



ENERGIST

BEYOND BUILDING

Energy Statement

Land at Reed House, Jacksons Lane, Reed

On behalf of David Tait

7th March 2024

Revision: 00



REVISION HISTORY

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Calculations contained within this report have been produced based on information supplied by the Client and the design team. Any alterations to the technical specification on which this report is based will invalidate its findings.

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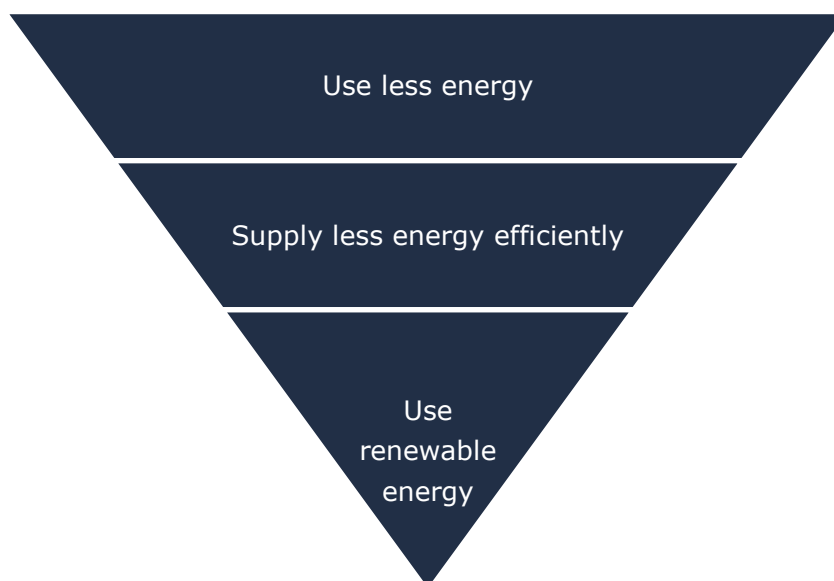
1. Executive Summary

This Energy Statement has been produced by Energist UK on behalf of David Tait ('the Applicant').

It will set out the measures planned by the Applicant to achieve energy reductions at the proposed development site: Land at Reed House, Jacksons Lane, Reed ('the Development') demonstrating compliance with:

- i) National Planning Policy Framework.
 - ii) Approved Document Part L of the Building Regulations 2021 (ADL2021)
 - iii) The local planning policy requirements for North Herts Council, Policy SP1, Policy SP9 and ENV 4.
- *Mitigate the effects of Climate Change by Encouraging the use of sustainable construction techniques, the appropriate use of renewable energy technologies.*

The Energy Statement sets out how design measures will be incorporated as part of the Development, aligning with the principles of the energy hierarchy.



The Energy Statement concludes that the following combination of measures, summarised in Table 1, will be incorporated into the Development demonstrating how the energy standard will be delivered by the Applicant.

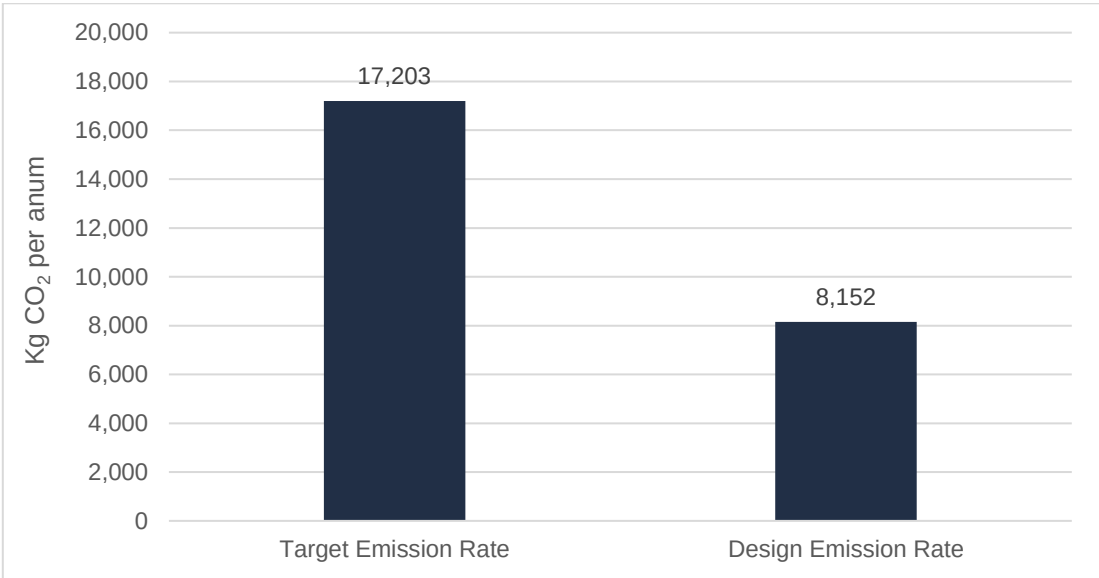


Table 1: Measures incorporated to deliver the energy standard.

