



ELEMENT
SUSTAINABILITY

KNOWSLEY LANE, KNOWSLEY

SUSTAINABILITY STATEMENT

MAY 2022

REF: 2022.055



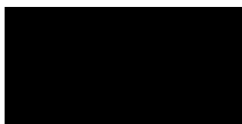
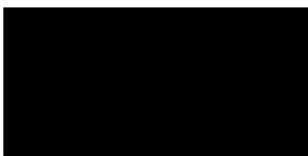
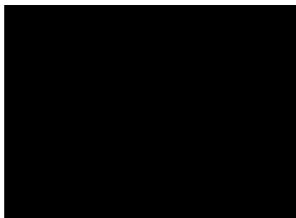
ELEMENT SUSTAINABILITY – ISSUE NOTES

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Charles Atkins Sustainability Consultant	Caroline Director	Laurie Wills Director

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phone: 01829 733 444

email: hello@elementsustainability.co.uk

www: [www: www.elementsustainability.co.uk](http://www.elementsustainability.co.uk)

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CONTENTS

1. Introduction	1
2. Development Proposals.....	2
2.1 Development Site Description	2
2.2 Development Proposals	2
3. Policy Review	4
3.1 National Planning Policy.....	4
3.2 Local Planning Policy	4
3.2.1 Knowsley Local Plan Core Strategy.....	4
3.2.2 Merseyside and Halton Joint Waste Local Plan.....	6
3.3 Supplementary Planning Documents.....	7
3.3.1 Ensuring a Choice of Travel	7
3.4 Climate Emergency	7
3.5 Emerging Policies	7
3.5.1 Design Quality in New Development.....	7
3.6 Regulatory Framework.....	8
3.7 Applicable Targets.....	8
4. Sustainability Statement.....	9
4.1 Energy Improvements.....	9
4.2 Water Conservation	9
4.3 Flood Risk Management:	9
4.4 Waste Management	10
4.5 Materials	11
4.6 Ecology and Biodiversity	11
4.7 Transport	12
5. Energy Strategy.....	13
5.1 Energy Strategy for Knowsley Lane.....	13
5.1.1 Build Fabric and Thermal Performance	13
5.1.2 Building Services Specification	13
5.2 Renewable Energy Feasibility.....	14
5.3 Photovoltaic Array	145
5.4 Energy Hierarchy.....	15
6. Conclusion	18

1. INTRODUCTION

Element Sustainability has been commissioned by Caddick Developments Limited to review the sustainability performance of the proposed scheme at Knowsley Lane, Knowsley.

The purpose of this statement is to summarise the relevant policy background and requirements of Knowsley Council (hereafter referred to as the council) and demonstrate the ways in which the developer has addressed these aims through their proposals, ensuring all practicable measures have been taken in order to deliver a sustainable development at this site.

Details of the design attributes, specifications and characteristics of the scheme are appraised in order to demonstrate how the proposals contribute to sustainable development in Knowsley and seek to mitigate the environmental impacts of the scheme, providing a sustainability appraisal in support of the planning application.

2. DEVELOPMENT PROPOSALS

2.1 Development Site Description

The application site is located approximately 1.5km north of Knowsley Town Centre and to the east of Knowsley Business Park. It is bound by the A580 to the north, Ormskirk Road to the West and Knowsley Lane to the east. The 5.5-hectare site is largely featureless with the exception of the dense woodland and scrubland area to the north of the site.

The site was identified as part of a Sustainable Urban Extension for land east of Knowsley Business Park and removed from the Green Belt for future employment use as part of a Local Plan Core Strategy review process. The Knowsley Business Park is the largest industrial area in the Liverpool City Region and has good access to the local, regional and national road network.

Figure 2.1 - Site Location Plan



2.2 Development Proposals

Planning approval is sought for the construction of a new industrial development providing 14,641 sqm of floor space, split into 3 commercial units. The development will provide a high-quality industrial workspace (B2 and B8 use classes) with a new access point to the western boundary off Ormskirk Road. Each unit will have a dedicated entrance and be within close proximity to the parking provisions.

The existing vegetation will be retained where possible and coupled with new planting that will include; native tree and hedge planting, an ecological wetland area and a wildflower meadow. Whilst creating an ecological "green" link around the perimeter of the site and maximising the ecological potential of the development.

