
Great Places Housing Group

Operational Energy Strategy Report

Laystall Street

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1 Executive Summary

This operational Energy Strategy Report has been prepared by Watt Energy on behalf of Great Places Housing to support a planning application for the development of Laystall Street. The statement specifically addresses the following Manchester City Council approved climate change action plans in addition to planning policies, as stipulated in the Manchester Core Strategy (July 2012):

- **Core Strategy Policy DM 1 - Development Management**
- **Core Strategy Policy EN 4 - Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development**
- **Core Strategy Policy EN 6 - Target Framework for CO₂ Reductions from Low or Zero Carbon Energy Supplies**

The report will also address the following pre-commencement planning conditions 16 & 17 Operational Energy Modelling Calculations:

- **SAP Calculations and Report to demonstrate that the development will aim for an operational energy use intensity of 206kWh/m²/yr**

The report details how the development will incorporate sustainable design and resource efficiency in line with the Energy Hierarchy, so to meet the policy requirements and council targets whilst reducing its overall environmental impact. The methodology and calculations are consistent with the MCC Appendix A EN6 Energy Target Explanation and all figures used within this report have been based on the most recent issue of drawings and modelled using SAP 2012 to accurately predict Energy Usage and CO₂ reductions.

In relation to the planning documents and policies outlined above, the development is required to achieve a **10%** reduction in carbon emissions over Part L 2014 of the Building Regulations.

In order to achieve compliance the development has been designed with a holistic low energy design concept involving a fabric first approach. The U-values, design air permeability and ventilation targets all aspire to Passive House design standards along with the consideration and application of low zero carbon renewable technologies.

Following the LZC feasibility assessment, it is proposed that the development will also benefit from a **KERS MEV Heat Pump** unit to each dwelling.

As a result of the above the predicted site wide reduction in CO₂ over Part L 2013 of the Building Regulations can be summarised as:

- **13.6%** with SAP 9 carbon factors (current Building Regulations)
- **35.8%** with SAP 10 carbon factors
- **60.9%** with SAP 10.1 carbon factors (proposed improvements to Part L)

This statement also examines how the design, specification and characteristics of the proposal will contribute to sustainability and meet the relevant objectives outlined within the National Planning Policy Framework (NPPF) 2019.

In relation to the planning target centred around carbon emissions reduction, the proposed development is achieving a **13.6%** reduction in these emissions, over the Part L1A 2013 of the Building Regulations. This surpasses all of Manchester City Council's planning targets and therefore allows compliance to be reached.

In relation to the planning target 16 & 17 centered around Operational Energy Usage, the proposed development is achieving an operational energy use of **42.9 kWh/m²/yr**. Surpassing planning conditions 16 & 17.

2 Sustainable Design Strategy

2.1.1 Energy and Carbon Emissions

Building Services Strategy

In response to the policy requirements and climate change plan targets set out in section 2.2, developments should aim to assist and achieve the following carbon reduction targets:

1. Achieve a minimum of 10% CO₂ reduction over the Part L 2013 Target Emission Rate (TER), as per Target 2 (Electricity intense buildings) in Table 12.1 of Policy EN6.
2. Assist in achieving carbon neutrality by 2038.

To achieve the most accurate calculations and estimates, the proposed units have been modelled using SAP 2012 the governments Standard Assessment Procedure for residential dwellings.

The proposed strategy for minimising energy use and carbon emissions is based on the energy hierarchy described in CIBSE Guide F 2012 (Energy efficiency in buildings). The energy hierarchy has been adopted for the development to ensure that the correct approach to design is taken to promote an energy-efficient low carbon solution (see figure 2). This has ensured that the benefits of effective methods of energy use reduction have been maximised first. The approach adopted is as follows:



Fig 1: Energy Hierarchy

Minimise energy demand – Implement passive design measures and optimise the building envelope in terms of orientation, air tightness, and insulation. For example, the proposal is targeting a low carbon classification through a holistic low energy design concept as it will be designed with a fabric first approach whereby standards designed to exceed Building Regulations compliancy are aspired to for all fabric U-values and air permeability targets.

