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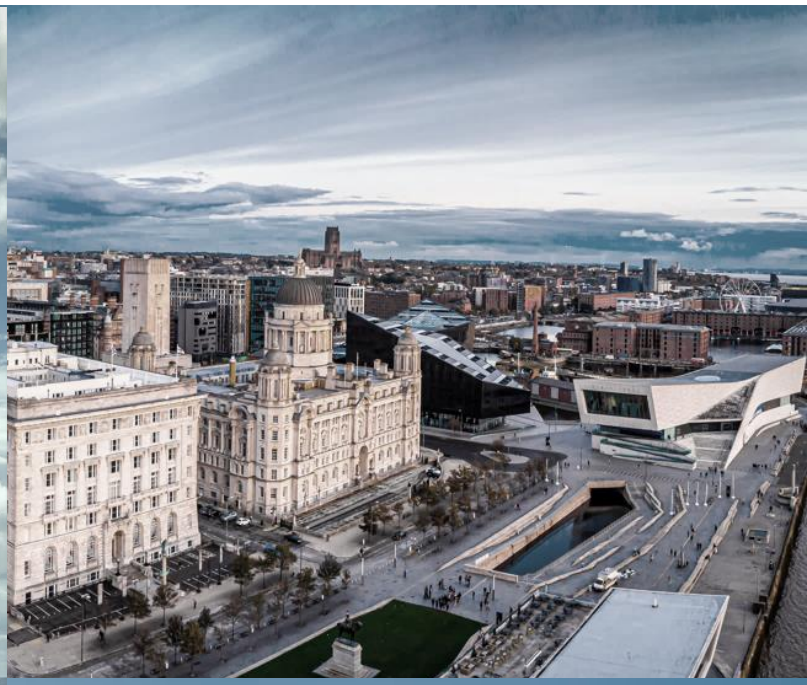
DESIGN ENGINEER SUSTAIN

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First St Plot 9B, Manchester

Energy Statement







First St Plot 9B

Manchester

Energy Statement

Ref: VS9B-FUT-G590-RP-XX-001

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QA – Document History

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Issue	**P1**			
Purpose	For Planning			
Date	17/12/2024			
Prepared By	David Carpenter			
Signature	*D. Carpenter*			
Approved By	Gareth Webb			
Signature	*G. Webb*			

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1 Executive Summary

1.1 Overview

Futureserv Ltd has been appointed by Vita Meadow Ltd to provide an Energy Strategy for the proposed student residential development at First St Plot 9B, Manchester.

This statement will demonstrate how the proposals have been brought forward in the context of a strong commitment to sustainability and will not only show achievement of policy compliance as per Manchester City Council's (MCC) Local Development Plan, including the Core Strategy Addendum (2024) and Places for Everyone and Building Regulations Approved Document Part L, but also that sustainability objectives form an integral part of the applicant's aspirations for the development.

1.2 Strategy

The design strategy has been advanced to ensure the development is in line with the Energy Hierarchy:

Be Lean – Demand reduction

- Passive measures adopted across the building including betterment of U-Values and air tightness over Part L (2021) limiting values
- Ensured G-Values are appropriate in reducing heat gains and losses

Be Clean – Maximising energy efficiency

- Increased hot water generating efficiencies
- Reduced Standing losses from pipes and cylinders
- Efficient LED lighting with improved controls
- Efficient and low energy motors in pumps and fans
- Efficient heat recovery in relevant systems
- Combined natural and mechanical ventilation systems

Be Green – Renewable Energy

- Low/zero carbon energy generation in the form of Air Source Heat Pumps to reduce energy demand

1.3 Results

A preliminary SBEM calculation has been developed for the building to show baseline carbon emissions and energy efficiency. By incorporating the three stages of the energy hierarchy, the results demonstrate compliance with MCC policy and Part L Building Regulations.

	Value	% Difference
TER (kgCO2/yr/m2)	**3.42**	
DER (kgCO2/yr/m2)	**3.36**	**1.75%**
TPER (kWh/m2/yr)	**36.02**	
DPER (kWh/m2/yr)	**35.15**	**2.42%**

TER: Target Emission Rate; BER: Building Emission Rate; TPER: Target Primary Energy Rate; BPER: Building Primary Energy Rate

1.4 Proposed fabric specification

Construction Element	Part L Specification	Development Specification	Improvement over Part L Building Regulations
Floor	0.18 W/m^{2}K	0.1 W/m^{2}K	**44%**
External Wall	0.26 W/m^{2}K	0.14-0.16 W/m^{2}K	**38%**
Curtain Walling	1.6 W/m^{2}K	0.58 W/m^{2}K	**64%**
Roof	0.16 W/m^{2}K	0.1 W/m^{2}K	**37%**
Glazing	1.6 W/m^{2}K	0.89 W/m^{2}K	**44%**
Air Permeability	8 m^3/h/m^2	2.25 m^3/h/m^2	**72%**