Figure 2.2 - Proposed Site Plan

3. POLICY REVIEW

3.1 National Planning Policy

The National Planning Policy Framework (NPPF) 2021 states that the planning system should play an active role in guiding development to sustainable solutions. At the heart of the 2021 updated NPPF lies the ‘presumption’ in favour of sustainable development; the golden thread running through plan-making and decision taking. There are three dimensions to sustainable development, as stated within the NPPF: economic, social, and environmental. These dimensions give rise to the need for the planning system to perform a number of roles:

An economic role – contributing to building a strong, responsive, and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;

A social role – supporting strong, vibrant, and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating beautiful and safe places, with accessible local services that reflect the community’s needs and support its health, social and cultural well-being; and

An environmental role – contributing to protecting and enhancing our natural, built, and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

These dimensions are considered to be mutually dependent with the NPPF, in its entirety, defining sustainable development. The NPPF states that ‘the purpose of the planning system is to contribute to the achievement of sustainable development’ (paragraph 7). It summarises the objective of sustainable development as meeting the needs of the present without compromising the ability of future generations to meet their needs. It goes on to state that at a similarly high level, members of the United Nations – including the United Kingdom – have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030. These address social progress, economic well-being, and environmental protection.

3.2 Local Planning Policy

3.2.1 Knowsley Local Plan Core Strategy

Knowsley’s Core Strategy (CS) is a Development Plan Document adopted by resolution of the Council, on the 6th January 2016. The Core Strategy will provide the strategic context for other planning policy documents, including other parts of the Local Plan. The number and type of supporting documents to be produced has been carefully considered by the Council.

Policy CS2 – Development Principles - New development in Knowsley and the preparation of subsequent stages of the Local Plan will be expected to support the following development principles:

- **Principle 1** - Promote sustainable economic development, tackle the causes of deprivation and disadvantage and narrow the gap between the richest and poorest neighbourhoods
- **Principle 2** - Reduce carbon emissions and adapt to the effects of climate change by:

- Contributing to reductions in carbon dioxide emissions from all sources, in line with national targets;
 - Ensuring an ability to adapt to future changes to national targets for carbon dioxide and other greenhouse gas emissions, including recognising the role of new technology;
 - Identifying and applying measures offering effective mitigation and adaptation to likely environmental, social and economic impacts of climate change; and d) Meeting appropriate minimum standards for sustainability.
- **Principle 3:** Reduce the need to travel and increase accessibility by:
 - Selecting locations that reduce the need to travel, especially by car, and enable people as far as possible to meet their needs locally;
 - Assisting the Council in achieving a shift towards more sustainable modes of transport for people, goods and freight;
 - Encouraging safe and sustainable access for all, particularly by promoting the use of public transport, walking and cycling between homes and employment
 - **Principle 4:** Recognise environmental limits, protect and enhance environmental assets, enhance local character and promote quality of place

Policy CS7 – Transport Networks - New development will be required to be:

- Located and designed to prioritise accessibility and sustainable modes of travel through a choice of walking, cycling, public transport, and incorporate access for private vehicles. Where deficiencies are identified, developer contributions will be required to improve the accessibility of the location;
- Located and designed to ensure that larger scale proposals (attracting a lot of visitors, customers and/or employees) are located in the most accessible locations;
- Where subject to a planning application, accompanied (except in the case of smaller scale proposals) by Transport Assessments and/or Travel Plans;
- In compliance with adopted cycle, car, disabled and service vehicle parking standards for different types and scales of new development; e) Inclusive of measures that will mitigate carbon emissions and improve air quality where appropriate

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. Avoiding the creation of adverse local climate conditions by using natural systems to avoid internal overheating and excessive heat generation;
 - b. Making the most effective and sustainable use of water, aggregates and other resources;
 - c. Limiting energy use by incorporating high standards of insulation, heat retention, natural ventilation and passive solar techniques;
 - d. Landscaping (including measures such as green walls or roofs) to create shelter and reduce any heat island effect;
 - e. Using sustainable materials from local suppliers where possible;
 - f. Supplying energy efficiently and incorporating decentralised energy systems, using renewable and low carbon energy where feasible;

- g. Managing flood risk, including through the use of Sustainable Drainage Systems (SuDS) and flood resilient design for infrastructure and property; and
 - h. Promoting sustainable waste practices in new and existing developments.
2. Government targets for carbon reduction in new development are expected to be implemented through updates to the Building Regulations.

Policy CS23 - Renewable and Low Carbon Infrastructure - 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)

Policy CS24 – Managing Flood Risk - All development which is within or otherwise affects an area of flood risk or is larger than one hectare in size shall be accompanied by a site-specific Flood Risk Assessment (FRA).

