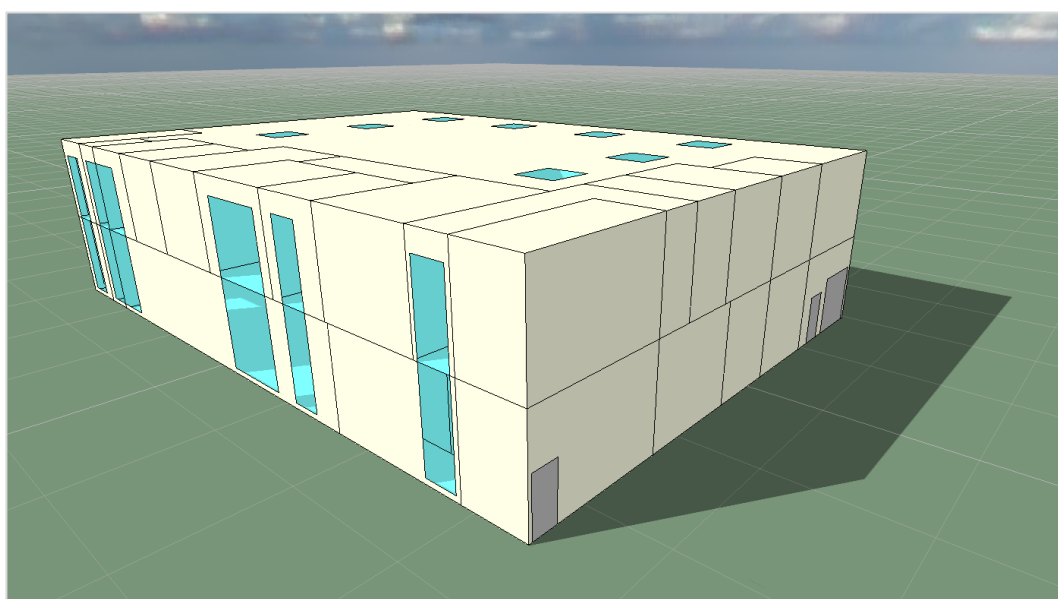
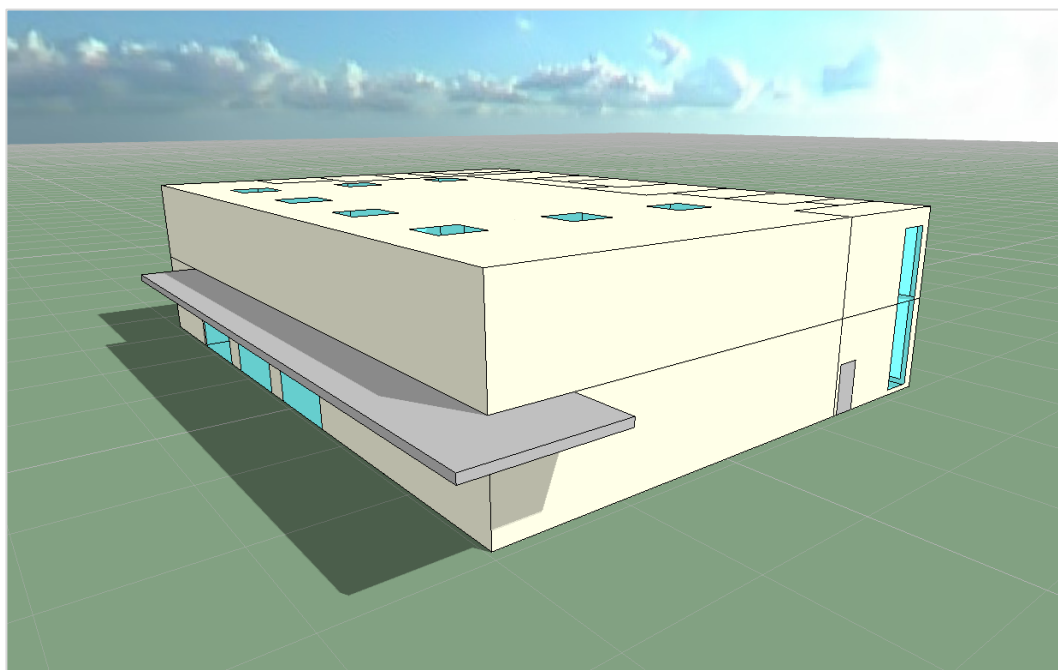


Moston Superstore

Ebsworth Street, Manchester

Energy Statement



Document Ref: L6563 Moston Superstore Energy Statement

Document History:

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1.0 Executive Summary

Futureserv have been appointed to develop an Energy Statement for the proposed retail development known as Moston Superstore. This document shall address all applicable planning requirements specific to the location of the proposed development, including the National Planning Policy Framework, Manchester Core Strategy, Places for Everyone Joint Development Plan, the energy and carbon requirements of Greater Manchester Combined Authority, and Approved Document Part L 2021 of the English Building Regulations.