2 Introduction

Futureserv Ltd have been appointed by Vita Meadow Ltd to produce an Energy Strategy to support the planning application for the proposed residential development:

First St Plot 9B, Manchester

This statement aims to address the relevant policies on a local and national level in which this development falls:

- Manchester City Council Places for Everyone Joint Development Plan (Adopted 21 March 2024) – (Policies JP-S1, JP-S2, JP-S3)
- Core Strategy Policy EN4
- National Planning Policy Framework (NPPF) (Adopted December 2023)

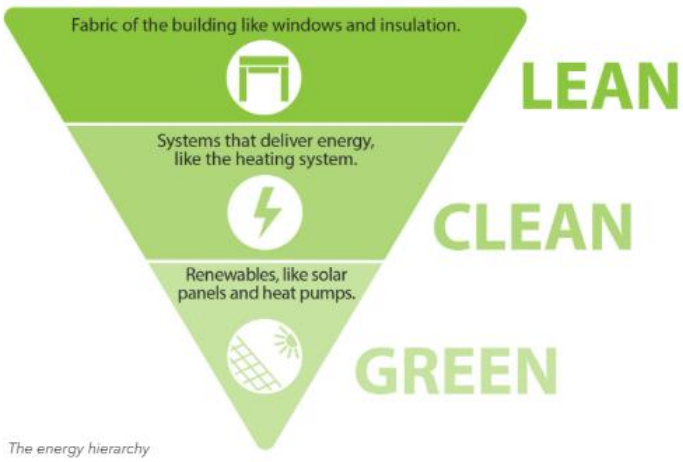
The methodology followed for this development utilises the 3- stage energy hierarchy to develop the low carbon energy design strategy. The hierarchy follows a **lean, clean** and **green** approach.

Baseline: The baseline carbon emissions are initially calculated using Part L 2021 notional specifications. This provides a target where further reductions can be judged where the hierarchy is applied in incremental stages.

Be Lean: Reducing demand through incorporating passive measures

Be Clean: Supplying the energy demand as efficiently as possible through active energy efficiency measures

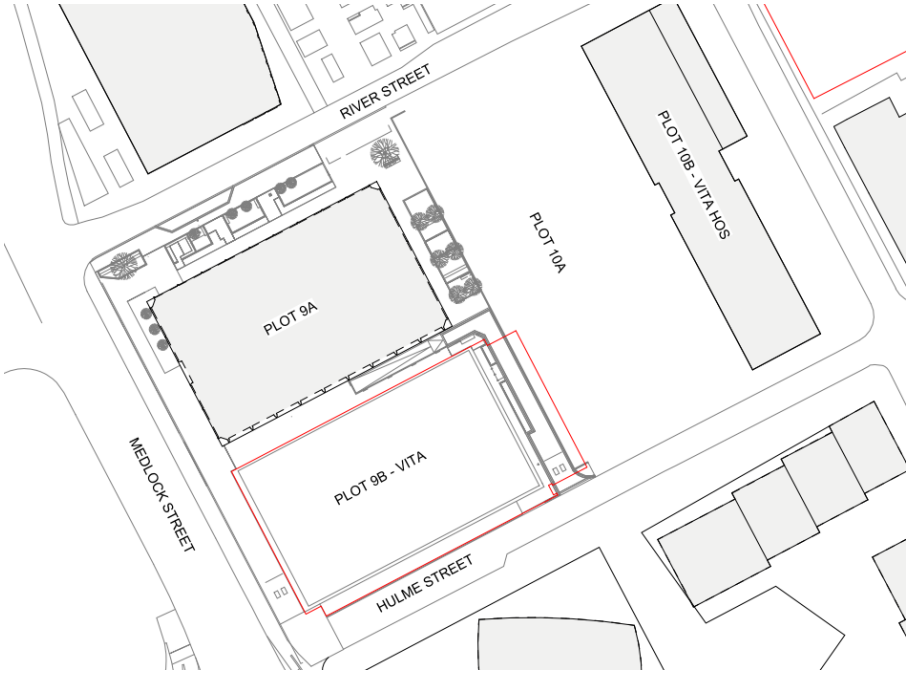
Be Green: Incorporating low and zero carbon energy technologies to offset carbon emissions