New development shall include flood mitigation measures, where necessary, to manage flood risk associated with or caused by the development. These measures shall be derived from the Strategic Flood Risk Assessment (SFRA), relevant FRA(s) or a local strategy for flood risk management

The drainage of new development shall be designed to reduce surface water run-off rates to those associated with a green-field site by treating it at its source.

Policy CS26 – Waste Management - The Council will promote sustainable forms of waste management in accordance with the waste hierarchy. As set out in the Merseyside and Halton Joint Waste Local Plan

3.2.2 Merseyside and Halton Joint Waste Local Plan

The Merseyside and Halton Joint Waste Local Plan has been prepared by the Merseyside Environmental Advisory Service (MEAS) for Halton, Knowsley, Liverpool, Sefton, St Helens and Wirral Councils and sets out the planning strategy for the sustainable management of waste across the sub region. It is a constituent part of each district's Local Plan and was adopted in July 2013.

Policy WM 8 Waste Prevention and Resource Management - Any development involving demolition and/or construction must implement measures to achieve the efficient use of resources, taking particular account of:

- Construction and demolition methods that minimise waste production and encourage re-use and recycling materials, as far as practicable on-site;
- Designing out waste by using design principles and construction methods that prevent and minimise the use of resources and make provision for the use of high-quality building materials made from recycled and secondary sources;
- Use of waste audits or site waste management plans (SWMP)G , where applicable, to monitor waste minimisation, recycling, management and disposal.

Evidence demonstrating how this will be achieved must be submitted with development proposals of this type.
Explanation

Policy WM 9 Sustainable Waste Management Design and Layout for New Development - The design and layout of new built developments and uses must, where relevant, provide measures as part of their design strategy to address the following:

- Facilitation of collection and storage of waste, including separated recyclable materials;

- Provide sufficient access to enable waste and recyclable materials to be easily collected and transported for treatment;
- Accommodation of home composting in dwellings with individual gardens;
- Facilitate small scale, low carbon combined heat and power in major new employment and residential schemes, where appropriate

3.3 Supplementary Planning Documents

3.3.1 Ensuring a Choice of Travel

The Ensuring a Choice of Travel SPD was adopted by the Council in September 2010 to provide detailed guidance about the council's transport policies. The main objective of the SPD is to ensure a good choice of travel modes to all new developments in Knowsley.

Policy T7 - New Development and Walking and Cycling Routes - New development should preserve and where possible enhance the walking and cycling network.

3.4 Climate Emergency

On 29th January 2020, Knowsley Council declared a Climate Emergency and made a commitment to develop an action plan with the aim of achieving net zero carbon emissions from the Council's estate and services by 2040.

the plan identifies the key areas for action, noting that some will require further feasibility, project development and business case approval to support the Council to reduce carbon emissions as far as possible by 2040 and then use offsetting to achieve the net zero target

A separate Knowsley Action Plan will be developed to address the Council's influence on carbon emissions across the wider borough, building on existing programmes to reduce emissions further. Again, the Scrutiny Committee will have oversight of this work and have agreed a series of eight key themes to set a framework against which actions can be developed:

- Protecting and enhancing Knowsley's green spaces;
- Reducing carbon emissions from transport in Knowsley;
- Reducing carbon emissions from new development in Knowsley;
- Reducing carbon emissions from energy use by businesses in Knowsley;
- Reducing carbon emissions from energy use in residential properties in Knowsley;
- Reducing carbon emissions from schools in Knowsley;
- Reducing carbon emissions from waste generation in Knowsley; and
- Community engagement and awareness in Knowsley.

3.5 Emerging Policies

3.5.1 Design Quality in New Development

This document, together with other Supplementary Planning Documents, complements the policies within the Local Plan.

General Principles – Sustainability in Design – A.7: The design of all new developments should:

- Meet any requirements regarding renewable energy, carbon reduction or sustainable development set out in the Building Regulations and any local adopted planning policy or guidance.
- Ensure that any voluntary measures relating to sustainability are fully integrated into the overall design, and (where such measures will affect the layout or external appearance of the development) are illustrated by appropriate drawings submitted as part of any relevant application for full planning permission or for approval of reserved matters.
- Reduce and mitigate any flood risk through the use of Sustainable Drainage Systems (SuDS) and flood resilient design where appropriate to enhance the layout, and landscaping to complement the development.
- Make appropriate provision for the storage and recycling of all waste likely to be generated by users of the development as an integral part of its layout (including well designed and screened bin storage areas).