For developments proposed within the Greater Manchester region, several local and national planning policies are applicable. These policies aim to reduce energy demand and thus CO₂ emissions by conforming to the energy hierarchy, supporting the goal of a net-zero carbon future. Unless specifically exempt, all new-build developments – whether residential or retail – must comply with this legislation. While the main UK-wide requirement is to meet the CO₂ and energy targets set in Part L 2021, Greater Manchester has introduced stricter guidelines that significantly exceed these national standards.

The Places for Everyone Joint Development Plan (PfE): JP-S2 (*Carbon & Energy*) replaces Manchester's former Local Plan by outlining greater standards for energy efficiency, CO₂ reduction, low-carbon heating, and net-zero design beyond national building regulations. Policy EN4 of the Manchester Core Strategy concerns reductions in CO₂ emissions through low/zero carbon technologies, stating that all development must follow the principle of the Energy Hierarchy. Please note, the Moston Superstore is exempt from the requirements of Policy EN6 as the development is under 1000m². The Greater Manchester Combined Authority (GMCA) requires developments to demonstrate net-zero operational carbon (as per local/net-zero guidance), meet relevant EUI targets, and align with other targets specified within the document based upon the building use and size. This is done via dynamic predictive energy modelling via SBEM and/or CIBSE TM54 analysis to demonstrate predicted annual carbon dioxide emissions and operational energy use associated with all proposed passive and active building service solutions. This is submitted to planning officers through an energy statement.

A fabric first approach has been prioritised where necessary, contributing towards the principle of heat conservation over heat generation. Regarding active building services, energy efficient VRF systems have been modelled to the majority of the building, providing space heating and cooling. Ventilation is provided via MVHR to select spaces, with others utilising mechanical extract. DHW is generated at point-of-use via 100% efficient electric water heaters. Additionally, a 60m² PV array has been included, generating 9,263 kWh/yr of clean, renewable technology.

The calculations presented within this report provide evidence that the development achieves compliance with all applicable local and national legislation considered within this report, specific to the Moston area of Greater Manchester.

2.0 Introduction

Futureserv have been commissioned to develop an Energy Statement for the newly proposed retail unit located on Ebsworth Street, Moston.

This Energy Statement addresses the planning requirements for developments within the Greater Manchester region, as set out in the Places for Everyone Joint Development Plan, Greater Manchester Combined Authority, and the Manchester Core Strategy.

Our client owns the existing Moston Superstore, located on Pym Street. We understand that our Client has been approached by Manchester City Council regarding the regeneration ambition involving land occupied by the current superstore. The council has offered an alternative site in the nearby area at Ebsworth Street for the relocation of the store, which currently features a surface level car park. The corresponding image demonstrates the proposed relocation of the store.

The proposed retail development shall utilise a fabric first approach by prioritising heat conservation over generation. The development shall also feature energy efficient VRF air conditioning systems to maintain internal temperatures, mechanical heat recovery ventilation units (MVHR), and point-of-use electric water heaters. Roof space has been allocated for the installation of a PV array to offset grid dependence, contributing towards decarbonisation.

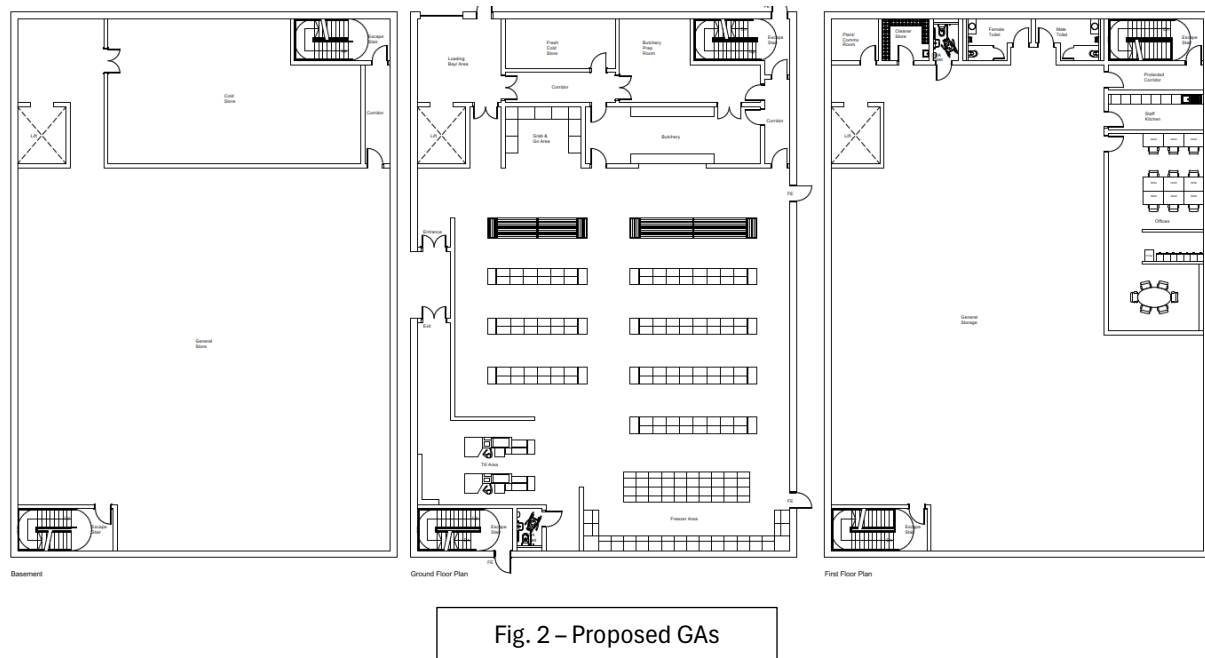
This strategy is essentially based on the reduction of energy consumption by use of passive construction measures, fabric first approach alongside active energy efficient equipment in conjunction with low carbon technologies.