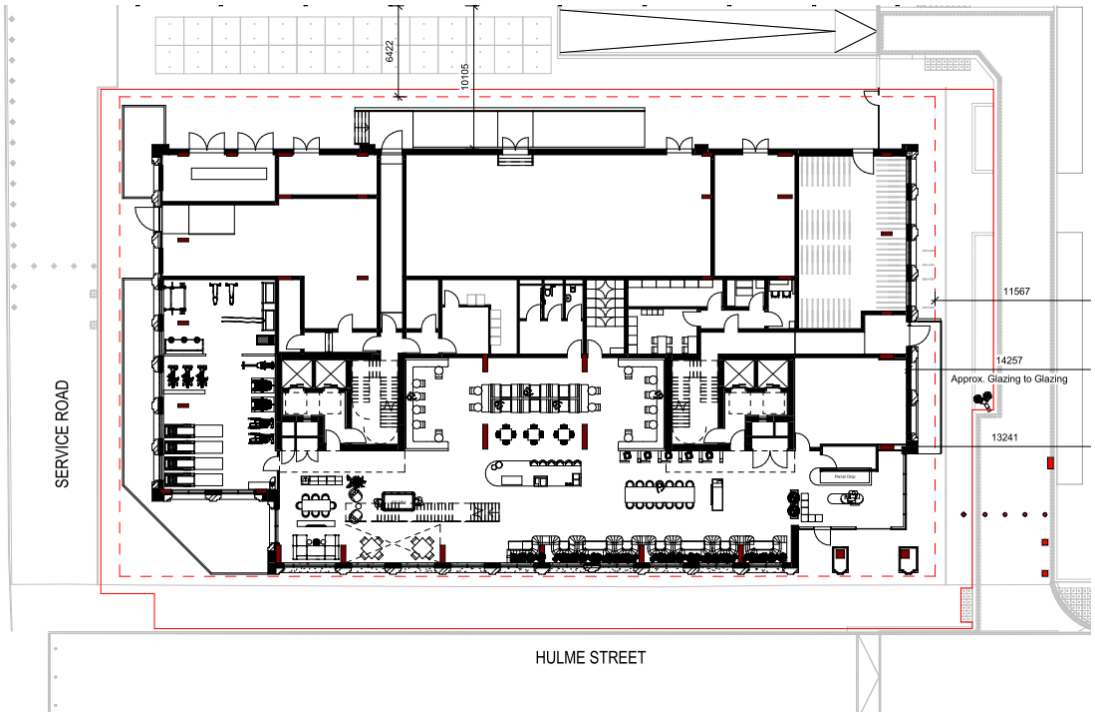
The energy hierarchy

3 Development Proposals

This Energy Statement has been prepared to illustrate the environmental aspects of the proposed development, highlighting the energy/carbon emissions profile and to assess the options available for reducing energy consumption and carbon emissions, in accordance with MCC's policies.



Plot 9B Site Location Plan



Plot 9B Ground Floor Site Layout

Assessing against future net zero targets help to determine the future potential magnitude of change when compared to industry net zero benchmarks. This development has been designed to target LETI and RIBA best practices for whole life embodied carbon and operational energy for 2025 and 2030.

Sustainable Outcome Metrics	Business as Usual	2025 Target	2030 Target
Whole Life Embodied Carbon ($kgCO_2e/m2$)	1,200	< 800	< 625
Operational Energy ($kWh/m^2/year$)	120	70	35

Futureserv have collaborated with the design team to provide a holistic solution for the building, that will provide an efficient envelope and contain intelligent building services therefore reducing the environmental impact of the development while providing comfortable living accommodation.

3.1 Energy Hierarchy

The energy hierarchy assists in the transition towards a sustainable energy system, in which Policy JP-S1 of the Manchester Places for Everyone Joint Development Plan Document aligns with in terms of reducing heat demand, and the use of low and zero carbon technologies such as Solar PV, connecting to or investing in district heating networks where this is applicable as per Policy JP-S3.

3.2 Decarbonisation of the power sector

The UK government has set an ambition for all electricity generation to be decarbonised by 2035. Approximately 60% of electricity today comes from low carbon sources, with fossil fuels accounting for the remainder.

While electricity demand is expected to increase following the implementation of technologies such as heat pumps and electric vehicles, a report produced by the BEIS (HC 283) states that to meet this demand a significant reduction in energy demand, and sustained investment in technology and infrastructure is required.

Furthermore, in a bid to move away from fossil fuels, the UK government are actively phasing out natural gas as a heating source, and for gas heating to be banned from 2025.

4 Policy Review

4.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) offers specific guidance highlighting the UK's aspiration to support a transition to a low carbon future in a changing climate, and to encourage the use of renewable resources, stating:

Planning authorities should ensure that development plans contribute to global sustainability by addressing the causes and effects of climate change through policies which reduce energy use and emissions, promote development of renewable energy resources, and take climate change impacts into account in the location and design of development.