3.6 Regulatory Framework

Building Regulations, Part L - Conservation of Fuel and Power sets the compliance standards for energy demand and carbon dioxide emissions from buildings. Guidance on how to meet the requirements of this regulation is provided within a number of approved documents. The relevant document is referenced below:

Approved Document L2A addresses the conservation of fuel and power in new non-domestic buildings. The proposed development will be registered against Building Regulations, Part L (2013) which requires all newly constructed buildings to comply with the 5 criteria set out in Approved Document L2A:

- I. Achievement of an acceptable Building CO₂ Emission Rate. i.e., the BER is less than the TER (target emission rate for a notional building);
- II. Limits on design flexibility – including U-values, air permeability, air handling plant efficiency, duct leakage, insulation, lighting system efficiency;
- III. Limiting solar gains in summer;
- IV. Construction quality and commissioning - The BER must be recalculated as constructed; and
- V. Provision of information - Information must be provided to the building operator.

3.7 Applicable Targets

Based upon a review of relevant planning policy requirements, legislative drivers, and client priorities, the following list provides a brief precis of the key criteria that should be targeted for this development:

- **Approved Document L2A (2013)** will addresses the conservation of fuel and power in new non-domestic buildings
- **Policy CS7 – Transport Networks**
- **Policy CS22 – Sustainable and Low Carbon Development**
- **Policy CS23 - Renewable and Low Carbon Infrastructure**
- **Policy WM 8 Waste Prevention and Resource Management**
- **Policy WM 9 Sustainable Waste Management Design and Layout for New Development**

4. SUSTAINABILITY STATEMENT

This section provides an appraisal of the development proposals and details the specific approach, design features and specifications which will contribute to reducing the environmental impact of this scheme. This section outlines those commitments that have been made to ensure this scheme contributes to sustainable development and meets the Council's policy aims.

4.1 Energy Improvements

In order to limit energy demand and carbon dioxide (CO₂) emissions from the operation of the buildings, a number of design features will be integrated that will collectively contribute towards the emissions reduction target for the scheme.

Detailed measures are presented in Chapter 5 of this report, but in essence, the energy strategy focuses on a holistic and multi-faceted approach of improving the buildings' performance by applying a fabric-led approach and through improvements in the efficiency of the mechanical and electrical systems.

The reduction in energy demand to meet the carbon reduction targets will be achieved through the following design measures and low carbon technology options:

- High performance thermal insulation
- Low air permeability
- Maximising solar control to mitigate overheating risks
- Point of use electric water heaters
- Heat recovery ventilation systems (MVHR)

4.2 Water Conservation

The proposed development will be designed to reduce mains/potable water consumption and will include the following water efficient design and equipment:

- 'A' rated appliances will be used for their water saving capabilities;
- Specification of efficient water fixtures throughout the scheme (low flow taps and dual flush WCs); and,
- In order to reduce water demand, the sanitary fixtures will be specified to limit daily consumption of potable water.

4.3 Flood Risk Management:

The Site is located within Flood Zone 1, and the probability of flooding is low (with a 1 in 1000 annual probability of river or sea flooding).

- The site is predominantly at a Very Low risk of flooding on the EA Risk of Flooding from Surface Water maps. There is a small area on the southern site boundary shown at high risk of flooding (annual chance of flooding greater than 3.3%) which is expected given the site levels here.
- The site is at a very low risk from reservoir flooding;

- The site is not highlighted as an area being at risk from groundwater flooding; and,
- Surface water drainage for the new development will need to discharge at a rate of 16.59 l/s into the existing network of ditches on site, which eventually joins Knowsley Brook.

The image below shows the extent of flooding on site (low to very low) on the EA Surface Water Flood Map.

Figure 4.1 EA Surface Water Flood Map



4.4 Waste Management

Construction Waste

Best practice techniques to prevent and minimise waste during the design and construction phases of the development will be adopted, as follows:

- Prior to commencement of the construction phase, a site waste management plan (SWMP) will be produced by the developer to limit the on and off-site environmental impacts of construction. The SWMP will detail:
 - Recycled and secondary materials;
 - Waste reduction;
 - Waste segregation;
 - Waste recovery; and,
 - Waste disposal.
- This scheme will promote the minimisation of waste arising in site development and seek to maximise the use of recycled materials in construction; and,
- A site waste management plan will identify opportunities to minimise waste generation and divert construction waste from landfill.

