

Parcel 2c Halsnead Garden Village

Vistry Partnerships North West

Energy and Sustainability Statement

AES Sustainability Consultants Ltd

June 2022



	Author	Date	E-mail address
Produced By:	Maja.Stanisz	06.06.2022	Maja.Stanisz@aessc.co.uk
Reviewed By:	Mitchell Bennellick	07.06.2022	Mitchell.Bennellick@aessc.co.uk

Revision	Author	Date	Comment
Rev0	Maja.Stanisz	07.06.2022	Initial Issue

Vistry Group

This statement has been commissioned by Vistry Partnerships North West to detail the proposed approach to energy and CO₂ reduction to be employed in the development at Parcel 2c Halsnead Garden Village. 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.

Contents

1.	Introduction	4
2.	Planning Policy	5
3.	Energy Consumption and CO ₂ Emissions	9
4.	Dwelling Performance	12
5.	Efficient Use of Natural Resources	13
6.	Conclusions	14

List of figures & tables

Figure 1. Proposed Site Layout	4
Table 1. CO ₂ emissions improvements from Part L standards	9
Figure 2. The Energy Hierarchy	9
Table 2. Benefits of the Fabric First approach	10
Table 3. Proposed construction specification – main elements	10
Table 4. Dwelling performance – CO ₂ emissions	12
Table 5. Estimated site-wide performance – CO ₂ emissions	12
Table 6. Dwelling performance – Fabric Energy Efficiency	12

1. Introduction

Preface

- 1.1. This Energy and Sustainability Statement has been prepared on behalf of Vistry Partnerships North West in support of the reserved matters application for development of Parcel 2c Halsnead Garden Village.

Development Description

- 1.2. The development site is located on the northern edge of Whinston. The site sits within a wider sustainable urban extension called Halsnead Garden Village with up to 1600 residential dwellings.
- 1.3. Phase 2c of the development will deliver 121 dwellings, across a mix of one to five bed houses and flats. The proposed site layout is shown in Figure 1.

Purpose and Scope of the Statement

- 1.4. The statement has been prepared to address national and local policy relating to sustainable design and construction of dwellings, including relevant policies within the Knowsley Local Plan Core Strategy adopted in January 2016.
- 1.5. This statement demonstrates that by following a fabric first approach to demand reduction, the proposed development will deliver a level of energy performance beyond the current Building Regulation standards whilst addressing a range of additional sustainable design considerations.



Figure 1. Proposed Site Layout

2. Planning Policy

Local Policy

- 2.1. This statement will address relevant policies within the Knowsley Local Plan Core Strategy, adopted in January 2016, relating to sustainable design and construction:

Policy SD1: Sustainable Development

Low Carbon Energy

1) When considering development proposals, a positive approach will be taken, which reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. Work will be undertaken proactively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.

2) Planning applications that accord with the policies in this Local Plan (and any relevant policies in Neighbourhood Plans) will be approved without delay, unless material considerations indicate otherwise.

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

- a) Any adverse impacts of granting permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework taken as a whole; or
- b) Specific policies in that Framework indicate that development should be restricted.

Policy CS22: Sustainable and Low Carbon Development

Sustainable Construction Principles

1) New development will be required to meet high standards of sustainable design and construction and minimise carbon emissions. This should be achieved by:

- a) Designing new buildings for flexible uses throughout their lifetime;
- b) Avoiding the creation of adverse local climate conditions by using natural systems to avoid internal overheating and excessive heat generation;
- c) Ensuring developments are comfortable and safe for users;
- d) Making the most effective and sustainable use of water, aggregates and other resources;
- e) Limiting energy use by incorporating high standards of insulation, heat retention, natural ventilation and passive solar techniques;
- f) Landscaping (including measures such as green walls or roofs) to create shelter and reduce any heat island effect;
- g) Using sustainable materials from local suppliers where possible;
- h) Supplying energy efficiently and incorporating decentralised energy systems, using renewable and low carbon energy where feasible;
- i) Managing flood risk, including through the use of Sustainable Drainage Systems (SuDS) and flood resilient design for infrastructure and property; and
- j) Promoting sustainable waste practices in new and existing developments.