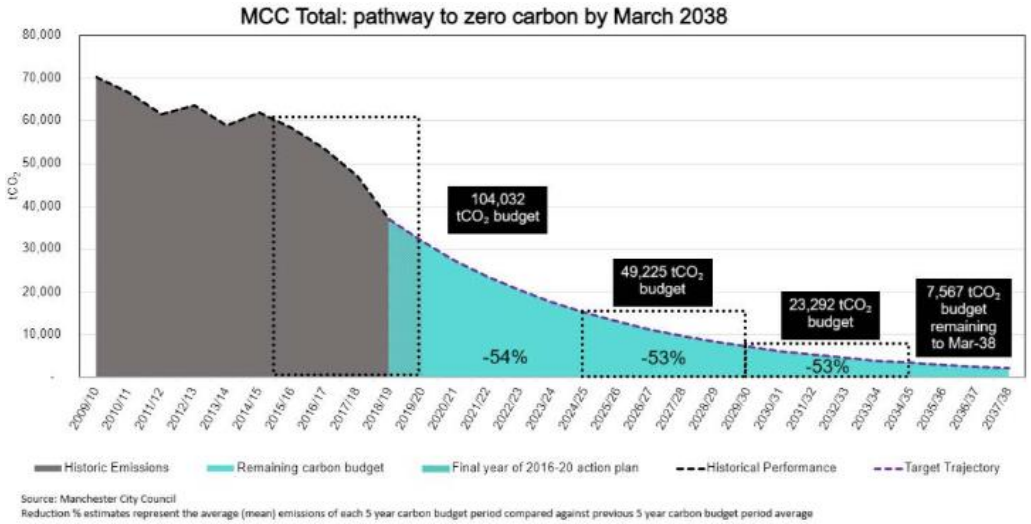
Where new developments should:

Avoid increased vulnerability to the range of impacts arising from climate change. When new developments are brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and can help to reduce greenhouse gas emissions, such as through its location orientation, and design. Any local requirements for the sustainability of buildings should reflect the government's policy for national technical standard Local plan and supplementary guidance.

4.2 Responses to Climate Change

The UK government has committed to a legally binding agreement as part of the Climate Change Act to reduce greenhouse gas emissions. A target has been set to reduce carbon emissions by 100% of 1990 levels by 2050.

On a local level, Manchester City Council declared a climate emergency in July 2019, and made a commitment to reduce the city's carbon emissions. An ambitious target was set for Manchester to become a zero carbon city by 2038.



4.3 Manchester Places for Everyone Joint Development Plan

4.3.1 Policy JP-S1: Sustainable Development

To help tackle climate change, development should aim to maximise its economic, social and environmental benefits simultaneously, minimise its adverse impacts, utilise sustainable construction techniques and actively seek opportunities to secure net gains across each of the different objectives.

5.6 To meet our carbon commitments we will need to:

- Be carbon neutral by 2038
- Hold cumulative carbon dioxide emissions to within our carbon budget
- Initiate a programme of mitigation to reduce emissions including by:
  - Significantly upscaling solar photovoltaic energy
  - Reducing heat demand in homes
  - Moving away from carbon intensive gas as the primary source of heat
  - Reducing heating and cooling demand for the public and commercial buildings
  - Increasing biofuel use
  - Enable sustainable choices for travel and decarbonise transport
  - Significantly upscaling building retrofit; and
  - Increase the delivery of nature- based solutions and biodiversity net gain.

5.17 … where planning applications for residential development are accompanied by an energy statement, the following best practice thresholds should be seen as the starting point in relation to reducing energy demand and onsite renewable energy generation. The threshold set out in Table 5.1, for post 2025 are consistent with the GM Five Year Environment Plan.

-	Space Heat Demand	Hot Water Energy Demand	Renewable Energy Generation Targets
2021 – 2025	Houses (30kWh/m2) Flats (25kWh/m2)	20% energy demand reduction in the total heat required for water heating	Photovoltaic installation: 20% ground floorspace
2025 – onwards	Houses (20kWh/m2) Flats (15kWh/m2)	20% energy demand reduction in the total heat required for hot water heating	Photovoltaic installation: 40% ground floorspace

Table 5.1 Best Practice Thresholds for Reducing Energy Demand and Onsite Renewable Energy Generation within residential developments

4.3.2 Policy JP-S2: Carbon and Energy

The aim of delivering a carbon neutral Greater Manchester no later than 2038, with a dramatic reduction in greenhouse gas emissions, will be supported through a range of measures including:

1. Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling.
2. Promoting the use of life cycle cost and carbon assessment tools to ensure the long-term impacts from development can be captured.

3. Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities.
4. Increasing the range of nature- based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, tree-planting and natural flood management techniques.
5. An expectation that new development will, unless it can be demonstrated that it is not practicable or financially viable:
    a. Be net zero carbon which applies:
        - From adoption- to regulated operational carbon emissions
        - From 2028 – to all emissions 'in construction

    From 2025, development should also calculate and minimise carbon emissions from unregulated emissions alongside regulated emissions.

    Development proposals should set out how this has been achieved in an energy statement in accordance with the energy hierarchy, which in order of importance seeks to:
    i. Minimise energy demand
    ii. Maximise energy efficiency
    iii. Use renewable energy
    iv. Use low carbon energy and
    v. Utilise other energy sources

From 2025 any residual carbon emissions that cannot be fully mitigated on- site should be offset, in agreement with the relevant local planning authority through a financial contribution to a carbon offset fund.