Meet demands efficiently – Specification of energy efficient decentralised plant, heating, ventilation, lighting, and system controls to facilitate efficient operation. For example, each dwelling will include highly efficient electric panel heaters and electric immersion cylinders to satisfy the main heating and hot water requirements.

Particular attention is being paid to the wellbeing of occupants. The ventilation strategy has been developed to minimise noise ingress from the proposed location as far as possible while minimising the risk of overheating.

Additional Renewable Energy Measures

Opportunities for incorporating low and zero carbon technologies (LZCT) have been considered for this development. A PV array is to be installed onto the roof of the apartment block.

Efficient and Sustainable Design Measures

In line with the above Sustainable Design Strategy, the following Energy Efficient design measures are specified.

- High levels of insulation throughout with minimal thermal bridges
- Passive solar gains and internal heat sources
- Excellent level of airtightness
- Good indoor air quality by openable windows

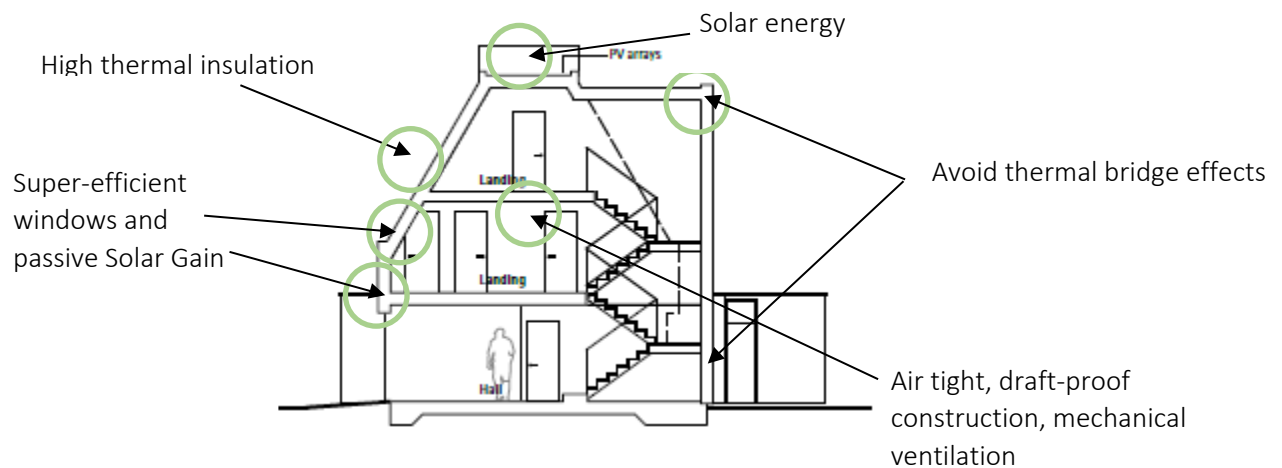


Fig 2. Efficient Design Measure examples

The Proposed specifications and key energy efficient design measures are as follows:

Residential Units:

- Ground floor U-values of 0.14 W/m²K
- External Wall U-values of 0.17 W/m²K
- Flat Roof U-values of 0.14 W/m²K
- Low Double Glazed Window U-values of 1.4 W/m²K
- 100% low energy lighting throughout
- 100% efficient electric panel heaters to each flat
- KERS MEV W200 to each dwelling providing water heating and ventilation
- Air Permeability Rate of 3m³/hm² in all houses

3 Choice and Impact of Renewable Technology

All reasonable technologies were investigated for their suitability to the site and development; please refer to section 3 for details.

In addition to energy efficiency measures, it is proposed that the development will feature the following Low/Zero carbon Technologies:

- **KERS MEV Heat Pump Unit to each flat**

The above LZO contribution has provided an **11.2%** reduction in CO₂ following Energy Efficiency Measures.