Fabric first: Demand-reduction measures	• Energy-efficient building fabric and insulation to all new heat loss floors, walls and roofs. • High-efficiency double-glazed windows throughout. • Quality of build will be confirmed by achieving good air-tightness results to new build dwellings. • Efficient-building services including high-efficiency heating systems. • Low-energy lighting throughout the development.
Low-carbon & renewable energy	• Vaillant aroTHERM ASHP to provide heating and hot water demand for the bungalows. The Daikin Altherma ASHP to provide the heating and hot water demand to all houses.

The impact of these design measures in terms of how the Applicant delivers the energy standard is illustrated in Figure 1.

Figure 1: How the Development meets the energy standard ADL2021



The calculated reduction in energy and the percentage reduction in CO₂ emissions over ADL 2021 is demonstrated in Table 2.



Table 2: How the Development meets the energy standard ADL2021

	CO ₂ emissions	
	Kg/CO ₂ per annum	% reduction
Target Emission Rate (TER): Compliant with ADL 2021	17,203	-
Design Emission Rate (DER): Fabric first: Demand-reduction measures and renewable energy	8,152	52.61%
Total savings	9,051	52.61%



2. Introduction

2.1 Site Description

This Energy Statement has been prepared for the residential development at Land at Reed House Jacksons Lane, Reed. This falls under the jurisdiction of the North Herts Council.

The proposed Outline Development consists of fourteen residential plots, a mix of one and two storey properties. The mix of one to four bedroom properties across the Development.

Map 1. Site plan for Land at Reed House Jacksons Lane, Reed.





2.2 Purpose of the Energy Statement

This Statement sets out how the Applicant intends to meet:

- i) National Planning Policy Framework.
 - ii) ADL of the Building Regulations 2021
 - iii) The local planning policy requirements for North Herts Council, Policy SP1, Policy SP9 and ENV 4.
- *Mitigate the effects of Climate Change by Encouraging the use of sustainable construction techniques, the appropriate use of renewable energy technologies.*

The Applicant proposes to achieve high levels of sustainability and emission reductions which exceeds building regulation and North Herts Council requirements.

The way in which the Applicant meets the energy standard at Land at Reed House, Jacksons Lane, Reed, will be set out in this Statement as follows:

- **Baseline energy demand:** The Development's Baseline Energy Demand in kWh will be calculated to establish the minimum on-site standard for compliance with ADL 2021.
- **Fabric first – reduced energy demand:** The Development's reduced energy in kWh will be calculated to explain how the Applicant's design specification will lead to a reduced energy demand and an improved fabric energy efficiency. The better the design of the building fabric in terms of, for example, insulation, air tightness and orientation to maximise solar gain, the less energy required to heat the dwelling and so the better the fabric energy efficiency.
- **Low-carbon and renewable energy:** Low-carbon and renewable energy technologies will be assessed for their suitability and viability in relation to the Development. Solutions will be put forward for the development and the resulting energy savings presented.

2.3 Methods

Energist UK has used SAP 10.2 methodology to calculate the energy demand for three proposed new dwellings. The data has then been used to accurately reflect the expected energy demand for all proposed units included in the development proposals.



3. Baseline Energy Demand

3.1 Introduction

In order to measure the effectiveness of demand-reduction measures, it is first necessary to calculate the baseline energy demand, and this has been done using SAP 10.2 methodologies.

The resulting ADL 2021 Baseline for Land at Reed House, Jacksons Lane, Reed has been calculated using Part L model designs which have been applied to the Applicant's Development details. The baseline energy demand, represents the maximum kgCO₂ emissions permitted for the Development in order to comply with ADL 2021.

