Materials with a low environmental impact as per the BRE Green Guide will be preferred.
- 7.5. Consideration will also be given to the embodied carbon associated with construction materials. Where reasonably practicable, materials will be selected with lower embodied carbon impacts, including the use of responsibly sourced materials, recycled content, and construction products with Environmental Product Declarations (EPDs). Opportunities to minimise material waste and maximise the reuse or recycling of construction materials will be explored as the detailed design progresses.
- 7.6. Private gardens associated with the dwellings will provide space suitable for outdoor clothes drying, reducing reliance on energy-intensive tumble dryers.

- 7.7. Roof drainage systems will be designed to ensure sufficient capacity to accommodate rainfall events, including allowance for more intense rainfall associated with climate change. Rainwater will be directed to the site drainage system in accordance with the wider surface water management strategy, ensuring that runoff is appropriately managed in line with sustainable drainage principles.

Waste

- 7.8. 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

- 7.9. 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.
- 7.10. Dedicated bin storage space will be provided on plot to accommodate the relevant collection boxes.
- 7.11. 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

- 7.12. 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. m³ of waste per 100m² / tonnes waste per m².
- 7.13. 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.

Electric Vehicle Charging

- 7.14. It is recognised that there is a need to ensure that the development is adaptable to accommodate a future shift in personal transportation to electric vehicles, to promote sustainable transport and to minimise air pollution. As Electric Vehicle (EV) ownership increases, developers have an increasing responsibility to provide EV charging points for occupants.

- 7.15. The development will therefore incorporate electric vehicle (EV) charging infrastructure in accordance with the requirements of Building Regulations and relevant local planning policy.
- 7.16. Further technical details of the charger along with locations will be provided at the appropriate time as preparation for the development progresses.

8. Water Efficiency

- 8.1. The UK Climate Change Risk Assessment 2017 identified risks of shortages in water supply as a future climate change impact. Therefore, the efficient use of water is an important factor when considering future resilience to climate change.
- 8.2. As well as aiming to minimise water usage through the materials used, water consumption of the end user will be considered in line with current national policy. Building Regulations 2013 Part G require water efficiency measures for all new dwellings:

Water Efficiency

G2. Reasonable provision must be made by the installation of fittings and fixed appliances that use water efficiently for the prevention of undue consumption of water.

Water Efficiency of New Dwellings

36. (1) The potential consumption of wholesome water by persons occupying a new dwelling must not exceed the requirement in paragraph (2)

(2) The requirement referred to in paragraph (1) is either –

(a) 125 litres per person per day; or

(b) in a case to which paragraph (3) applies, the optional requirement of 110 litres per person per day,

- 5.1. As measured in either case in accordance with a methodology approved by the Secretary of State.

- 8.3. Water efficiency measures are met under Part G if: The estimated consumption of wholesome water resulting from the design of cold and hot water systems (calculated in accordance with the methodology set out in Appendix A) is not greater than the standard set by the Secretary of State of 125/litres/person/day, or the optional standard of 110 litres/person/day.
- 8.4. The potential for rainwater harvesting and greywater recycling systems has also been considered as part of the water efficiency strategy. However, these systems are not proposed for the development as the scheme will achieve the optional higher water efficiency target of 110 litres per person per day through the specification of water efficient fixtures and fittings in

accordance with Building Regulations Part G. This approach represents a practical and robust means of reducing potable water demand without introducing additional maintenance requirements for occupants.

- 8.5. Appendix A of Part G provides a water efficiency calculation methodology. This assesses the whole house potable water consumption in new dwellings. The calculation methodology is to be used to assess compliance against the water performance targets in Policy CC2 & ND9 to ensure that all new dwellings meet the water efficiency requirement.
- 8.6. Water efficiency measures including the use of efficient dual flush WCs, low flow showers and taps and appropriately sized baths will be installed with the aim to limit the use of water during the operation of the development to limit water use.
- 8.7. Table 13 shows a typical specification to achieve a result less than the optional requirement for 110 litres/occupier/day calculated in accordance with Building Regulations 17.K methodology.