Operational Waste

The operational waste strategy for the scheme focuses on the segregation of waste at source, in order to maximise the potential for staff and visitors to recycle. All staff will be informed on collection frequency, as well as guidance on recycling and health and safety practices related to the management and storage of waste.

The proposed strategy has been developed in compliance with the policies of Knowsley Council:

- Waste will be segregated at source with the help of segregated bins. It is expected that there will be multiple streams of waste – general, recyclables and compost / green waste;
- The number of bins and subsequently the size of the refuse store is based on waste generation figures for each unit;
- The management company will be responsible for transferring the waste from the refuse store to a hardstanding service area on the day of collection by refuse operators; and
- Following collection, the bins will be returned to the refuse store.

4.5 Materials

This development will contribute towards making more efficient use of non-renewable material resources and to reducing the lifecycle impact of materials used in construction. This is demonstrated by the prioritisation and selection of:

- Materials with low environmental impact throughout their lifecycle;
- Responsibly sourced materials from suppliers operating an Environmental Management System or procuring timber verified by either the Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification standard (PEFC);
- Local sourcing of construction materials where feasible and viable, which will minimise the impact of carbon dioxide emissions associated with the transportation of materials;
- Material selection within the warehouses will be carefully considered to avoid the use of toxic materials, such as Volatile Organic Compounds (VOCs) and contribute towards creating a healthy indoor environment;
- Excavated material (such as soil and substructural elements) from construction and demolition works will be used, where practical, for landscaping purposes and within the public realm.

4.6 Ecology and Biodiversity

A Preliminary Ecological Appraisal has been undertaken for the site. The findings demonstrate that the site provides ecological value for farmland birds and bats. Therefore, the following recommendations should be taken into consideration:

- The broadleaved woodland is classified as a priority habitat deciduous woodland. Therefore, it should be retained and protected as best as possible;
- A Construction Environmental Management Plan (CEMP) should be implemented to protect the retained habitats;
- Further bird surveys are required, to understand the extent of nesting birds in the woodland areas;

- Any vegetation removal should take place outside of the bird breeding season. If this is not possible, an experienced ecologist should check the habitat for breeding bird activity no more than 48 hours before clearance;
- A single oak tree within the strip of woodland to the north was assessed as having bat roosting potential, and therefore should undergo reasonable avoidance measures;
- The habitats of highest potential value for commuting and foraging bats include the scrub, woodland and hedgerows. Due to the loss of these habitats, it is recommended that further bat surveys are completed to determine the sites value for foraging and commuting bats; and,
- Bat and bird boxes could be placed on the proposed industrial units and planted trees

4.7 Transport

The proposed site has a high level of connectivity and benefits from access to a number of sustainable transport methods. Pedestrians and cyclists will be able to access the site via a 3m shared cycleway along the site frontage on Ormskirk Road. Which is supported by the shared footway/cycleway along the A580 East Lancs Road, Moorgate Road, Coopers Lane and Country Road. This vast network of footways provides street lit routes to and from the site, the surrounding residential areas, and other amenities. Therefore, the development is considered to be highly accessible via foot and bicycle for future staff and visitors. A pair of bus stops are situated on Ormskirk Road and Knowlsey lane, which are within 400m of the site. These local bus services, enable passengers to travel to Liverpool City Centre, Kirkby, St. Helens and the numerous residential areas in between. Making this mode of transport a convenient choice for future visitors. There is however no rail station within close proximity of the site, but the nearest train station (Kirkby) can be accessed via a 25-minute direct bus journey.

237 car parking spaces, split across the 3 buildings has been proposed for the development. 5% of the designated spaces for each building will be for EV charging and a further 5% will be accessible spaces. In addition to this, Building 1 is expected to include 16 cycle spaces, whereas buildings 2 and 3 will accommodate 8 and 12 respectively. Further encouraging more people to travel by bicycle to and from the site.

To enhance the sustainable credentials of the proposal, the site is underpinned by a Travel Plan. This plan seeks to promote existing transport routes, complement the sustainable location of the site, and meet the needs of visitors. This plan incorporates measures such as administrative staff occasionally working from home, promoting walking and cycling through the educating of staff on their health benefits, encouraging bus travel through the promotion of timetables, promoting lift sharing websites, and incorporating EVC facilities. This travel plan will be managed by an appointed Travel Plan Coordinator that will be tasked with implementing the travel plan measures, monitoring and reviewing the travel plan through regular surveys, and updating performance targets based on the survey results.