3.2 The Development Baseline

The resulting Baseline, representing the total maximum CO₂ emissions permitted for the Development, has been calculated as **17, 203 kgCO₂ per annum**. To ensure compliance with ADL2021, CO₂ emissions should not exceed this figure.



4. Fabric-First Approach - Reduced Energy Demand

4.1 Introduction

Many Local Planning Authorities are now recognising the benefits of a fabric-first approach, where the lifetime energy consumption of a building takes precedence over the use of bolt-on renewable energy technologies.

It is clear that the fabric-first approach can create buildings with a very comfortable living and working environment. The internal temperature is consistent and fuel bills are kept to a minimum. One key advantage of a fabric-first approach is that it does not require changes to the behavioral patterns of the occupants and, as such, a building designed using a fabric-first approach will often perform more effectively once completed than a building that incorporates a low-carbon or renewable-energy technology that requires behavioral change (e.g., solar thermal). This becomes an increasingly important consideration as energy costs rise and the issue of fuel poverty becomes commonplace.

Energist UK has considered a fabric-first approach as the priority solution for this Development as it can be shown that the energy standard required to achieve the Target Emission Rate of Approved Document L (2021) at this Land at Plain Road, Smeeth development can be exceeded through the use of efficient building fabric and building services.

4.2 The Development - Reduced Energy Demand

The Applicant will integrate the following design measures to reduce energy demand:

- Energy-efficient building fabric and insulation to all heat loss floors, walls and roofs.
- High-efficiency double-glazed windows throughout.
- Quality of build will be confirmed by achieving good air-tightness results throughout.
- Efficient-building services.
- Low-energy lighting throughout the building.

The Applicant's design specification and intended demand-reduction measures for the Development have been modelled using the same SAP methodology as before.



Table 3. The fabric-first design specification at Land at Reed House, Jacksons Lane, Reed.

Element	Design Specification
Ground Floor U-Value (W/m ² .K)	0.11
External Wall U-Value (W/m ² .K)	0.22
Adjacent Garage Wall U-Value (W/m ² .K)	0.24
Roof U Value (W/m ² .K)	0.10
Glazing U-Value – including Frame (W/m ² .K)	1.2
Glazed Door U-Value – including Frame (W/m ² .K)	1.4
Door U-Value – including Frame (W/m ² .K)	1.4
Design Air Permeability $\text{m}^3/\text{m}^2/\text{h}$ @ 50 Pa	5.0
Space Heating	ASHP – Daikin Altherma or Vaillant aroTHERM
Heating Controls	Zone controls
Domestic Hot Water	From ASHP 150 L 2.5 kWh/day
Ventilation	System One – Standard Extract fans
Low Energy Lighting	Efficacy of 85lm/W
Thermal Bridging	Masonry recognised Construction details



Shower	7 litres/min
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5. Low-Carbon and Renewable Energy

5.1 Introduction

The Applicant adopts a fabric-first approach as the priority solution for this Development and steps have been taken to reduce energy demand through high-quality sustainable design. The planned integration of efficient building fabric and building services has been modelled and is predicted to lead to an enhancement over Part L of the Building Regulations 2021.

The low-carbon and renewable energy solutions applicable to this development scheme are assessed and potentially viable solutions recorded.

Viability of the following low-carbon and renewable energy technologies have been considered:

- Wind
- Solar
- Aerothermal
- Geothermal
- Biomass



5.2 Wind	<i>The ability to generate electricity via a turbine or similar device which harnesses natural wind energy. This could be considered as an onsite solution to reducing carbon emissions (turbines included within the development), or offsite (investing financially into a nearby wind farm).</i>
Installation Considerations	• Wind turbines come in a variety of sizes and shapes. Turbines of 1 Kw can be installed to single house and large-scale turbines of 1-2 MW can be installed on a development to generate electricity to multiple dwellings and other buildings. In both instances the electricity generated can be used on site or exported to the grid. Vertical- or horizontal-axis turbines are available. • A roof-mounted 1 kW micro wind system costs up to £3,000. A 2.5 kW pole-mounted system costs between £9,900 and £19,000. A 6 kW pole-mounted system costs between £21,000 and £30,000 (taken from the Energy Saving Trust, TBC by supplier) • Local average wind speed is a determining factor. A minimum average wind speed of 6 m/s is required. • Noise considerations can be an issue dependent on density and build-up of the surrounding area. • Buildings in the immediate area can disrupt wind speed and reduce performance of the system. • Planning permission will be required along with suitable space to site the turbine, whether ground installed, or roof mounted.
Advantages	• Generation of clean electricity which can be exported to the grid or used onsite. • Can benefit from the Feed in Tariff, reducing payback costs.
Disadvantages	• Planning restrictions and local climate often limit installation opportunities. • Annual maintenance required. • High initial capital cost. It is usual for an investor to consider a series of turbines to make the investment financially sound.
Development feasibility	• Installing a large turbine in an area such as this is not considered to be appropriate due to its appearance and physical impact on the built-up environment. Residents' and neighbours' concerns may include the look of the turbine,