Table 13. Typical Water Demand Calculation.

Installation Type	Unit of measure	Capacity/ flow rate	Litres/occupier/ day
WC (dual flush)	Full flush (l)	4.5	6.57
	Part flush (l)	3	8.88
Taps (excluding kitchen taps)	flow rate (l/min)	5	9.48
Bath	Capacity to overflow (l)	160	17.60
Shower	Flow rate (l/min)	8	34.96
Kitchen sink taps	Flow rate (l/min)	5	12.56
Washing Machine	Litres/kg dry load		17.16
Dishwasher	Litres/place setting		4.50
Calculated Use			111.07
Normalisation Factor			0.91
Total Internal Consumption (L)			101.7
External Use			5.0
Building Regulations 17.K			106.7

9. Conclusions

- 9.1. This Sustainability Statement has been prepared by AES Sustainability Consultants on behalf of A2Dominion Developments Ltd to detail the proposed approach to sustainable construction to be employed at the site Land West of Ravenscroft, Storrington.
- 9.2. The primary purpose of this statement is to demonstrate how the proposed development accords with the relevant national and local sustainability and climate change policies applicable to the site. These include the National Planning Policy Framework (NPPF), together with policies contained within Horsham District Planning Framework 2015 & South Downs Local Plan 2019. The proposed development is expected to achieve an overall site-wide reduction in regulated carbon emissions of approximately 83% beyond the Part L 2021 compliant baseline.
- 9.3. The statement sets out a fabric first approach to sustainable construction, demonstrating that improvements in insulation specification, a reduction in thermal bridging, unwanted air leakage paths and further passive design measures will ensure that energy demand and consequent CO₂ emissions are minimised.
- 9.4. A range of potentially appropriate technologies have been assessed for feasibility in delivering a further reduction in CO₂ emissions, concluding that air source heat pumps/hot water heat pumps & photovoltaic panels are considered the appropriate technology for this site.
- 9.5. All homes will be delivered to meet the minimum requirements of Part L 2021.
- 9.6. The development will additionally consider the longer-term impacts of a changing climate, building in resilience through the construction specification and managing overheating risk through consideration of thermal mass and solar gain.
- 9.7. A range of additional sustainability measures have been given consideration including reduction of both construction and household waste
- 9.8. Water consumption within the development will be reduced in accordance with the requirements of Building Regulations Part G, together with **Strategic Policy SD48: Climate Change and Sustainable Use of Resources**
- 9.9. .Water efficient fittings, including low flow taps, showers and dual flush WCs, will be specified to ensure that the calculated internal potable water consumption does not exceed 110 litres per person per day, in accordance with the optional higher efficiency standard set out within Part G of the Building Regulations. The potential for rainwater harvesting and greywater recycling has also been considered; however, these measures are not proposed as the required water efficiency target can be achieved through the specification of efficient fixtures and fittings.
- 9.10. Appropriate provision for internal waste and recycling storage will be provided to ensure that recycling can be split into the appropriate streams for collection.
- 9.11. Provision will be made for electric vehicle (EV) charging infrastructure in accordance with the requirements of the Waverley Borough Council Local Plan and Policy ND9 (Energy Efficiency and Design) of the Witley Neighbourhood Plan, which supports the provision of EV charging points within new developments. The proposed development will therefore incorporate EV charging infrastructure to all dwellings, supporting the transition to low emission vehicles and contributing to improved local air quality and sustainable transport objectives. This approach is consistent with the sustainable transport principles outlined in the Waverley Climate Change and Sustainability SPD.
- 9.12. Overall, the proposed development demonstrates a robust and integrated approach to sustainable design, ensuring compliance with national and local planning policy while delivering energy efficient, climate resilient homes.