- Energy Saving from onsite LZO Technologies = **131560.4 kWh/Yr**
- CO₂ Saving from onsite LZO Technologies = **13619.7 kgCO₂/Yr**

4 Energy and CO₂ Reduction Summary

A summary of all stages of the energy demand assessment from baseline figures to final carbon reduction are shown in Figures 1 & 2 below:

	SAP 9.0	SAP 10.0	SAP 10.1
Summary of CO₂ Emission Reductions	Total CO₂ emissions (kgCO₂/year)		
Carbon Factors (Gas / Electric)	0.216 / 0.519	0.210 / 0.233	0.210 / 0.136
Baseline emissions	124486.5	75202.7	72183.5
Improved emissions (after application of energy efficiency measures) - residual emissions	121223.9	72136.3	68048.1
Improved emissions (after incorporation of renewable energy technology) % CO ₂ displaced in total	107604.2	48307.9	28196.9
% CO ₂ displaced in total	13.6%	35.8%	60.9%
% CO ₂ displaced by energy efficiency measures	2.6%	4.1%	5.7%
% CO ₂ displaced by renewable energy	11.24%	33.03%	58.56%

Table 1: Summary of CO₂ Reductions



	Energy demand (kWh pa)	Energy saving achieved (%)	Regulated CO ₂ emissions (kg pa)	Saving achieved on residual CO ₂ emissions (%)
Building Regulations Part L compliance (“Baseline” energy demand & emissions)	354698.9		124486.5	
Proposed scheme after energy efficiency measures (“Residual” energy demand & emissions)	338890.3	4.5%	121223.9	2.6%
Proposed scheme after on-site renewables	207329.9	41.5%	107604.2	11.2%
Proposed scheme offset for financial contribution or other “allowable solution”			0	0
Total savings on residual emissions				11.2%

Table 2. Total Energy and Carbon Emissions Savings Based on SAP 9.0 Carbon



5 Manchester City Council' Policy and Targets Summary

With regards to the Manchester City Council's planning documents policy and targets (outlined in section 2.2.1 to 2.2.3) the table below details how the Sustainable Design Strategy (outlined in section 2.3.1) achieves the current planning policy requirements and targets.

Planning Document:	Sustainable Design Strategy
Manchester Council's Core Strategy 2012-2027	The Sustainable Design Strategy achieves a 13.6% reduction in carbon emissions over Part L 2013 - exceeding the EN6 documents Low Carbon target of 9% over Part L 2013.
Climate Change and Low Emission Strategies 2016-2020	The Sustainable Design Strategy achieves a 13.6% reduction in carbon emissions over Part L 2013 – exceeding the documents Low Carbon target of 48% over 1990 Emissions.
Manchester: A Certain Future	The Sustainable Design Strategy achieves a 13.6% reduction in carbon emissions over Part L 2013 – exceeding the documents Low Carbon target of 10% over Part L 2013.

Table 3. Summary of MCC and Planning Targets

As a result of the sustainable design parameters outlined within section 2.3.1 and the energy and CO2 reduction figures summarised above, the development of 89 residential dwellings at the Laystall Street site achieves a total reduction of **13.6%** in carbon emissions over Part L 2014.

The low carbon classification for Laystall Street development can be derived from its prioritisation of fabric first carbon reduction through exceeding Building Regulation design standards, before the incorporation of on-site renewable technologies.



6 Operational Energy Use Summary

With regards to pre-commencement planning conditions 16 & 17 (outlined in section 1) the table below details how the operational energy use intensity per m² far exceeds the current planning policy requirement of 206 kWh/m²/yr.

Operational Energy Use Summary	
Total Energy Use (kWh pa)	207329.9
Total Floor Area (m²)	4832.5
Operational Energy Use Intensity (kWh/m²/yr)	42.9

Table 3. Summary of Operational Energy Use

The prioritisation of a fabric first approach and adoption of LZC technologies (outlined in section 2.1 to 3) has resulted in a low total energy demand for the dwellings. Therefore, the Laystall Street development meets the Manchester City Council pre-commencement planning conditions 16 & 17.

Target operational energy use intensity = 206 kWh/m²/yr

Whole development operational energy use intensity = 42.9 kWh/m²/yr