As an interim measure, development should be consistent with the 2021 Part L Building Regulations unless superseded by changes to building regulations and/or national or local planning policies.

a. Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance of a low carbon energy/heating/cooling network that is adaptable to non- fossil fuels later

b. In residential developments, achieve energy demand reductions in terms of space heat demand; hot water energy demand and the delivery of on-site renewable energy generation, in accordance with Table 5.1.

For renewable energy generation priority should be given to PV installation where technically feasible, alternative technology will be appropriate where the equivalent generation is evidenced.

4.3.3 Policy JP-S3: Heat and Energy Networks

The provision of decentralised energy infrastructure is critical to the delivery of our objectives for low carbon growth, carbon reductions and an increase in local energy generation. The following measures will help to achieve this:

1. Delivery of renewable and low carbon energy schemes will be supported with particular emphasis on the use of decentralised energy networks in areas identified as 'Heat and Energy Network Opportunity Areas'. These have been identified where:

a. Existing heat/energy networks are operational or have been commissioned
b. Proposals for new heat networks/energy networks are being progressed, or future opportunities have been identified in city- region master planning
c. Sufficient density of existing heat demand occurs
d. Significant future development is proposed at the strategic development locations

2. Within the identified 'Heat and Energy Network Opportunity Areas', unless it can be demonstrated that there are more effective alternatives for minimising carbon emissions or such connection is not practicable or financially viable, it is expected that:
    a. New residential developments that are '10 dwellings or more' or other developments over 1,000m2 floorspace shall:
        i. Connect to an existing or planned heat/energy network or be designed to enable future connection (where within 500m of such a network); and/or
        ii. Install a site wide or communal heat/energy network solution

The development must aim to meet the requirements of the Manchester Places for Everyone Joint Development Plan Document and follow the guidelines set above.

Development must follow the principles of the Energy Hierarchy, being designed:

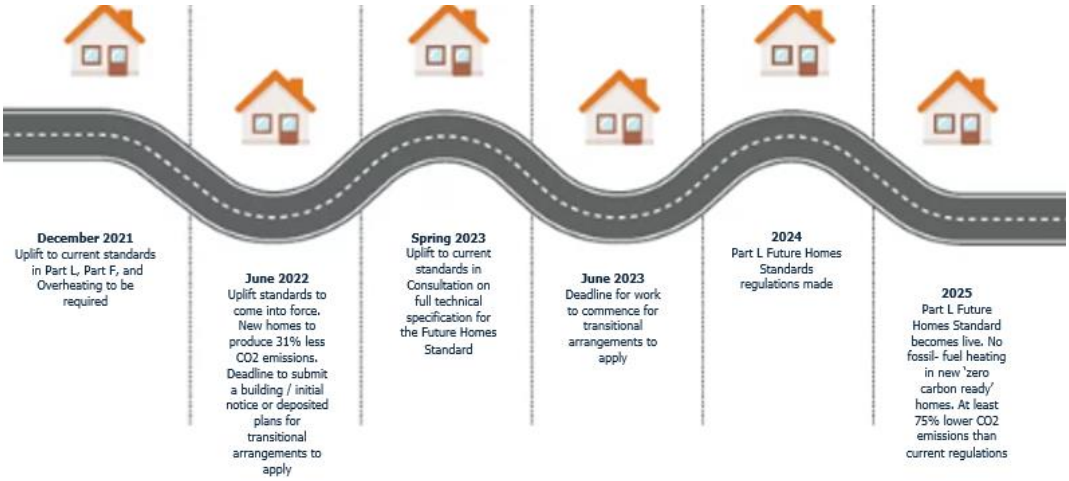
- To reduce the need for energy through design features
- To reduce the need for energy through energy efficient features
- To meet residual energy requirements through the use of low or zero carbon energy generating technologies.

5 Building Regulations

Part L 2021 of the Building Regulations took effect in June 2022, adopting a 27% and 31% uplift in CO2 emission standards in comparison to the previous Part L 2013 for domestic and non-domestic buildings respectively.

The improvements upon Part L demonstrate a significant uplift, the effects of this will continue to improve as the UK electricity grid continues to decarbonise.

The Future Homes Standards is due to come into effect starting 2025, which will require carbon emissions to further decrease by 40%.