x	the hum of the generator and the possibility of stroboscopic shadowing from the blades on homes. • Wind speed has been checked for the development scheme using the NOABL wind map: http://www.rensmart.com/Weather/BERR. The wind speed at ten metres for the development scheme is 5.7 metres per second (m/s) which is above the minimum of 5 m/s and threshold for technical viability. • Typical payback times for a single turbine are expected to be greater than 15 years which means that the cost of installing and maintaining a single wind turbine is not considered a commercially-viable option.
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5.3 Solar PV and Solar Thermal	<i>The ability to generate energy (either electricity, hot water, or a combination of the two) through harnessing natural solar energy. This could include the use of solar thermal panels, photovoltaic (PV) panels, or a combined solution. PV panels, similarly, to turbines, can be considered both on and offsite.</i> Solar Photovoltaics convert solar radiation into electricity which can be used on site or exported to the national grid. Solar Thermal generates domestic hot water from the sun's radiation. Glycol circulates within either flat plate or evacuated tube panels, absorbing heat from the sun, and transferring this energy to a water cylinder. A well designed solar thermal system will account for 50-60% of a dwelling's annual hot water demand. Sizing the system to meet a higher demand will lead to excess heat generation in the summer months and overheating of the system.
Installation considerations	• Operate most efficiently on a south-facing sloping roof (between 30 and 45-degree pitch.) • Shading must be minimal (one shaded panel can impact the output of the rest of the array.) • Panels must not be laid horizontally on a flat roof as they will not self-clean. Panels will therefore need to be installed at an angle and with appropriate space between them, to avoid over-shading. • Large arrays may require upgrades to substations if exporting electricity to the grid.



	• Local planning requirements may restrict installation of panels on certain elevations. • Installation must consider pitch and fall of the roof, along with any additional plant on the roof to ensure there is sufficient room. • The average domestic solar PV system is 4kWp and costs £5,000 - £8,000 (including VAT at 5 per cent) - (taken from the Energy Saving Trust, TBC by supplier.)
Advantages	• Relatively straightforward installation, connection to landlord's supply and metering. • Linear improvement in performance as more panels are installed. • Maintenance free. • Installation costs are continually reducing. • Can benefit from the Feed in Tariff to improve financial payback.
Disadvantages	• Not appropriate for high-rise developments, due to lack of roof space in relation to total floor area. • With Solar Thermal, performance is limited by the hot water demand of the building – system oversizing will lead to overheating.
Development feasibility 	• The suitability of solar panels has been considered for this Development and are concluded as a technically-viable option. • There are potential areas of roof space suitable for the positioning of unshaded solar PV arrays. • The Development is not on land, which is protected or listed, so it is considered that solar panels would not have a negative impact on the local historical environment or the aesthetics of the area.



5.4 Aerothermal	<i>The transfer of latent heat in the atmosphere to a compressed refrigerant gas to warm the water in a heating system. This includes air to water heat pumps and air conditioning systems.</i> Air Source Heat Pumps (ASHPs) extract heat from the external air and condense this energy to heat a smaller space within a dwelling or non-domestic building. A pump circulates a refrigerant through a coil to absorb energy from the air. This refrigerant is then compressed to raise its temperature which can then be used for space heating and domestic hot water. They can feed either low-temperature radiators or underfloor heating and often have electric immersion heater back-up for the winter months.
Installation Considerations	• ASHPs operate effectively in buildings with a low energy demand, as they emit low levels of energy suitable for maintaining rather than dramatically increasing internal temperatures. It is therefore vital that the dwelling has a low heating demand to ensure the system can provide appropriate space-heating capability. • Underfloor heating will give the best performance, but oversized radiators can also be used. • Immersion heater back-up required to ensure appropriate Domestic Hot Water (DHW) temperature in winter months. • Noise from the external unit can limit areas for installation. • £7,000-£11,000 per dwelling (taken from the Energy Saving Trust, TBC by supplier.)
Advantages	• Air source systems are a good alternative solution to providing heating and hot water to well-insulated, low heat loss dwellings. • They require additional space when compared to a gas boiler. Space for an external unit is needed, as is space for the hot water cylinder and internal pump. • Heat pumps are generally quiet to run. • Running costs between heat pumps and modern gas boilers are comparable. • Heat pumps are a low energy heating solution and are encouraged as part of the Future Homes Standard package of regulations changes which are being implemented in England over the next few years.