Policy CS22: Sustainable and Low Carbon Development

Low Carbon Development, Community Energy Fund and Allowable Solutions

2) Government targets for carbon reduction in new development are expected to be implemented through updates to the Building Regulations. Where it is not technically feasible or economically viable to meet the requirements on site, contributions to the Council's Community Energy Fund may be accepted as one of a range of options under the Government's proposed 'Allowable Solutions' mechanism. The Fund will be used to support carbon reduction initiatives in Knowsley and potentially the wider Liverpool City Region.

Sustainable Construction Targets

3) Local targets for sustainability in relation to specific development areas or sites may be outlined in the Local Plan: Site Allocations and Development Policies.

Priority Zones and Decentralised Energy Networks

4) Knowsley Industrial Park and Knowsley Business Park are identified as a 'Priority Zone'. Within this area the Council and its partners will facilitate renewable and low carbon infrastructure by (subject to feasibility) requiring new development to:

- a) Make provision for connection to an existing or planned decentralised energy network; and
- b) Be designed to enable future connectivity in terms of proposed site layout, infrastructure and heating provision, including consideration of connections at a later date or phase.

5) Subject to opportunity and need, additional 'Priority Zones' may be identified in the Local Plan: Site Allocations and Development Policies.

Policy CS23: Renewable and Low Carbon Infrastructure

1) The Council will support proposals that will produce and distribute decentralised, low carbon and renewable energy, provided that they do not cause significant harm (in terms of their number, scale, siting or cumulative impacts) to:

- a) Natural resources, biodiversity, geodiversity, water and air quality and, landscape character;
- b) Aviation and transport safety;
- c) Historical and cultural assets;
- d) Public amenity and living conditions; or
- e) Openness and amenity of the Green Belt, except in very special circumstances.

2) Proposals must be accompanied by information that shows how the local environment will be protected, and how the site will be restored when energy production ends. Proposals resulting in an unacceptable impact must be mitigated by appropriate measures agreed by the Council.

Current National Policy Standards

- 2.2. Government policy in relation to the energy performance of buildings has been evolving over the past decade, following government commitments to reduce the emission of greenhouse gases – particularly CO₂. This obligation was enshrined in the Climate Change Act 2008, which commits the UK to achieving a mandatory 80% reduction in the UK's CO₂ emissions by 2050, compared with 1990 levels.
- 2.3. 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.
- 2.4. 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.
- 2.5. The built environment has a key role to play in delivering on 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.

- 2.6. Following the introduction of the 2013 edition of Building Regulations Part L, the successive updates now require regulated CO₂ emissions levels from new build domestic buildings to be approximately 30% lower than 2006 levels.
- 2.7. 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.
- 2.8. As an acknowledgement of the challenge to the built environment in meeting future 'net zero' targets, the Government published the next revision to the Building Regulations Approved Document L1A (Part L) in December 2021. The CO₂ emissions requirement of Part L 2021 is set at a 31% improvement on Part L 2013.

National Planning Policy Framework

- 2.9. On the 20th July 2021, the Government published the revised National Planning Policy Framework (NPPF), which sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development
- 2.10. Chapter 14 of the NPPF outlines its energy and climate change policies. New development should be planned in ways that:
 - avoid increased vulnerability to the range of impacts arising from climate change...
 - can help to reduce greenhouse emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.
- 2.11. In determining planning applications, local planning authorities should expect new developments to:
 - 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
 - take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.
- 2.12. This chapter also outlines the requirement of Local Plans to take account of climate change over the longer term, including factors such as flood risk, coastal change, water supply and changes to biodiversity and landscape. The key focus of the NPPF is to support local and regional planning authorities.