To further promote sustainable transport methods and encourage the uptake of the travel plan, a staff information pack will be distributed to all new employees. This will introduce employees to the travel plan's objectives and benefits, include information on the potential benefits of making more sustainable transport choices, include time and cost savings and the possibility for carbon footprint reductions, and provide details for the travel plan coordinator. Notice boards and the website will be used to further promote walking, cycling and public transport options.

Overall, the surrounding area benefits from excellent levels of pedestrian and cycling infrastructure and there are public transport options within appropriate walking distance of the site.

5. ENERGY STRATEGY

5.1 Energy Strategy for Knowsley Lane

The Energy Strategy for Knowsley Lane seeks to improve the building's energy demand and carbon dioxide emissions performance by applying an enhanced thermal envelope to limiting demand side energy loads. This will be allied to improvements in the efficiency of the mechanical and electrical systems and controls, along with the inclusion of renewable and low carbon energy technology. The design measures outlined in the Energy Strategy comply with the policy requirements as set by Knowsley Council's Core Strategy.

5.1.1 Build Fabric and Thermal Performance

The energy strategy and design attributes will provide the following benefits:

- **High performance thermal insulation** throughout the building envelope (ensuring very low U-values for all heat loss elements) and thermally efficient windows and doors will minimise heat loss through the main building elements;
- **Thermally efficient windows** will be specified with argon gas fill and low emissivity coatings to limit heat loss through the panes. The glazing g-value will be specified to optimise beneficial solar gains but limit the propensity for the apartments to overheat;
- **Low air permeability** to further reduce heat losses and provide high levels of occupant comfort (in combination with the proposed mechanical ventilation strategy). Focus on the quality of the build is vital to deliver such airtight buildings;
- **Attention to cold bridging junctions** including the provision of insulation to reduce heat and limit heat losses that occur at the junctions between building elements and around openings and will significantly improve the emission rate of the apartments; and

These will help to deliver an energy efficient development that achieves an emission rate reduction and fabric energy efficiency performance significantly beyond the requirements set by building regulation Part L (2013).

5.1.2 Building Services Specification

In addition to the improvements in the building fabric and thermal performance, a number of measures to improve the energy efficiency of the building systems have also been considered to ensure efficient servicing of the buildings. The mechanical and electrical specification will deliver a Building Regulation Part L2A (2013) compliant scheme and will provide the following benefits:

- **Electrical panel heating (for space heating)** generates a reduced overheating potential – electric space heating delivers virtually instantaneous heating at the location it is required. Unlike a 'wet system' associated with communal gas boilers which inherently have a long lag time for the heat to be generated and then dissipated when no longer needed. This lag time can lead to the units overheating as the hot water remains in the radiators for a considerable time after the heat demand is required;
- **Point of use water heaters** deliver hot water on demand with minimal standing losses;

- **LED lighting** will be specified throughout the scheme to maximise operational efficiencies and lifespan of the fittings. LEDs operate with an estimated energy efficiency of up to 90% when compared to traditional lighting and conventional light bulbs. This means that about c.90% of the electrical energy is converted to light, rather than wasted heat as in conventional bulbs; and
- **Sophisticated heating controls** including time and temperature zonal controls will ensure the efficient delivery of heat from electric panel heaters to further reduce the apartments' energy demand.

5.2 Renewable Energy Feasibility

In order to meet the energy targets of the Core Strategy Policy CS22 and CS23. An analysis of the most appropriate options has been undertaken to ensure compliance.

A number of renewable energy technologies have been considered for this site, including:

- Solar Hot Water;
- Photovoltaics (PV);
- Wind;
- Heat Pumps; and
- Biomass heating.

A review of the development proposals and site location concludes that one of these options are feasible for this scheme, as detailed below:

✗ **Solar Hot Water** utilises the energy in sunlight and diffuse daylight to heat water for use in buildings. The main component of any solar water heating system is the collector, which absorbs the radiant energy of the sun and converts it to heat energy. This technology is not considered to be a feasible option for this site because, there is limited hot water demand from the operation of the buildings therefore these solar thermal technologies can make only a relatively limited contribution to reducing the building's energy demand and carbon dioxide emissions.