Disadvantages	• Residents need to be made aware of the most efficient way of using a heat pump, as the low flow rates used by such a system means that room temperature cannot be changed as reactively as a conventional gas or oil boiler system. • Will not perform well in homes that are left unoccupied and unheated for a long period of time. • Back-up immersion heating can drastically increase running costs. • Noise and aesthetic considerations limit installation opportunities.
Development feasibility 	• ASHPs are considered a technically viable option for this development scheme. • DHW only ASHPs are a viable consideration for schemes such as this. • In line with the future homes standard drive away from on-site combustion. • For this reason, ASHPs are considered viable on all plots.

5.5 Geothermal	<i>The transfer of latent heat from the ground to a compressed refrigerant gas to warm the water in a heating system. This includes ground source heat pumps. Heat can be collected through the use of either horizontally laid or vertically installed coils.</i> Ground Source Heat Pumps (GSHPs) operate on the same principle as an Air Source Heat Pump (ASHP) in that they extract heat from a source (in this instance the ground) and compress this energy to increase temperature for space heating and hot water. Pipework is installed into the ground, either through coils or in bore holes and piles, circulating a mix of water and antifreeze to extract energy from the ground, where the year-round temperature is relatively consistent (approx. 10 °C at 4 metres depth). This leads to a reliable source of heat for the building. Again, an electrically powered pump circulates the liquid and powers the compressor, however annual efficiencies for GSHPs tend to be higher than those of ASHPs.
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Installation considerations	• Require appropriate ground conditions to sink piles/bore holes or excavate for coils (which also require a large area of land.) • Decision between coils or piles can lead to significant extra cost. • Need to consider whether low temperature output is fed through underfloor heating (most efficient) or oversized radiators. • Similar to ASHPs, perform best in well-insulated buildings with a low heating demand. • Electric immersion heater required for winter use. • £11,000-£15,000 per dwelling dependent on the size of the system (taken from the Energy Saving Trust, TBC by supplier.)
Advantages	• Perform well in well-insulated buildings, with limited heating demand. • More efficient than ASHPs.
Disadvantages	• The coils can be damaged by natural earthworks and by intensive gardening practices – occupants would need to be aware of the location of the coils for this system, and how to operate the system efficiently. Coils may also be damaged within the dwelling where the circuit is connected to the internal unit. • Will not perform well in buildings that are left unoccupied and unheated for a long period of time. • Back up immersion heating can drastically increase running costs. • Large area of ground needed for coil installation.
Development feasibility 	• GSHPs are considered a technically viable option for this development scheme but further investigations would be required to see if there are physical constraints in terms of ground conditions and area available for installation.



	• The capital installation cost would be high which leads us to the conclusion that GSHPs would not be a commercially viable option for this development scheme.
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5.6 Biomass	<i>Providing a heating system fueled by plant-based materials such as wood, crops, or food waste.</i> Biomass boilers generate heat for space heating and domestic hot water through the combustion of biofuels, such as woodchip, wood pellets or potentially biofuel or bio diesel. Biomass is considered to be virtually zero carbon. They can be used on an individual scale or for multiple dwellings as part of a district-heating network. A back-up heat source should be provided as consistent delivery of fuel is necessary for continued operation.
Installation considerations	• Biomass boilers are larger than conventional gas-fired boilers and also require what can be significant storage space for the fuel source. This needs to be considered at planning stage to ensure an appropriate plant room can be provided. • Flue required to expel exhaust gases – design needs to be in line with the requirements of the Building Regulations. • Need to consider whether fuel deliveries will be reliable and consistent to the location of the site (especially relevant in rural areas) and whether the plant room can be easily accessed by the delivery vehicle. • £9,000-£21,000 per dwelling dependent on size (taken from Energy Saving Trust, TBC by Supplier).
Advantages	• Considerable reduction in CO₂ emissions.
Disadvantages	• Limited reduction in running costs compared to A-rated gas boilers, but at a substantially higher up-front cost. • Plant room space required for boiler and storage. • Dependent on consistent delivery of fuel. • Ongoing maintenance costs (need to be cleaned regularly to remove ash.)