Future Homes Standards Roadmap

6 Design Measures

6.1 Be Lean – Reduce Energy Demand

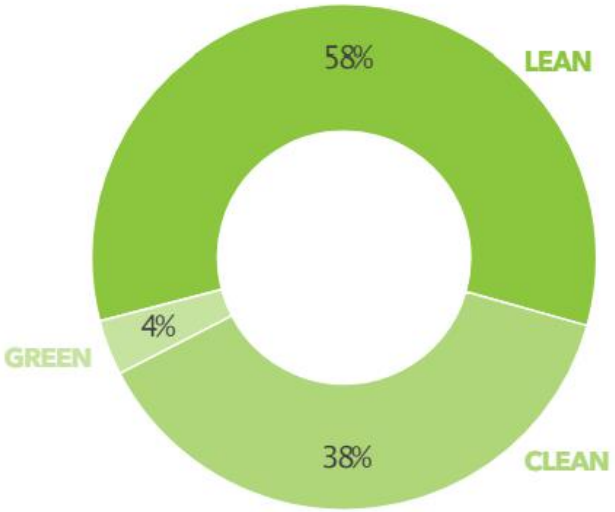
As a result of maximising the performance of the building fabric through passive design measures, the energy efficiency of the building becomes improved and so reducing carbon emissions as a result. Incorporating passive design measures can also reduce the need for maintenance during the building's life.

The following may be considered for the design:

- Maximised air tightness
- High resistance insulation
- Optimised daylight through the provision of openings
- Solar shading to reduce solar gain
- Optimised natural ventilation
- Enhanced U-Values exceeding Part L limiting values

Focusing on passive design measures is generally considered to be the most sustainable method in comparison to relying on energy saving technology or renewable energy generation which may be expensive, have a high embodied energy rate and may not be used efficiently by the consumer.

By incorporating energy efficiency measures into the building envelope, occupants are less likely to require changes in their habits, and so there is less reliance on the end user in maximising the building's energy efficiency.



The typical proportion of energy savings resulting from 'Lean', 'Clean' and 'Green' measures. 'Lean' measures have much the highest impact.

6.1.1 Fabric values

The table below shows the proposed material specification that will be incorporated within the building design to limit heat loss and ensure efficient operation of the proposed development.

An air tightness of 2.5 $m^3/hr/m^2$ @50Pa has been targeted for this development to minimise uncontrolled ventilation through the building, therefore reducing heating and cooling energy demand.

Construction Element	Part L Specification	Development Specification	Improvement over Part L Building Regulations
Floor	0.18 W/m^2K	0.1 W/m^2K	**44%**
External Wall	0.26 W/m^2K	0.14-0.16 W/m^2K	**38%**
Curtain Walling	1.6 W/m^2K	0.58 W/m^2K	**64%**
Roof	0.16 W/m^2K	0.1 W/m^2K	**37%**
Glazing	1.6 W/m^2K	0.89 W/m^2K	**44%**
Air Permeability	8 $m^3/h/m^2$	2.25 $m^3/h/m^2$	**72%**

6.2 Be Clean – Supply energy efficiently

In addition to the passive design measures, active design measures are implemented to minimise direct energy consumption and CO2 emissions, with particular emphasis on:

- Increased hot water generating efficiencies
- Reduced Standing losses from pipes and cylinders
- Efficient LED lighting with improved controls
- Efficient and low energy motors in pumps and fans
- Efficient heat recovery in relevant systems
- Combined natural and mechanical ventilation systems

All internal lighting installations will make use of low energy technologies combined with presence and absence detection in conjunction with timed setbacks.

All fans, motors and pumps will be specified to incorporate ECA accredited technology and appropriate controls.

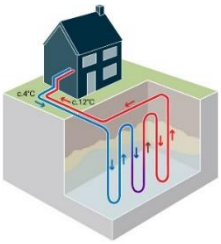
The domestic hot water will be provided through a centralised air source heat pump system. Heating will be via electric panel heaters with a portion of the electricity provided by on site PV panels.

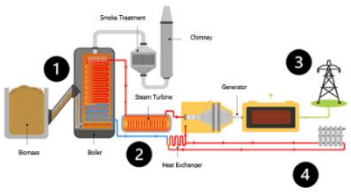
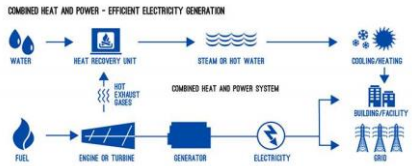
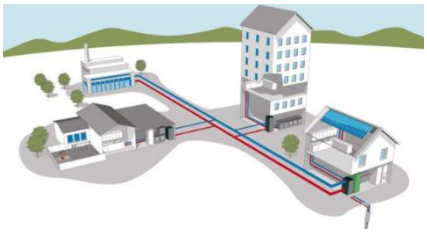
The ventilation will be provided through whole dwelling mechanical ventilation heat recovery units, these will provide extract ventilation to kitchens and bathrooms, and balanced supply ventilation to the living area. Purge ventilation will be via openable windows, allowing for occupants to have final control over the environment in their room.

6.3 Be Green – Use LZC technology

In order to comply with Manchester's Development Plan, which aim to utilise LZC technologies, there are numerous options to consider. All acknowledged and commercially available technologies have been considered and assessed.

