

Energy Statement

Queens Road

Job number: 10463

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1 Executive Summary

This report has been produced by Base Energy on behalf of Mainstay Developments Ltd and in support of the planning application for the development at Queens Road comprising two-storey industrial unit to provide a trade counter style retail warehouse falling under the requirements of Manchester City Council.

It sets out the design approach with regards to energy and carbon dioxide emissions in order to ensure the development complies with:

- National Planning Policy
- The Manchester City Council Local Plan Policies EN4 and EN6

The above policies require:

- That the development follows the energy hierarchy
- An energy statement to show regulated energy demand and carbon dioxide emissions and the impact of the design proposals

The design of the development will incorporate energy efficient building fabric and services in addition to low carbon technology:

- Thermal specification exceeding Part L 2021 minimum standards
- A design which limits air permeability, targeting 5.00
- Energy saving building services including low energy lighting, photoelectric dimming, and power factor correction,
- Low carbon Air Source Heat Pumps to provide space heating and cooling

This results in a 34% reduction in CO₂ over Part L 2013, compliance with Part L 2021, and a 72% contribution to final energy demand from onsite low carbon technology.

In addition to this report, BREEAM, SUDs, and Ecology reports have been commissioned in order to address environmental standards further to those regarding energy and CO₂.

3 Planning Policy

National Planning Policy Framework 2021

The NPPF was updated in July 2021 to place greater emphasis on beauty, place-making, the environment, and sustainable development. The strengthened environmental objectives aim to protect and enhance the natural, built, and historic environment, and encourage effective land use, greater biodiversity, prudent use of natural resources, minimisation of waste and pollution, and adaptation to climate change alongside a move to a low carbon economy.

Local Planning Policy

The relevant Manchester City Council local planning policy requirements are as follows:

Development Management **Policy EN 4** of Manchester City Council's Core Strategy document sets requirements for 'Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development".

"The Council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO₂ emissions, and rising fossil fuel prices, through the following actions:

- All development must follow the principle of the Energy Hierarchy, being designed:
 - to reduce the need for energy through design features that provide passive heating, natural lighting and cooling
 - to reduce the need for energy through energy efficient features such as improved insulation and glazing
 - to meet residual energy requirements through the use of low or zero carbon energy generating technologies
- Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies.
- Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings.
- Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing / potential decentralised energy schemes.
- The use of building materials with low embodied carbon in new development and refurbishment schemes.

Policy EN 5 identifies “Strategic Areas for low and zero carbon decentralised energy infrastructure”. Although the proposed development lies within a strategic area the size and nature of the development and the lack of established or proposed networks in the locale make building level low carbon solutions more appropriate.

An Energy Statement is required by the Local Authority in line with **Policy EN6** of the Manchester Core Strategy Development Plan which sets out carbon dioxide reduction targets and states the following:

“Applications for residential development of 10 or more units and all other development over 1,000 sq m will be expected as a minimum to meet the target shown in Tables 12.1 or 12.2, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated CO₂ emissions for all phases of the development.

The target framework relates to three broad development locations and their potential for low and zero carbon, decentralised energy. The areas are defined as follows.

- *Target 1 Network development areas: Locations where the proximity of new and existing buildings, the mix of uses and density of development provide the right conditions to support district heating (and cooling).*
- *Target 2 Electricity intense areas: Locations where the predominant building type has an all electric fit-out such as retail units and leisure complexes.*
- *Target 3 Micro-generation areas: Locations where lower densities and a fragmented mix of uses tend to mean that only building scale solutions are practical.”*

Non-domestic CO ₂ emissions reduction targets	
Table 12.2	
Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible, a 15% increase on Part L 2010
Target 2: Electricity intense buildings (Applies to commercial uses with a high proportion of emissions from electricity use (>45 kg CO ₂ /m ²))	+10% increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

The development is less than the 1000sq m threshold to trigger specific targets. However, the approach as set out in this energy statement and in line with **Policies EN4 & EN6** is to follow the energy hierarchy and show any carbon reductions achieved. The energy hierarchy will be applied as follows:

- Use less energy through an efficient building fabric
- Supply energy efficiently
- Use low carbon solutions

The Energy Statement will assess the predicted regulated CO₂ emissions for the development and propose a strategy for a reduction through energy efficiency and low carbon technology in line with the policies outlined above.

The Simplified Building Energy Model procedure (SBEM) will be used to assess energy use and associated CO₂ emissions. Regulated energy as calculated in SBEM includes all fixed consumption inherent in the building, i.e. fixed lighting, space heating, water- heating and ventilation.

4 Methodology

The Standard Assessment Procedure (SAP) is the UK Government methodology for assessing and calculating the energy performance of dwellings.

The Simplified Building Energy Model (SBEM) is the UK Government methodology for assessing and calculating the energy performance of non-domestic buildings.