Fig. 1 – Current/Proposed Site Location

3.0 Development Proposals

The proposed development consists of the erection of a two-storey new-build retail unit with a basement, located on Ebsworth Street, Moston. As stated, the proposal features the relocation of an existing supermarket to a nearby site due to regeneration ambitions for the area.



This Energy Statement has been prepared to illustrate the environmental aspects of the proposed development highlighting the Energy/Carbon emission profile and assess the options available for reducing energy consumption and associated CO₂ emissions, in accordance with policies applicable to new-build developments within the Greater Manchester region.

Futureserv Consulting Engineers have collaborated with the design team in order to provide a holistic solution for the building that will provide an efficient envelope and contain intelligent building services reducing the environmental impact of the development.

4.0 Policy & Legislation

There are a number of planning policies, both national and local, applicable to the proposed development.

The UK government has signed up to a legally binding agreement to reduce Carbon emissions by 34% based on 1990 levels before 2020 and by 80% before 2050, this responsibility is being discharged using the Climate Change Act 2008.

The National Planning Policy Framework (NPPF), offers specific guidance which highlights the UK's aspiration to support a transition to a low/zero carbon future in a changing climate and in particular, to encourage the use of renewable resources such as renewable technologies, stating:

'The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.'

4.1 Building Regulations Part L2 2021

For new build developments, compliance with Approved Document (AD) Part L2 England (2021) is required for Building Control sign off. AD L2 England 2021 consists of several relevant sections, with the main ones summarised:

- Calculation of TER & TPER
- Calculation of BER & BPER
- Limiting Heat Gains & Losses
- Minimum Building Service Efficiencies & Controls
- Air Permeability & Pressure Testing

Calculation of TER & TPER

- The Target Emission Rate (TER) is the maximum emissions allowed for a particular development, expressed as $\text{kgCO}_2/\text{m}^2/\text{year}$.
- The Target Primary Emission Rate (TPER) is the maximum allowable primary energy usage by a particular development, expressed as $\text{kWh}/\text{m}^2/\text{year}$.

Calculation of BER & BPER

- The Building Emission Rate (BER) is the annual emissions associated with the building, based upon NCM templates and expressed as $\text{kgCO}_2/\text{m}^2/\text{year}$.
- The Building Primary Energy Rate (BPER) is the annual primary energy rate associated with the building, based upon NCM templates and expressed as $\text{kWh}/\text{m}^2/\text{year}$.

Minimum Building Service Efficiencies & Controls

- The minimum efficiencies regarding space and water heating, lighting, ventilation, and cooling systems are outlined within Approved Document Part L2 2021.

Limiting Heat Gains & Losses

For all new-build non-residential developments, the external envelope must meet the following minimum requirements:

Construction Element	Part L 2021: Limiting U-Values
Wall	0.26 W/m ² .K
Floor	0.18 W/m ² .K
Flat Roof	0.18 W/m ² .K
Party Wall	0.20 W/m ² .K
Windows, Roof Lights, Curtain Walling	1.60 W/m ² .K
Air Permeability	8 m ³ /(h.m ²)@50Pa

Air Permeability & Pressure Testing

Building Regulation 43 requires that once a development is completed, an air permeability test must be carried out for buildings over 500m² of total useful floor area. The measured air permeability is captured within the assessment of Part L2 compliance within an SBEM calculation.