Proposed Strategy

- 2.13. This statement is intended to establish the proposed approach to sustainable construction and energy and water demand reduction to be delivered at the development.
- 2.14. The current edition of Part L of the Building Regulations requires regulated CO₂ emission levels from new build domestic buildings to be approximately 30% lower than 2006 levels.
- 2.15. It is proposed that the dwellings will be constructed following a fabric first approach to meet, and exceed where possible, the current Building Regulations, with insulation standards, thermal bridging and air leakage all improved beyond the minimum compliance levels. In addition, consideration will be given to building design, passive solar design and energy efficiency site-layouts where possible.
- 2.16. The following sections of this statement set out the sustainable design considerations which will be applied to the dwellings in order to deliver low energy, comfortable and affordable housing.
- 2.17. Other aspects of sustainability which relate to new housing development will be considered further within this statement in line with the Knowsley Local Plan Core Strategy and Policies: SD1, CS22 and CS23.

3. Energy Consumption and CO₂ Emissions

- 3.1. As one of the key areas of ongoing impact of any new development, the energy demand of the dwellings to be constructed is a key consideration in the overall sustainability strategy.
- 3.2. 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.

Building Regulations

- 3.3. The proposed site will be constructed in accordance with the 2013 edition of Approved Document L1A (hereafter 'Part L'), therefore this forms the baseline compliance level in terms of energy demand and CO₂ emissions.
- 3.4. Part L sets out 5 Criteria which must be met in order to demonstrate that the dwellings are designed and constructed in accordance with the approved standards:
- Criterion 1 – Achieving the TER
 - Criterion 2 – Limits on Design Flexibility
 - Criterion 3 – Limiting the Effects of Solar Gain in Summer
 - Criterion 4 – Building Performance Consistent with DER
 - Criterion 5 – Provisions for Energy-Efficient Operation of the Dwelling

Criterion 1 - Achieving the TER

- 3.5. Criterion 1 relates to achieving a maximum calculated level of CO₂ emissions, referred to as the 'Target Emission Rate' (TER). The TER is calculated in accordance with the Standard Assessment Procedure (SAP), which establishes a maximum rate - expressed in kilograms of carbon dioxide per metre squared of total useful floor area, per annum (kgCO₂/m²/yr) - as the benchmark for compliance.
- 3.6. 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, requiring substantial improvements to thermal insulation and heating services, or a significant increase in on-site renewable energy provision.

Table 1. CO₂ emissions improvements from Part L standards

Building Regulations	CO ₂ emissions improvement over L1A 2006
L1A 2006	-
L1A 2010	25%
L1A 2013	Circa 30%

Energy and CO₂ Reduction Strategy – Fabric First

- 3.7. It is proposed that the CO₂ reduction strategy to meet the TER figure of each dwelling incorporates improvements beyond the minimum requirements contained within Part L1A and concentrates finance and efforts on reducing energy demand as the first stage of the Energy Hierarchy (Figure 2).

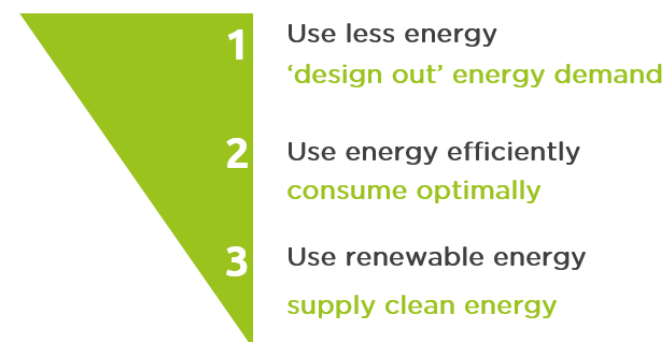


Figure 2. The Energy Hierarchy

- 3.8. 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 of new housing, 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.

- 3.9. This approach has been widely supported by industry and Government for some time, with the Zero Carbon Hub¹ and Energy Savings Trust² having both stressed the importance of prioritizing energy demand as a key factor in delivering resilient, low energy homes.
- 3.10. There is further explicit acknowledgement of the benefits of this approach through the introduction of Fabric Energy Efficiency Standards into Part L of the Building Regulations 2013, which is intended to “discourage excessive and inappropriate trade-offs... for example... poor insulation standards being offset by renewable energy systems with uncertain service lives.”³
- 3.11. The benefits to prospective homeowners of following the Fabric First approach are summarized 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	✓	✗

Criterion 2 – Limits on Design Flexibility

- 3.12. Criterion 2 introduces minimum standards which must be met for all main building elements to ensure that an excessively low performance in one area is not simply offset through over-performance in another area.
- 3.13. In accordance with this approach and in order to ensure that the energy demand of the development is reduced, the dwellings should be designed to minimise heat loss through the

fabric wherever possible. Table 3 details the proposed fabric specification of the major building elements. The first column in this table sets out the Part L1A limiting fabric parameters in order to provide a comparison with the proposed specification.