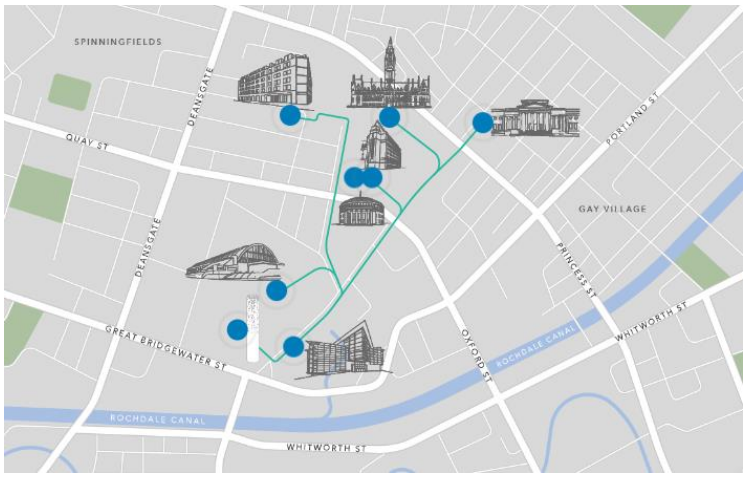
Proposed Technology	Description	Comments
Air Source Heat Pumps **SELECTED** 	Air source heat pumps extract ambient air which is transferred into water. This can be used to heat or cool a building.	Air source heat pumps will be utilised for domestic hot water.

Solar Photovoltaic **SELECTED** 	Photovoltaic panels absorb sunlight, in turn generating electricity. This system will assist in offsetting emissions from grid electricity. During low demand periods, excess electricity can be fed back into the grid network through a system known as 'net metering'	The flat roof of the building can be used to accommodate this system and is therefore a viable source of technology to meet LZC needs.
Ground Source Heat Pump **DISCOUNTED** 	The ground remains at a constant temperature of approximately 10-12°C, offering the ability to extract energy throughout the winter and discharge energy during the summer through cooling with the energy exchange being achieved by open or closed loop systems linked to heat pumps.	The inclusion of Ground Source Heat Pumps has been discounted due to the requirement of extensive boreholes and pipework. The location of this development renders this option unviable and so has been discounted.
Solar Thermal **DISCOUNTED** 	Solar thermal systems consist of flat plate or vacuum tube collectors. Sunlight is absorbed heating up and transferring thermal energy to the collector.	The restricted flat roof areas available negate the inclusion of a panel system offering any significant contributions. Additionally, this technology makes a limited contribution to reducing the building's energy demand and carbon emissions. A Solar Photovoltaic system would be better suited to this development.

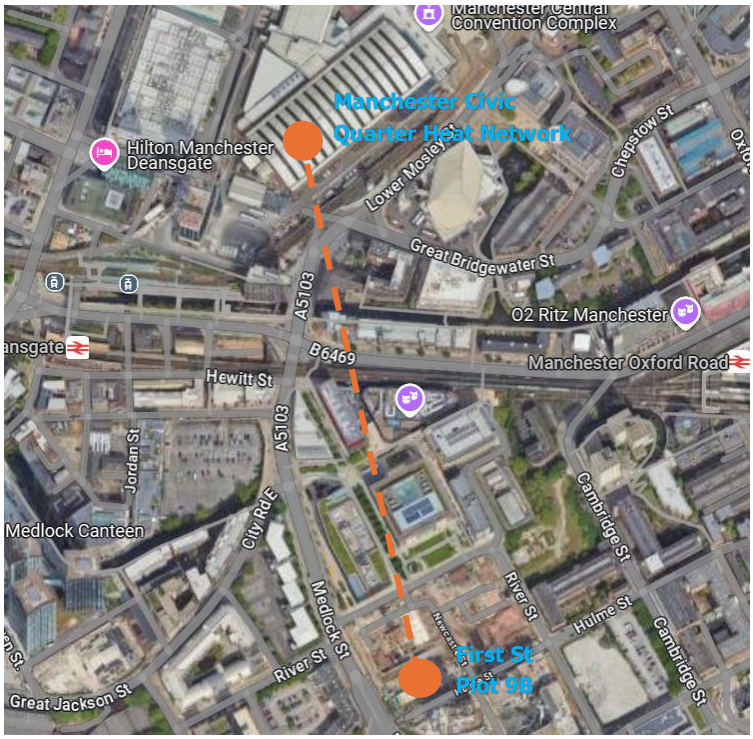
Biomass Boiler **DISCOUNTED** 	Biomass is burned in a biomass boiler to heat water. This may be sourced from wood based materials such as logs, pellets or chips.	Biomass boiler solutions have been discounted at this location due to potential clean air issues, deliverability logistics and the preference to utilise electrically powered solutions.
Wind Turbines **DISCOUNTED** 	The most common design is for three blades mounted on a horizontal axis, which is free to rotate into the wind. This drives a generator to produce electricity which is linked to the grid or charge batteries.	Wind turbines have been discounted due to the resulting visual/noise impact from the equipment, and relatively poor performance of the solution when used within Urban and Sub-Urban locations.
Combined Heat and Power **DISCOUNTED** 	On- site generation of electricity and the utilisation of waste heat from this process within a building can create a beneficial arrangement whereby the transmission losses of grid supplied electricity can be omitted.	The integration of Combined Heat and Power technology has been discounted due to the clean air act implications with the flue discharge alongside the movement to utilise decarbonised grid electricity over traditional fossil fuel heating systems.
District Heat Network **DISCOUNTED** 	Establishing a connection to a District Heating Network can enable the delivery of low carbon and sustainable energy to residents and businesses. The feasibility of this is dependent on the proximity of the development to the network to enable a connection.	Connection to a District Heat Network has been discounted due to the lack of an existing system being available in the vicinity of the development and alternative methods being more viable.