4.2 Manchester Local Policies

Due to the location of the proposed site, the development must achieve compliance with several Greater Manchester local policies, summarised:

- The Places for Everyone Joint Development Plan
- Manchester Core Strategy
- Greater Manchester Combined Authority

4.2.1 Places for Everyone Joint Development Plan

The Places for Everyone Joint Development Plan is a long-term regional sustainability strategy applicable to areas including Manchester, Bolton, Bury, Salford, Rochdale, Trafford, etc. The purpose of the document is to provide clear guidance regarding new-build dwellings and non-domestic units, promoting the use of low/zero carbon technologies and outlining minimum requirements that exceed the targets of Part L 2021 – ultimately leading to a net-zero future.

Policy JP-S2: Carbon and Energy provides further support for the Greater Manchester Spatial Framework 2020 target of achieving a carbon neutral Greater Manchester by 2038. The policy replaces the former Manchester Core Strategy and emphasises improving energy efficiency in buildings, reducing CO₂ emissions in line with net-zero ambitions, and encourages designers to think holistically about a building's energy use and carbon footprint – both present and throughout its future lifespan.

The document states minimum targets for PV installations and low/zero carbon technologies for dwellings, but does not state minimum targets for non-residential buildings instead encouraging use of LZC technologies.

4.2.2 Manchester Core Strategy

The Manchester Core Strategy (2012-2027) is the main planning document that outlined the long-term vision, policies, and land use strategy for how the city should develop within the future, prepared by Manchester City Council to be used alongside the NPPF. Select policies have been revised as per the introduction of the Places for Everyone Joint Development Plan, but still remain in effect until 2027.

Policy EN4: Reducing CO₂ Emissions by Enabling Low & 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:*
 - o *To reduce the need for energy through design features that provide passive heating, natural lighting, and cooling*
 - o *To reduce the need for energy through energy efficient features such as improved insulation and glazing*
 - o *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 supplied to existing buildings*
- *Where possible new development and retrofit 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 EN6: 'Target Framework for CO₂ Reductions from Low or Zero Carbon Energy Supplies' is applicable for domestic developments of 10 or more units, and other developments over 1000m². The development is exempt from the requirements of this policy as the total floor area is below 1000m² (approx. 700m²).

4.2.3 Greater Manchester Combined Authority

The Greater Manchester Combined Authority (GMCA) document is an additional set of supplementary planning guidance to allow developers to conform to the targets of PfE plan, specifically for carbon and energy policies.

The document consists of three core parts, summarised:

1. Net-Zero Carbon Buildings

- Design guidance on how to achieve net-zero operational carbon
- Conformance to the established energy hierarchy:
 - i. *Minimise energy demand*
 - ii. *Maximise energy efficiency*
 - iii. *Use renewable energy*
 - iv. *Use low carbon energy*

v. Utilise other energy sources

- Provides design principles including fabric-first design, heat pump integration, PV sizing, and whole-life carbon

2. Low Carbon Heat

- Guidance on low-carbon heating appraisals
- Minimum efficiencies; improvement upon those outlined within Part L 2021
- Avoidance of fossil-fuel systems, any gas connections require in-depth justification

3. Submission Guidance, Energy & Low Carbon Development Proforma

- A step-by-step checklist is required for submission alongside this energy statement for planning applications
- The proforma is based upon building use and size
- Building services are summarised, including U-Values, efficiencies of plant/equipment, PV coverage, EUI benchmarks

As stated, the proforma must be submitted alongside this energy statement. This development falls under the 'non-residential minor development (100-999m²)' assessment, with the proposed superstore floor area approximately 700m².

As a result, the proforma requires the following detail:

- Summary of main building services (U-Values, efficiencies associated with space and water heating, form factor, etc.)
- BREEAM 'Excellent' rating
- Energy use intensity (EUI) calculation
- Total PV footprint including percentage of ground floor area, annual yield, and compared to total predicted energy demand
- Overheating assessment (if required)
- Confirmation that a summary of efforts has been made to design a lean, low carbon structure

From the Part L2 calculation included within this Energy Statement, Futureserv have provided the required figures where necessary. At this stage, the BREEAM assessment, EUI calculation, and overheating assessment have been excluded. The guidance of GMCA states that an alternative calculation model must be employed for the calculation of EUI, such as CIBSE TM54: Operational Energy Analysis. CIBSE TM52: Overheating may be considered for any necessary spaces within the building that are occupied but do not feature mechanical cooling. At this stage, Futureserv have not been commissioned for these calculations.

The proforma specification, to be used for planning submission can be found within Section 6.2 of this report.

5.0 Energy Strategy

5.1 Baseline Energy Assessment

Futureserv have conducted an assessment for this stage of the development, based on the proposed design of the building. The objective of this analysis is to demonstrate that compliance with Approved Document: Part L2 2021 is feasible and achievable, whilst concurrently outlining baseline energy emission rates. The Simplified Building Energy Model (SBEM) calculation methodology has been used to develop this calculation.

The proposed building must comply with the calculated notional targets concerning carbon emission and primary energy rate.