Table 3. Proposed construction specification – main elements

	Part L1A Limiting Fabric Parameters	Proposed Fabric Specification
External wall – u-value	0.30 W/m ² K	0.25 W/m ² K
Party wall – u-value	0.20 W/m ² K	0.00 W/m ² K
Plane roof – u-value	0.20 W/m ² K	0.11 – 0.17 W/m ² K
Ground floor – u-value	0.25 W/m ² K	≤ 0.18 W/m ² K
Windows – u-value	2.00 W/m ² K	1.40 W/m ² K
Doors – u-value	2.00 W/m ² K	1.10 W/m ² K
Air permeability	10 m ³ /h.m ² at 50 Pa	5.01 m ³ /h.m ² at 50 Pa
Thermal Bridging	Y = 0.150 (default)	Y = 0.039 (calculated)

Energy efficient heating and lighting

- 3.14. 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. High efficiency combi boilers should be installed to properties to eliminate the need for hot water cylinders where feasible. Primary pipework should be fully insulated in all dwellings, and controls including programmers, thermostats and thermostatic radiator valves will be installed in all dwellings.
- 3.15. Internal lighting should be low energy wherever possible, and areas of infrequent use will be fitted with occupancy sensors. External security and space lighting should be low energy and fitted with PIR and daylight sensors where appropriate.

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

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

³ The Building Regulations 2010, Approved Document L1A 2013 Edition

Criterion 3 – Limiting the Effects of Solar Gains in Summer

Passive design measures and overheating risk mitigation

- 3.16. Site constraints can dictate layout; however, orientation has been considered to maximise the potential for solar gain where feasible.
- 3.17. Majority of the dwellings will be able to benefit from cross-ventilation to reduce unwanted heat build-up in hot weather, however when considering glazing specification, a balance should be considered which allows useful solar gain in the winter whilst reducing unwanted solar gain in the summer.
- 3.18. Measures taken to reduce internal heat gain and provide natural ventilation through window openings will allow sufficient air exchange rates to purge any heat build-up. Active cooling systems are therefore not proposed.
- 3.19. These measures will serve to ensure that the development builds in resilience to a potentially changing climate over the lifetime of the buildings and minimises the overheating risk that can be exacerbated by the drive to build better insulated, more airtight homes, if not considered within the design and construction process.

Criterion 4 – Building Performance Consistent with DER

Thermal bridging

- 3.20. 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.
- 3.21. The dwellings should be constructed 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 which will be undertaken to establish energy demand of the dwellings. Industry approved calculations provide guidance on reducing bridging and provide calculated values to be used within calculations. Where bespoke detailing is used, thermal modelling will need to be undertaken to assess the performance of these building junctions.

Air leakage

- 3.22. After conductive heat losses through building elements are reduced, convective losses through draughts are the next major source of energy wastage. It is assumed at this stage that the dwellings will be designed to achieve an airtightness standard of no greater than 5.01 m³/h.m²@50Pa, a significant enhancement on Part L1A minimum requirements.
- 3.23. Pressure testing in accordance with Building Regulations and ATTMA standards is required on completion to confirm that the design figure has been met.

Criterion 5 – Provisions for Energy-Efficient Operation of the Dwelling

- 3.24. The occupant of the dwelling should be provided with all necessary literature and guidance relating to the energy efficient operation of fixed building services.
- 3.25. Currently it is assumed that all dwellings will be provided with modern gas-fired heating systems, fully insulated primary pipework, and controls including programmers, thermostats and thermostatic radiator valves to avoid unnecessary heating of spaces when not required.