SAP and SBEM calculations take into account a range of factors that contribute to energy efficiency, including:

- Materials used for the construction and the thermal insulation of the building fabric (u-values¹ and thermal mass)
- Air permeability
- Efficiency, fuel source, and control of heating and cooling systems
- Ventilation system energy use and heat recovery
- Lighting energy
- Low carbon and energy saving or generating technologies

Approved Document Part L of current Building Regulations addresses the conservation of fuel and power. Part L is divided into two separate documents:

- Part L1 Newly constructed and extended or renovated existing dwellings
- Part L2 Newly constructed and extended or renovated existing non-domestic buildings

To comply with Part L, the calculations should demonstrate how the building will either meet or achieve a percentage reduction in the Building Emission Rate (BER) under the required Target Emission Rate (TER).

The calculation software has been used to calculate a baseline of energy demand and carbon dioxide emissions as appropriate from which any reductions or contributions have been measured.

The building has been modelled using software and compliance thresholds based on the latest Part L 2021.

¹ U-values (Thermal Transmittance) - the measure of the overall rate of heat transfer by all mechanisms under standard conditions, through a particular section of a construction. Lower u-values mean better thermal insulation

5 Baseline Energy & CO2

Energy modelling software has been used to calculate a baseline for the development. This forms the basis from which emissions reductions have been measured. As the Core Strategy predates the new Part L and equivalent Part L 2013 compliance threshold has also been calculated and is shown below.

Table 5.1: Baseline CO2

	CO2 Emission Rate (kg CO2/m2/year)	Floor Area (m2)	Total Baseline Emissions (kg CO2/year)
Baseline CO2	5.00	252.2	1,261
Baseline Part L 2013 Equiv	7.34	252.2	1,851

The **Total Baseline CO2 Emissions** for the development are shown to be 1,261 kg/year. In previous Part L terms they are shown to be approximately 1,851 kg/yer.

Table 5.2: Baseline Energy Demand

	Energy Demand (kWh/m2/year)	Floor Area (m2)	Total Baseline Energy Demand (kWh/year)
Baseline Energy Demand	35.17	252.2	8,870

The **Baseline Energy Demand** for the development is shown to be 8,870 kWh per year

6 Low Carbon Design Following the Energy Hierarchy

Before considering low carbon energy generating technology the development has been designed to reduce energy demand through the first step of the energy hierarchy by considering 'fabric first'. A thermally efficient building envelope will follow the design standards as set out below.

Table 6.0: Building Fabric Standards (including u-values W/m²K)

	Part L 2013 Limiting Parameters	Part L 2021 Limiting Parameters	Proposed Development
Walls	0.30	0.26	0.18
Ground Floor	0.25	0.18	0.15
Roof	0.20	0.16	0.15
Windows	2.00	1.6	1.4
Roller Doors	2.00	1.5	1.5
Air permeability	10.00	8.00	5.00

- Insulation: The specified building envelope is designed to better the Part L limiting values and will help to limit the energy demand of the development for space heating and cooling
- Air permeability: The specified building envelope is designed to limit air leakage which increases heating demand

Once heat retention has been addressed the next step is to ensure energy consuming building services are efficient.

- Lighting: Low energy LED lighting throughout with a minimum efficacy of 100 luminaire lumens per circuit watt and photoelectric dimming with a parasitic power no greater than 0.1W/m²
- Power factor correction >0.95
- Space & Water Heating: Split system air source heat pumps will provide low carbon space heating and cooling
- Ventilation: Natural ventilation

8 Low Carbon Design Impact

The selected Low Carbon design parameters have been incorporated into the calculation model and the results are set out below.

Table 8.1: Reduction in CO2

	CO2 Emission Rate (kg CO2/m2/year)	Floor Area (m2)	Total Baseline Emissions (kg CO2/year)	Reduction in CO2 over Core Strategy Baseline
Baseline CO2	5.00	252.2	1,261	N/A
Baseline Part L 2013 Equiv	7.34	252.2	1,851	
Proposed Design	4.85	252.2	1,223	34%

The **CO2 Emissions reduction** as a result of energy efficient fabric and services is shown to 34% over Part L baseline compliance as per the Core Strategy. As the development will need to comply with the latest edition of Part L the new compliance threshold has been calculated to ensure design performance complies.

Table 8.2: Reduction in Energy Demand

	Energy Demand (kWh/m2/year)	Floor Area (m2)	Total Baseline Energy Demand (kWh/year)	Low Carbon Energy Contribution
Baseline Energy Demand	35.17	252.2	8,870	N/A
Proposed Design	34.65	252.2	8,739	N/A
Low Carbon Energy	19.41+5.51	252.2	6,285	72%

Low carbon technology is shown to contribute an estimated **72% of regulated energy demand**.