Development Feasibility x	• Biomass is not considered a technically viable option for this development scheme as there are physical constraints on site in terms of installing biomass boilers or storing a sufficient supply. • There are concerns regarding a sustainable supply of biomass to the site. • On-site combustion of this nature is not in line with the future homes standard or relevant air quality standards.
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5.7 Viable Technologies

The following low-carbon and renewable energy technologies, summarised here in Table 4, are considered potentially viable options for the mixed-use development scheme at Land at Reed House, Jacksons Lane, Reed.

Table 4: Summary of Feasibility for Land at Reed House, Jacksons Lane, Reed.

✓	Solar Thermal Solar PV Air Source Heat Pumps Ground Source Heat Pumps
x	Wind Turbines Biomass Boilers

The Applicant has opted to install ASHP technology to serve the heating and hot water demand to all properties across the Development.



6. Sustainability

The Applicant addresses their potential impact on climate change by designing a development scheme that reduces energy demand and, in doing so, takes positive action and exceeds building regulation requirements for the Development and positive steps towards Zero Carbon Homes.

With the decarbonising of the electric grid, the Developer plans to use electricity as the source for heating and hot water, to align with future Home requirements and the move towards Zero carbon developments.

The Applicant will reduce water demand within the proposed development by incorporating water-efficient fixtures and fittings as a standard specification within each new dwelling. Part G calculations will be provided by the Applicant at the Detailed Design stage.

The Development has been designed to encourage walking, cycling and the use of public transport. Electric car charging points will also be provided to all houses across the site in line with the Approved Document S, Infrastructure for the charging of electric vehicles, 2021.

All properties will be designed to comply with the requirements of Approved Document O (2021). This will be assessed at the detailed design stage.

The design and Layout of the Development will take into consideration steps towards a sustainability development, through large open spaces, solar gains.

The Development will be designed to provide discrete and accessible storage for waste, recycling and composting.

The Development will be designed to achieve a biodiversity net gain.

Policies and procedures will be put in place by the Applicant to in order to minimise the possible negative effects of construction, such as air pollution, noise and vibration, traffic congestion, dust and contamination of land and water.



7. Conclusions

The Applicant demonstrates commitment to delivering the energy standard at Reed House, Jacksons Lane, Reed:

- The Applicant proposes to achieve high levels of sustainability and emission reductions which exceeds building regulation and North Herts Council requirements.
- This energy standard is delivered through a fabric-first approach to design and renewable energy.
- The Applicant proposes to install ASHP's to all properties.
- The scheme has been designed to meet a total reduction in CO₂ emissions of 52.61%. Which exceeds Building regulation requirements.

A combination of demand-reduction measures, energy-efficiency measures, low-carbon heating and renewable energy will deliver the Applicant's target for on-site reduction in energy demand.

The following measures, summarised here in Table 6, are incorporated in the development proposals.

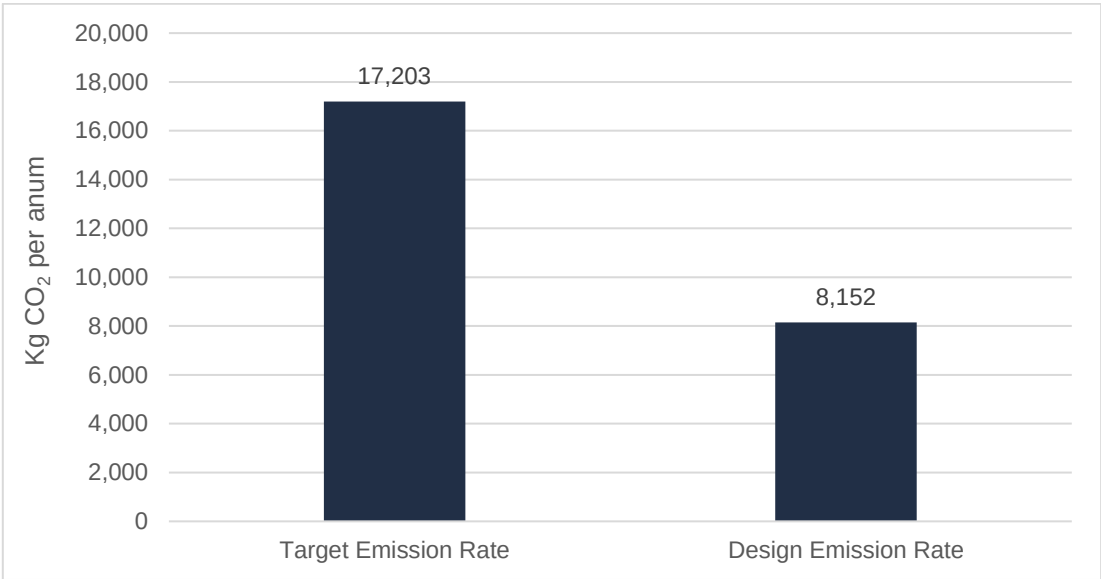
Table 6. Measures incorporated to deliver the energy standard.