4. Dwelling Performance

- 4.1. Through following the strategy described, the dwellings will significantly reduce energy demand and consequent CO₂ emissions beyond a Part L 2013 compliant level of performance through the dwelling fabric alone, without requiring low carbon or renewable energy systems with shorter service lives to offset unnecessary emissions.
- 4.2. SAP calculations have been undertaken on a sample of the proposed dwelling types to provide an overview of the typical as-designed energy performance, in comparison with Building Regulations standards. The results of these calculations are shown in Table 4.

Table 4. Dwelling performance – CO₂ emissions

House type	Part L compliant emissions (kgCO ₂ /year)	As-designed emissions (kgCO ₂ /year)	Improvement %
Sharman End/Semi	1,502	1,459	2.83
Stafford End/Semi	1,270	1,254	1.26
Eveleigh - End	1,488	1,479	0.56
Grainger - Detached	2,233	2,232	0.03
Mountford - Detached	1,772	1,738	1.91
Wyatt - Semi	1,490	1,474	1.12
First Floor Flat	1,220	1,139	6.62
Ground Floor Flat	1,439	1,385	3.75
Top Floor Flat	1,340	1,239	7.51
Mountford Semi	1,502	1,613	3.16

- 4.3. The estimated site-wide Part L compliant and as-designed CO₂ emissions are shown in Table 5.

Table 5. Estimated site-wide performance – CO₂ emissions

	Part L compliant emissions (kgCO ₂ /year)	As-designed emissions (kgCO ₂ /year)	Improvement %
Site-wide emissions	186,611	183,830	1.49

- 4.4. As previously discussed, the Fabric Energy Efficiency (FEE) rating is an additional metric by which the improved performance of the dwellings as designed can be measured. Table 6 shows the Part L compliant Target Fabric Energy Efficiency (TFEE) and the as-designed calculated Dwelling Fabric Energy Efficiency (DFEE) to demonstrate the improvements made.

Table 6. Dwelling performance – Fabric Energy Efficiency

House type	TFEE (kWh/year)	DFEE (kWh/year)	Improvement %
Sharman End/Semi	4,267	3,866	9.40
Stafford End/Semi	3,465	3,153	9.03
Eveleigh - End	4,194	3,823	8.84
Grainger - Detached	7,581	6,717	11.39
Mountford - Detached	5,544	5,093	8.14
Wyatt - Semi	4,250	3,824	10.02
First Floor Flat	2,924	2,642	9.64
Ground Floor Flat	4,091	3,690	9.81
Top Floor Flat	3,537	3,054	13.66
Mountford Semi	4,982	4,530	9.07

- 4.5. This calculated performance indicates that the dwellings will exceed the requirements of Part L through the proposed specification.

5. Efficient Use of Natural Resources

Materials

- 5.1. 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.
- 5.2. Within the development choices will be made in order 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.

Waste

- 5.3. 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

- 5.4. 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.
- 5.5. Knowsley Council currently operate a comprehensive household collection service through which households are able to recycle materials including: dry recyclables (grey lidded bin) general waste (maroon bin) and garden waste (blue bin).

- 5.6. 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

- 5.7. The development will additionally be designed to effectively and appropriately monitor and manage construction site waste. Target benchmarks for resource efficiency will be set in accordance with best practice – e.g. m³ of waste per 100m² / tonnes waste per m².
- 5.8. Wherever possible materials will be diverted from landfill through re-use on site, reclamation for re-use, returned to the supplier where a 'take-back' scheme is in place or recovered and recycled using an approved waste management contractor. A target to divert 85% by weight/volume of non-hazardous construction waste will be applied.

6. Conclusions

- 6.1. This Energy and Sustainability Statement has been prepared by AES Sustainability Consultants on behalf of Vistry Partnerships North West to detail the proposed approach to sustainable construction to be employed at Parcel 2c Halsnead Garden Village.
- 6.2. Calculations undertaken on the proposed dwellings under the approved Standard Assessment Procedure demonstrate that through following the energy efficiency approach described, the calculated as-designed emissions are reduced by 1.49% over Part L 2013 requirements.
- 6.3. Section 5 of this report outlines how Vistry Partnerships will seek to make efficient use of natural resources in line with Policy CS22.