✓ **Photovoltaic (PV)** panels harness solar thermal energy and convert it into electricity which can then be used within a building. The panels may be roof mounted and orientated in a southerly direction to enable this technology to operate efficiently. This technology is considered to be a viable option for this site with sufficient roof area to accommodate a large PV array.

✗ **Wind Turbines** are considered unsuitable for this site due to a poor wind resource and lack of space to locate the turbines at the lower levels of the scheme. Integrating these systems at height is not considered feasible due the associated noise, vibration and structural stresses upon the building. Furthermore, there are planning issues and perceived safety concerns with this technology.

✗ **Ground Source Heat Pumps** collect low-grade heat from the ground to supply useful heat for space and water heating requirements. By applying additional energy input (in the form of electricity), it is possible to raise the temperature of the source heat to the temperature required. Such technology is considered unsuitable for this site due to an insufficient area (based upon the proposed densities) to install a horizontal ground collector and the prohibitive costs and technical constraint of installing vertical boreholes.

✓ **Air Source Heat Pumps** collect low-grade heat from the air to supply useful heat for space and water heating requirements. They operate in the same way as a ground source heat pump, by applying additional energy input (in the form of electricity), it is possible to raise the temperature of the source heat to the temperature required. The incorporation of ASHP's may be appropriate subject to further design development and financial viability.

✖ **Biomass heating** would be capable of delivering the target CO₂ emission reductions but are considered inappropriate for this type of development and location due to the requirement for a large fuel store and the high NO_x emissions associated with biomass combustion which is inappropriate for this urban location.

5.3 Photovoltaic Array

PV arrays are relatively straightforward to install, benefit from low maintenance costs and will reduce the operational cost of the building. The use of PV in general at this site would provide the following benefits:

- Reducing the building's electrical energy grid load;
- Simple installation and commissioning;
- Low maintenance; and,
- Reliable, proven technology.

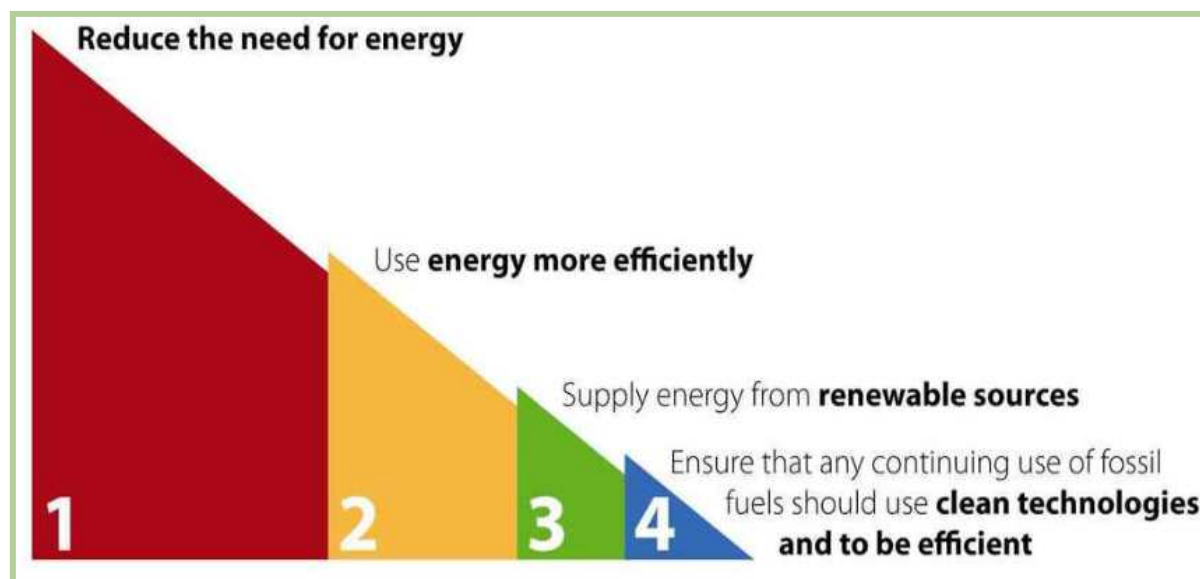
Proposed System Details -

- PV arrays will be shallow mounted upon the roof areas, orientated due south to optimise the operating efficiency of the system.
- 10% of available roof space will be covered with PV.
 - Building 1
 - Approximate PV Coverage: 625.25m²
 - Building 2
 - Approximate PV Coverage: 270.27m²
 - Buildings 3
 - Approximate PV Coverage: 447.46m²

5.4 Energy Hierarchy

The Knowsley Lane scheme will incorporate a significantly enhanced material specification along with high quality design and construction standards in order to improve the whole building energy efficiency through a 'fabric led' energy strategy. The proposed construction, design and specification will deliver a scheme that is inherently energy efficient during occupation.