Fabric first: Demand-reduction measures	• Energy-efficient building fabric and insulation to all new heat loss floors, walls and roofs. • High-efficiency double-glazed windows throughout. • Quality of build will be confirmed by achieving good air-tightness results to new build dwellings. • Efficient-building services including high-efficiency heating systems. • Low-energy lighting throughout the development.
Low-carbon & renewable energy	• Vaillant aroTHERM ASHP to provide heating and hot water demand for the bungalows. The Daikin Altherma ASHP to provide the heating and hot water demand to all houses.

The way in which these design measures deliver the Applicant's commitment to the energy standard is illustrated in Figure 2 and Table 7 overleaf.



Figure 2: How the Development meets the energy standard ADL2021



The calculated reduction in CO₂ emissions and the percentage reduction in Kg/CO₂ over ADL 2021 is demonstrated in Table 7.

Table 2: How the Development meets the energy standard ADL2021

	CO ₂ emissions	
	Kg/CO ₂ per annum	% reduction
Target Emission Rate (TER): Compliant with ADL 2021	17,203	-
Design Emission Rate (DER): Fabric first: Demand-reduction measures and renewable energy	8,152	52.61%
Total savings	9,051	52.61%

8. Appendices



Appendix 1: List of Abbreviations

ADL 2021	Approved Document Part L 2021
ASHP	Air Source Heat Pump
CHP	Combined Heat & Power
DER	Dwelling Emission Rate
DHN	District Heat Network
DHW	Domestic Hot Water
ESCO	Energy Services Company
GSHP	Ground Source Heat Pump
LPA	Local Planning Authority
PV	Photovoltaics
SAP	Standard Assessment Procedure
TER	Target Emission Rate



Appendix 2: Planning Policy and Design Guidance

The Climate Change Act (2008)

Passed in November 2008, the Climate Change Act mandated that the UK would reduce emissions of six key greenhouse gases, including Carbon Dioxide, by 80% by 2050.

As a consequence, the reduction of carbon dioxide emissions is at the forefront of National, Regional and Local Planning Policy, along with continuing step changes in performance introduced by the Building Regulations Approved Document L (2021).

National Planning Policy Framework (Dec 2023)

The National Planning Policy Framework encourages Local Planning Authorities to *'support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change'* (NPPF paragraph 157), *'whilst taking a proactive approach to mitigating and adapting to climate change, taking into account the long-term implication for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of over shading from rising temperatures'*. (NPPF Paragraph 158).

Paragraph 160, upholds the requirement for Local Plans to:

'a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, and their future re-powering and life extension, while ensuring that adverse impacts are addressed appropriately (including cumulative landscape and visual impacts)

b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and

c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for locating potential heat customers and suppliers

In paragraph 162, NPPF stipulates that local planning authorities should take account of the benefits of decentralised energy and passive design measures as a means of energy efficiency in new development: *'In determining planning applications, local planning authorities should expect new development to:*

a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and

b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.'



North Hertfordshire Local Plan 2011 – 2031

Policy SP1: Sustainable development in North Hertfordshire

This Plan supports the principles of sustainable development within North Hertfordshire. We will:

- a) Maintain the role of key settlements within and adjoining the District as the main focus for housing, employment and new development making use of previously developed land where possible;
- b) Ensure the long-term vitality of the District's villages by supporting growth which provides opportunities for existing and new residents and sustains key facilities;
- c) Grant planning permission for proposals that, individually or cumulatively:
 - i. deliver an appropriate mix of homes, jobs and facilities that contribute towards the targets and aspirations in this Plan;
 - ii. create high-quality developments that respect and improve their surroundings and provide opportunities for healthy lifestyle choices;
 - iii. provide the necessary infrastructure required to support an increasing population;
 - iv. protect key elements of North Hertfordshire's environment including biodiversity, important landscapes, heritage assets and green infrastructure (including the water environment); and
 - v. secure any necessary mitigation measures that reduce the impact of development, including on climate change; and
- d) Support neighbourhood plans and other local planning initiatives where they are in general conformity with the strategic policies of this Local Plan.