7 District Heat Network

As part of Policy JP-S3: Heat and Energy Networks of the Places for Everyone Joint Development Plan, it is stated that developments should connect to a district heating scheme where such schemes exist, unless it can be demonstrated that there are more effective alternatives for minimising carbon emissions, or where such connection is not practical or financially viable.



Manchester's Energy Network Route which will provide energy to the Manchester Town Hall when complete



The proposed development is a reasonable distance away from the heat network, approximately 0.5-0.6 mile distance. Therefore, alternative low carbon and renewable technologies such as air source heat pumps and solar PV are more suitable. These technologies offer beneficial carbon factors resulting in reduced regulated carbon emissions.

8 Results

To enable demonstration that the environmental benefits associated with our energy hierarchy approach to energy demand and BREEAM Excellent rating for the new development, approved SBEM software has been used to generate energy demand calculations for the building.

The below table shows baseline energy demand and emissions and actual energy demand and emissions for the development in the form of Target Emission Rates and Building Emission Rates (Kg CO_2/m^2/annum) and Target Primary Energy Rating and Building Primary Energy Rating (kWh/m^2/annum).

	Value	% Difference
TER (kgCO2/yr/m2)	**3.42**	
DER (kgCO2/yr/m2)	**3.36**	**1.75%**
TPER (kWh/m2/yr)	**36.02**	
DPER (kWh/m2/yr)	**35.15**	**2.42%**

TER: Target Emission Rate; BER: Building Emission Rate; TPER: Target Primary Energy Rate; BPER: Building Primary Energy Rate

Below is the draft BRUKL results out for the development.

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Plot 9B As designed

Date: Wed Dec 04 11:56:57 2024

Administrative information

Building Details

Address: Manchester,

Certifier details

Name:

Telephone number:

Address: , ,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.27

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.27

BRUKL compliance module version: v6.1.e.1

Foundation area [m^2]: 629.9

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2$annum	3.42	
Building CO_2 emission rate (BER), $kgCO_2/m^2$annum	3.36	
Target primary energy rate (TPER), kWh_{PE}/m^2annum	36.02	
Building primary energy rate (BPER), kWh_{PE}/m^2annum	35.15	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

9 Conclusion

This Energy Strategy has summarised the energy hierarchy requirements for the new student residential development at First St Plot 9B, Manchester, to respond to emission reduction targets set out within Building Regulations Part L 2021 and the aspirations set out within Manchester's Places for Everyone Joint Development Framework, in particular Policies JP-S1, JP-S2, JP-S3 to implement the use of low carbon and/or renewable technologies and ensure the way in which the development is designed and constructed is in a way that is sustainable in terms of design, energy usage and carbon emissions.

The proposed development will incorporate a fabric first approach using passive energy techniques available in the construction industry to reduce its ongoing requirement to consume energy to heat, ventilate, and light the building. This is achieved by improved highly efficient fabric design which exceeds the thermal properties set out within the Building Regulations Part L 2021.

The proposed development will incorporate energy efficiency measures in its building services to reduce the carbon footprint of the site below the passive improvement stage, using highly efficient heat generation plant, heat recovery systems and energy efficient and highly controllable lighting.

The approach adopted is to implement energy saving options which reduce the requirement for regulated energy, such as a more efficient building envelope, and utilising high efficiency low carbon technologies which are feasible and appropriate for this type of building.

The lean, clean, green approach has been followed in this document and the building design. The regulated energy sources are targeted for reduction by means of both passive and active measures in terms of highly improved u-values, reduced air leakage, energy efficient MEP systems, and the use of air source heat pumps and Solar PV.

Overall, the carbon emissions from the proposed development indicate compliance with the 2021 Building Regulations Part L by achieving reductions in target carbon emissions and primary energy use, and ultimately shows the strategy improves on the fundamental principles of the Building Regulations and will make a significant contribution to reducing the annual carbon emissions of the development.