9 Conclusion

Proposals are for a development at Queens Road, Manchester comprising two-storey industrial unit to provide a trade counter style retail warehouse falling under the requirements of Manchester City Council.

Under the local planning policy the proposed development is required to follow the energy hierarchy and provide an energy statement setting out energy demand, carbon dioxide emissions, and the impacts of low carbon design including the proportion of final energy demand met by low carbon technology. Due to the development size there are no specific targets. It is noted however that the calculations indicate the development would exceed the targets for major development by a considerable margin.

Energy modelling software has been used to calculate a baseline against which compliance with the above can be measured.

The proposed development will be designed to limit energy demand through the inclusion of a thermally efficient building fabric and energy efficient services.

Low carbon technology will be incorporated and is to comprise air source heat pumps.

Due to the development size there are no specific targets. It is noted however that the calculations indicate the development would exceed the targets for major development by a considerable margin.

This results in a **34% reduction in CO2 over Part L 2013, compliance with Part L 2021**, and a **72% contribution to final energy demand** from onsite low carbon technology.

In addition to this report, BREEAM, SUDs, and Ecology reports have been commissioned in order to address environmental standards further to those regarding energy and CO2.

This Energy Statement and the calculations on which it is based demonstrate that the proposed development complies with the local planning policy requirements.

10 Appendix 1 - SBEM Output Part L 2021

BRUKL Output Document HM Government

Compliance with England Building Regulations Part L 2021

Project name

New Industrial Unit

As designed

Date: Mon Feb 20 14:41:21 2023

Administrative information

Building Details

Address: Queens Road, Cheetham Hill, Manchester,

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.1.4

BRUKL compliance module version: v6.1.e.0

Certifier details

Name: Base Energy Services Ltd

Telephone number: 0151 933 0328

Address: 202 Stanley Road, Liverpool, L20 3EN

Foundation area [m²]: 126.09

The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	5
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	4.85
Target primary energy rate (TPER), kWh _m /m ² annum	52.8
Building primary energy rate (BPER), kWh _m /m ² annum	51.73
Do the building's emission and primary energy rates exceed the targets?	BER ≤ TER BPER ≤ TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	U _{a,Limit}	U _{a,Calc}	U _{i,Calc}	First surface with maximum value
Walls*	0.26	0.18	0.18	0F - Front of House_W_5
Floors	0.18	0.12	0.12	0F - Warehouse_S_3
Pitched roofs	0.16	0.15	0.15	0F - Warehouse_R_9
Flat roofs	0.18	-	-	No heat loss flat roofs
Windows** and roof windows	1.6	1.4	1.4	0F - Front of House_G_6
Rooflights***	2.2	-	-	No external rooflights
Personnel doors*	1.6	1.5	1.5	0F - Warehouse_D_8
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

U_{a,Limit} = Limiting area-weighted average U-values [W/(m²K)]
 U_{a,Calc} = Calculated area-weighted average U-values [W/(m²K)]
 U_{i,Calc} = Calculated maximum individual element U-values [W/(m²K)]
 * Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
 ** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.
 * For fire doors, limiting U-value is 1.8 W/(m²K)
 NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	5

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Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Floor area [m ²]	252.2	252.2	100	Retail/Financial and Professional Services
External area [m ²]	778.2	778.2		Restaurants and Cafes/Drinking Establishments/Takeaways
Weather	MAN	MAN		Offices and Workshop Businesses
Infiltration [m ³ /h.m ² @ 50Pa]	5	3		General Industrial and Special Industrial Groups
Average conductance [W/K]	243.28	204.84		Storage or Distribution
Average U-value [W/m ² K]	0.31	0.26		Hotels
Alpha value* [%]	29.55	26.42		Residential Institutions: Hospitals and Care Homes
* Percentage of the building's average heat transfer coefficient which is due to thermal bridging				
				Residential Institutions: Residential Schools
				Residential Institutions: Universities and Colleges
				Secure Residential Institutions
				Residential Spaces
				Non-residential Institutions: Community/Day Centre
				Non-residential Institutions: Libraries, Museums, and Galleries
				Non-residential Institutions: Education
				Non-residential Institutions: Primary Health Care Building
				Non-residential Institutions: Crown and County Courts
				General Assembly and Leisure, Night Clubs, and Theatres
				Others: Passenger Terminals
				Others: Emergency Services
				Others: Miscellaneous 24hr Activities
				Others: Car Parks 24 hrs
				Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	19.41	21.87
Cooling	5.51	3.19
Auxiliary	0	0
Lighting	8.17	8.55
Hot water	1.56	1.56
Equipment*	16.69	16.69
TOTAL**	34.65	35.17

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
 ** Total is not of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	344.93	258.36
Primary energy [kWh _m /m ²]	51.73	52.8
Total emissions [kg/m ²]	4.85	5