5.2 Passive Building Services

A fabric-first approach to building design involves maximising the performance of the components and materials that make up the building fabric itself before considering the use of mechanical or electrical building services systems, conforming to the principle of heat preservation over generation. This can help reduce capital and operational costs, improve energy efficiency, and reduce CO₂ emissions. The fabric first principle can also reduce the requirement for maintenance during a building lifespan.

Buildings designed and constructed using the fabric first approach aim to minimise the need for energy consumption through methods such as:

- Maximising air-tightness
- Using high resistance insulation
- Optimising solar gain through the provision of openings and shading
- Optimising natural ventilation

Focusing on the building fabric first is generally considered more sustainable than relying on energy saving technology, or renewable energy generation which can be expensive, have high embodied carbon, and may or may not be used efficiently by the consumer. Having energy efficiency integrated into the building envelope provides opportunity that occupants have less responsibility to operate the building, without having to adjust their habits or learn new technologies. This can result in less reliance on the end user regarding a building's energy efficiency.

Fabric first buildings systems can be constructed off-site, resulting in higher quality, better performing systems whilst simultaneously providing reduced labour costs and an increased speed of construction.

5.2.1 Fabric U-Values

The following table states the proposed material specification that will be incorporated within the building design, to mitigate heat losses and ensure efficient operation of the proposed development.

An air permeability of 3.0 m³/hr/m² @ 50Pa has been targeted for the new-build development in order to minimise uncontrolled ventilation. Improved air permeability also reduces heat losses and the energy demand of the development. The following figures comply with limiting AD: Part L1 2021 figures, achieving a betterment of 25-50% on fabric elements, and 63% on air permeability.

Construction Element	Part L 2021: Limiting U-Values	Proposed U-Values	Percentage Improvement
External Walls	0.26 W/m ² .K	0.15 W/m ² .K	42%
Floor	0.18 W/m ² .K	0.13 W/m ² .K	27%
Flat Roof	0.18 W/m ² .K	0.13 W/m ² .K	27%
Glazing	1.60 W/m ² .K	1.20 W/m ² .K	25%
Rooflights	1.60 W/m ² .K	1.30 W/m ² .K	19%
Air Permeability	8 m ³ /(h.m ²)@50Pa	3 m ³ /(h.m ²)@50Pa	63%

The GMCA proforma, based on building use and size, states an air permeability of 1 m³/(h.m²)@50Pa should be targeted. This figure has been relaxed as accepted above, to achieve a more realistic figure considering the building use (entrance doors opening/closing throughout operational hours per day).

5.2.2 Glazing G-Values

For the preliminary Part L calculation, glazing G-Values have been modelled to limit solar gain within the building, thus reducing energy demand associated with active cooling. The following figures have been applied:

- Glazing: 0.40 (all façades)
- Rooflights: 0.40

5.3 Active Building Services

In addition to passive design measures outlined within Section 5.2, active building services should be designed to minimise direct energy consumption and carbon dioxide emissions, with particular emphasis on the following:

- Increased hot water generating efficiencies and reduced standing losses
- Energy efficient LED lighting
- Low energy motors in fans
- Efficient heat recovery in relevant systems
- Efficient mechanical ventilation systems

The majority of the building shall utilise VRF air conditioning systems for energy efficient space heating and cooling. Ventilation shall be provided to the majority of occupied spaces via MVHRs to provide a level of heat recovery from extract air, other spaces (i.e. WCs) shall utilise mechanical extract ventilations fans. Hot water shall be generated at point-of-use with electric water heaters, whilst lighting shall target a minimum efficacy of 110 lm/W to all spaces.

Space has been allocated on the roof for the installation of a PV array, offsetting grid dependence whilst also contributing towards the local and national targets outlined within this report.

The above specification has been derived from consideration of all widely accepted low/zero carbon technologies, stated in the following section along with conclusions.

5.4 Low-Carbon Technologies

To comply with Approved Document: Part L 2021, the Places for Everyone Joint Development Plan, the Manchester Core Strategy, and the Greater Manchester Combined Authority; all of which aims to utilise renewable or low-carbon technologies, there are several options to consider.

The following section summarises several low/zero carbon and renewable technologies acknowledged in modern building design. Each is concisely explained, with concluding comments provided regarding the selections made.

5.4.1 Ground-Source Heat Pumps

The ground below buildings remains at a constant temperature of around 10°C to 12°C offering the ability to extract energy in the winter and discharge energy in the summer from cooling with the energy exchange being achieved via open or closed loop systems linked to heat pumps.