ENV4 Mitigate the effects of climate change by encouraging the use of sustainable construction techniques, the appropriate use of renewable energy technologies and reducing the risk of flooding.



Policy SP9: Design and Sustainability

The Council considers good design to be a key aspect of sustainable development. We will:

- a) Support new development where it is well designed and located and responds positively to its local context;
- b) Require Strategic Masterplans to be produced for Strategic Housing Sites and other significant development. Significant development generally comprises residential development of 100 dwellings or more. Exceptionally, developments under 100 dwellings will be considered significant if there are site specific complexities and sensitivities that require a masterplan-led approach. In some circumstances a Strategic Masterplan may also be required to consider the cumulative impact of more than one site to support a co-ordinated and integrated approach to place-making and design.
- c) Require Strategic Masterplans and planning applications for Strategic Housing Sites and significant development to (as applicable):
 - i. create buildings, spaces and streets which positively reflect and respond to the local landscape, townscape and historic character
 - ii. create integrated, accessible and sustainable transport systems with walking, cycling and public transport designed to be the most attractive forms of transport and effectively linking into the surrounding areas;
 - iii. provide a clear structure and hierarchy of pedestrian friendly streets and well-connected footpaths and cycleways integrate with the wider built and natural environment and communities;
 - iv. plan for integrated and mixed-use communities with walkable locally accessible community, employment and retail facilities;
 - v. positively integrate with adjacent rural and urban communities and positively contribute to their character and the way the area functions, including addressing cumulative, cross boundary planning and infrastructure matters;
 - vi. create an accessible multi-functional green infrastructure network that provides:
 - a key structuring and functional place-making feature supporting healthy lifestyles, sport, play and recreation linking into the wider Green Infrastructure Network; and



- a high-quality integrated network to support ecological connectivity, biodiversity net gain, climate adaptation and mitigation linking into the wider Ecological Network
 - vii. ensure the effective use of sustainable urban drainage and sustainable water management;
 - viii. ensure a hierarchy of linked, high quality and attractive public spaces and public realm that is safe, attractive and supports social interaction for all age groups; and
 - ix. design to last with a clear stewardship, management and maintenance strategy
- d) Ensure Strategic Masterplans are informed by a technical and design evidence base and include the following for Strategic Housing Sites and where applicable for other significant development:
- i. site specific vision and place-making principles
 - ii. Masterplan setting out the quantum, scale, type, mix and distribution of land uses, housing and community facilities;
 - iii. Green Infrastructure Framework identifying the scale, distribution, type and design of green spaces, biodiversity net gain, strategic drainage and on and off-site linkages:
 - iv. Movement Framework setting out the key access points, strategic highways, street hierarchy and footways and cycleways (on and off site)
 - v. Urban Design Framework and design principles identifying how the site responds to local character and context and key structuring elements and layout principles (including heights and densities)
 - vi. Sustainability & Energy Framework identifying site-wide and building scale opportunities for low and zero carbon
 - vii. Illustrative Masterplan Layout
 - viii. Infrastructure Delivery, Phasing & Management Strategy
- e) Encourage the submission of Strategic Masterplans for the Council's consideration and agreement before the submission of a planning application. We will also confirm the scope and contents of individual Strategic Masterplans with applicants in pre-application discussions. Planning applications must be accompanied by a Strategic Masterplan. Where applications have already been submitted to the Council a Strategic Masterplan should be agreed with the Council prior to or as part of the grant of planning permission. Adherence to the Strategic Masterplan will be secured through planning conditions and/or legal agreement.



Appendix 3: SAP Results

Dwelling Type	Total Target Emissions	Total Design Emissions	Low-Carbon & Renewable
Plot 010	3,144	1,494	1,494
Plot 02	10,732	5,098	5,098
Plot 05	3,327	1,559	1,559
Total Emissions	17,203	8,152	8,152