The energy hierarchy provides a framework to guide energy policy and decision making to achieve practical and cost-effective carbon emission reductions. The hierarchy prioritises demand-side activities to reduce wastage and improve efficiency (see Figure 5.1).

Figure 5.1 – The Energy Hierarchy**First Principle:**

The following efficiency measures are designed to reduce heat losses and minimise energy demand:

- The building will be constructed with high specification materials and design criteria which exceed current minimum Building Regulation standards and includes numerous efficiency measures designed to reduce heat losses and minimise energy demand.
- Heating systems will be provided with zonal, programmable thermostatic controls. This is intended to reduce the demand for additional energy usage.

Second Principle:

The approach taken for this Scheme will help to minimise energy demand and associated carbon dioxide emissions and is aligned with the second principle of the energy hierarchy which states that reduction in energy demand should be achieved initially by energy efficiency.

To this effect, the following measures have been proposed:

- The design air permeability target for the buildings is $3.0\text{m}^3/\text{hm}^2$ (@50Pa.). This low air permeability target will assist to limit the heat loss through the structure of the building;
- The g value within the buildings will be optimised to control solar gain in the summer months and allow beneficial gains in the winter season to minimise the overheating risk and limit the heating energy demand within the units;
- 100% LED provision and sophisticated control systems for the space within the buildings will also ensure the energy consumed is used efficiently; and,
- Photocell switching and automatic presence control of the lighting will be specified in order to further improve the efficiency of the lighting system.

Third Principle:

Renewable and low carbon technology including air source heat pumps and photovoltaic panels will be specified for the development in a bid to reduce the scheme's operational carbon footprint.

Fourth Principle:

The use of electric panels and point of use water heaters will ensure that fossil fuels converted and distributed through the National Grid as electrical energy for heating purposes will be consumed cleanly and efficiently.

Furthermore, as the UK electricity grids' CO₂ footprint continues to improve, so too would the carbon dioxide emissions associated with the operational phase of the proposed scheme which benefits from a 'full electric' energy strategy.

6. CONCLUSION

This Statement has reviewed the sustainability performance of the proposed Knowsley Lane Development against national and local planning policies. The conclusion that can be drawn from the review is as per the following:

Sustainability Performance –

- Water consumption of the development will be minimised through **the specification of efficient water fixtures**.
- The proposed scheme location promotes access **to sustainable transport options**. The direct links to local cycleways and footways, cycle storage and access to regular busses will all contribute towards creating a highly connected and sustainable development.
- The development Site is located within Flood Risk Zone 1. Post development surface water run-off rates will be **managed and mitigated through the implementation of SUDs** where applicable.
- Waste arising during construction and occupation/operation will be minimised through the **implementation of a Waste Management Plan (WMP)**. The WMP will be used to ensure that there is adequate management and storage of construction waste takes place in line with the Council's policies. Opportunities for the possible recycling of construction from excavation works will also be considered in line with best practice.
- **A refuse management strategy** has been developed to manage waste and recyclables from the operational phase of the development. Source segregation and the provision of refuse areas will encourage the residents to recycle and **divert waste away from landfills**.
- Materials are proposed to be **responsibly sourced and materials with low environmental impact** will be selected and local suppliers will be prioritised. Material selection will be carefully considered to avoid the use of toxic materials and materials with VOCs.
- The findings from the Preliminary Ecological Appraisal show that the site is of high ecological value and further **bat and bird surveys will be required** to determine appropriate means to mitigate the impact of the proposed scheme and removal of existing woodland.

Energy Strategy –

The development will be designed and specified in accordance with **the principles of the energy hierarchy** and in line with the **targets and guidance set out Knowsley Core Strategy**.

- A combination of **enhanced building fabric** (significantly beyond the regulatory compliance standard), **efficient mechanical and electrical systems**, and controls will be specified; and,
- The energy strategy will achieve compliance with the emission reduction targets stipulated by Building Regulations Part L2A (2013).

In conclusion, the proposals reviewed within this statement for this industrial scheme on Knowsley Lane in Knowsley will deliver a highly energy efficient and sustainable scheme, providing a quality development that accords with the guidance provided within the Knowsley's adopted planning policies.