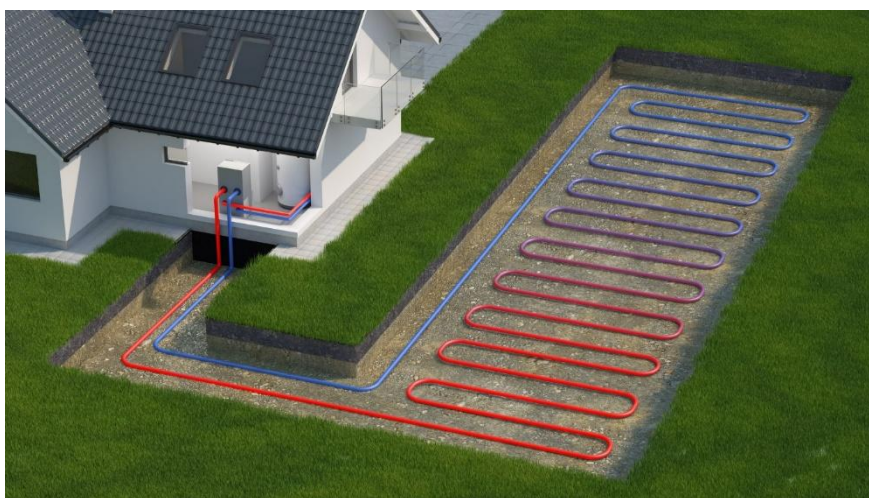


Fig. 3 – Ground-Source Heat Pump Installation

The footprint of the development and the surrounding site conditions do not have the potential to deliver an element of space available for closed loop heat exchange, due to this as well as the likely yield, peak load demand, and cost feasibility, GSHPs have been discounted from this development in favour of better performing, more suitable technologies.

5.4.2 Air-Source Heat Pumps

Air-source heat pumps are acknowledged to provide an achievable solution by using renewable energy extracted from ambient air to provide heat for heating or hot water.

An ASHP works by extracting heat from outside air and transferring it indoors to heat a building, even with minus temperature ambient air. It uses a refrigerant that absorbs heat from the air, then compresses the refrigerant to raise its temperature before releasing the heat inside. This process is reversed in summer to cool a building. Because it moves heat rather than generating it, an ASHP is energy-efficient and can provide both heating and cooling.

The introduction of ASHPs are a highly effective option to reduce grid supplied energy demand and thus, reduce the CO₂ emissions associated with the building.

Variable refrigerant flow (VRF) systems are similar in the method they operate. Typically, an ASHP condenser unit is located outside with cassettes installed inside the heated/cooled areas of the building. With VRF systems, each zone can be cooled to an individual temperature allowing for a greater variance of control.

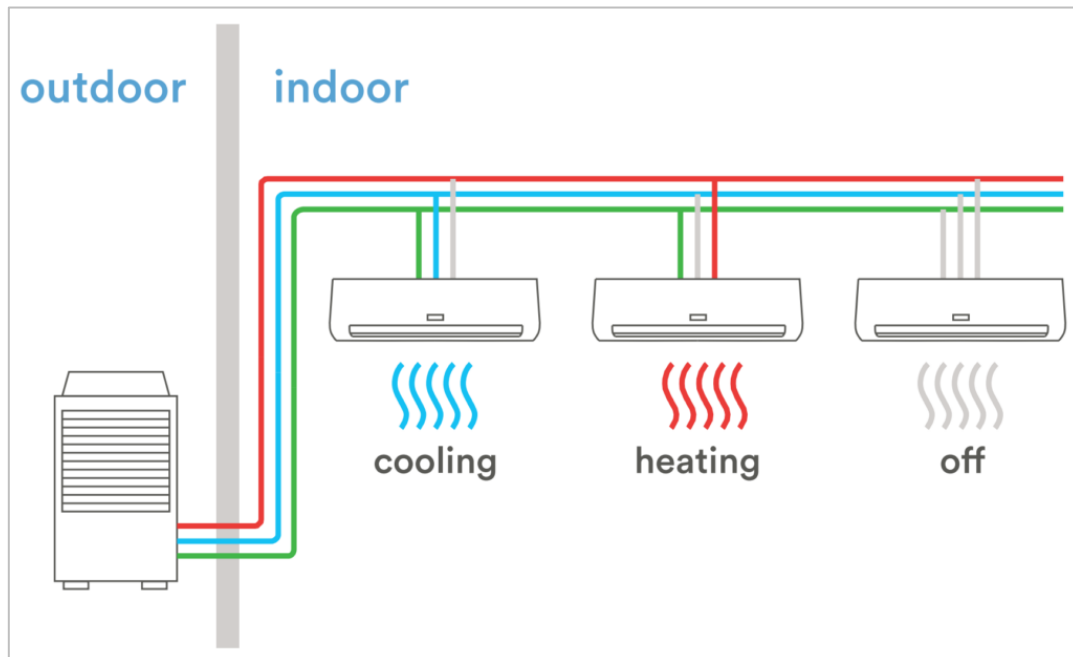


Fig. 4 – VRF/ASHP Installation

5.4.3 Solar Photovoltaic Panels

Rooftop photovoltaic (PV) arrays are a widely adopted renewable energy technology for on-site electrical power generation. By converting sunlight directly into electricity, these systems provide a clean, carbon-free source of energy that reduces reliance on grid-supplied electricity and helps lower overall carbon emissions. Additionally, during periods of low on-site demand, surplus electricity generated by the PV array can be exported back to the grid, contributing to the broader energy supply and potentially generating financial benefit for the system owner.

Because of their proven reliability, scalability, and relatively straightforward installation, rooftop PV systems are considered a practical and effective solution for offsetting electricity consumption and reducing greenhouse gas emissions. Their integration into residential, commercial, and industrial settings supports the global transition towards more sustainable and low-carbon energy systems.



5.4.4 Combined Heat & Power

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 use of Combined Heat & Power (CHP) tends to require a steady and continuous heat demand, therefore considering the large quantity of domestic hot-water demand associated with residential accommodation, this requirement would be satisfied.

However, the integration of CHP has been discounted for this project due to the city centre location and the detrimental clean air act implications.

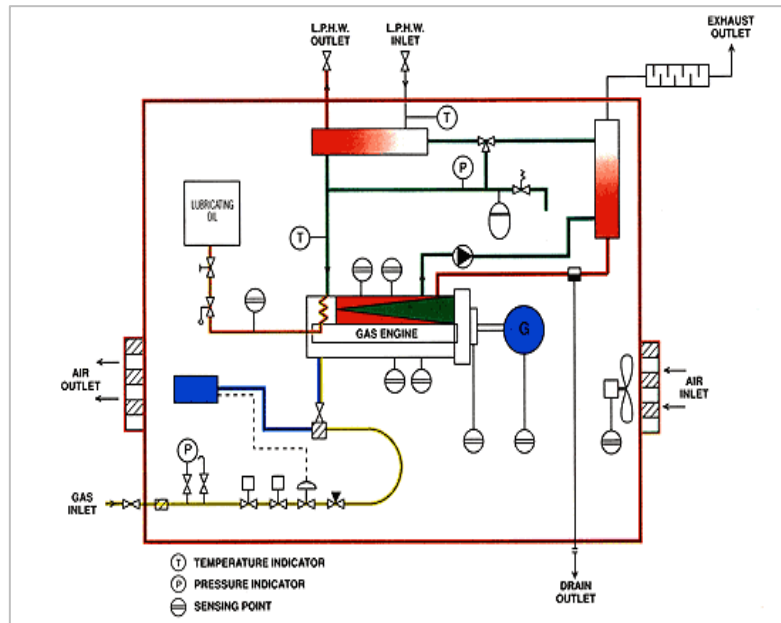


Fig. 5 – Diagrammatic Layout of a CHP Unit

5.4.5 Solar Thermal Collectors

The use of flat plate or evacuated tube solar thermal panels is commonly recognized as an effective method for harnessing renewable solar energy to pre-heat domestic hot water. These systems can significantly reduce reliance on conventional energy sources by capturing solar heat and supplying it directly to the building's hot water system.

However, considering the proposed development aims to incorporate a roof mounted PV array, the available roof space would be best utilised by this technology rather than solar thermal collectors. Therefore, the installation of solar thermal panels has been discounted from the development.

5.4.6 Wind Turbines

Wind energy can be a cost-effective method of renewable power generation, with turbines capable of producing carbon neutral electricity with outputs ranging from watts to megawatts. The most common design is for three blades mounted on a horizontal axis, which is free to rotate into the wind on a tall tower. The blades drive a generator either directly or via a gearbox (generally for larger machines) to produce electricity.

The electricity can either link to the grid or charge batteries. An inverter is required to convert the electricity from direct current (DC) to alternating current (AC) for feeding into the grid. There are a variety of wind turbines on the market ranging from smaller turbines that can be attached directly to a buildings structure to larger stand-alone turbines. City centre and sub-urban locations generally experience poorer yields for electricity output from small and medium scale wind turbines, due to obstructions and variations in local topography.

Due to this, and considering the noise and visual impact, the use of wind turbines has been discounted from this development.



Fig. 6 – Typical Wind Turbine Installation

5.4.7 Biomass

Some success on other projects has been made with the implementation of wood fuelled energy equipment forming a carbon neutral heat source however these projects have tended to be light density suburban or even rural in their location. The relatively constrained nature of this site, together with limited storage space and potential delivery issues, due to the city centre location, reduces the opportunity to take advantage of a Biomass solution for this development.

This in addition to the flue emissions in a city centre location, contribute towards the reasons as to why this technology has been discounted for this scheme.

5.5 Summary of Technologies

The following table provides an overview of the systems considered for the proposed development, considering their feasibility, suitability, and performance:

Proposed Technology	Status	Comments
Air Source Heat Pumps/Variable Refrigerant Flow Systems	Selected	VRF systems have been proposed for the development, supplying space heating and cooling to several spaces within the building. Grid supplied electricity demand is significantly reduced due to the units offering highly efficient means of space heating and cooling. As a result, CO₂ emissions and annual fuel costs associated with the building are reduced.
Solar Photovoltaic Panels	Selected	A photovoltaic array of 60m² has been proposed, equivalent to 8.69% of the ground floor area. The inclusion of this technology provides compliance with all applicable local and national legislation.
Ground Source Heat Pumps	Discounted	Due to the footprint and location of the scheme, this technology has been discounted from the scheme. GSHP installations are expensive, and requires an excavation of surrounding groundworks.
Solar Thermal Collection	Discounted	It is considered that the available roof space is better utilised with the implementation of a PV array over solar thermal collectors. As a result, this technology has been discounted.
Biomass Boilers	Discounted	Biomass boiler solutions have been discounted at this location due to potential clean air issues, deliverability logistics and the lack of available storage space for the required quantity of fuel.
Wind Turbines	Discounted	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 suburban locations.
Combined Heat & Power	Discounted	The proposal of CHP technology has been discounted due to the city centre location of the scheme, and the more favourable movement to utilise decarbonised grid electricity over traditional fossil fuels.



5.6 Energy Generation & Distribution Systems

As a consultant, Futureserv has an over-arching philosophy of delivering design of a truly sustainable nature, employing widely recognised methods.

- Be Lean, Fabric First Approach: Reduce demand wherever possible utilising passive measures;
- Be Clean: Where energy is used, then it should be optimised to operate at the highest efficiencies practical;
- Be Green: Take advantage of renewable options to reduce fossil fuel energy sources.

The proposed development will be designed with an all-electric building service solution, in line with the requirements of AD Part L2 2021 and the Greater Manchester Combined authority. Due to this, the CO₂ emissions associated with the development will continue to reduce in the future as the UK electricity supply grid continues to decarbonise.

5.7 Carbon & Energy Performance Calculations

To demonstrate the environmental benefits associated with the energy hierarchy, the Government approved Simplified Building Energy Model (SBEM) calculation methodology has been used to calculate the proposed CO₂ emissions associated with the development.

Under the current 2021 Building Regulations, it is a requirement for new developments to deliver a 31% reduction in carbon emissions (compared to Approved Document L 2013) through technologies and fabric upgrades.

The preliminary SBEM calculation has been performed for the proposed planning stage development using the Integrated Environmental Solutions Virtual Environment 2025 (IES VE) software. The results indicate that with an all-electric system, the scheme achieves a 3.32% improvement over the calculated carbon dioxide emission target. As stated, this reduction will improve further over time as the UK electricity grid continuously decarbonises in the future.

6.0 SBEM Calculation

To demonstrate the environmental benefits associated with the considered energy hierarchy approach to energy demand and carbon emission reduction for the development, the Government approved IES VE software has been used – specifically the ‘VE Compliance’ module. The following image has been extracted from the BRUKL cover page, demonstrating the BER and BPER compared to the associated targets. Please refer to Appendix A for the full BRUKL document.

BRUKL Output Document

Compliance with England Building Regulations Part L 2021

Project name

Moston Superstore

As designed

Date: Thu Aug 28 11:34:01 2025

Administrative information

Building Details

Address: Ebsworth Street, Manchester,

Certifier details

Name: Futureserv

Telephone number: 0161 827 1760

Address: 10 Oxford Court, Manchester, M2 3WQ

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.29

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.29

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

Foundation area [m²]: 284.13

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	2.11
Building CO ₂ emission rate (BER), kgCO ₂ /m ² :annum	2.04
Target primary energy rate (TPER), kWh _{pe} /m ² :annum	22.64
Building primary energy rate (BPER), kWh _{pe} /m ² :annum	21.62
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	0.15	0.15	0000000A:Surf[0]
Floors	0.18	0.13	0.13	00000012:Surf[1]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.13	0.13	01000002:Surf[0]
Windows** and roof windows	1.6	1.2	1.2	00000008:Surf[0]
Rooflights***	2.2	1.3	1.3	01000004:Surf[0]
Personnel doors^	1.6	1.6	1.6	00000009:Surf[2]
Vehicle access & similar large doors	1.3	1.3	1.3	00000009:Surf[1]
High usage entrance doors	3	-	-	No high usage entrance doors in building
U_a-Limit = Limiting area-weighted average U-values [W/(m²K)] U_a-Calc = Calculated area-weighted average 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
m³/(h.m²) at 50 Pa	8	3

6.1 SBEM Calculation Summary

The following specification has been used to develop the energy demand and carbon emission rates as per the SBEM calculation in Section 6.0:

- VRF systems to all occupied main areas, providing efficient space heating and cooling
- Electric panel heaters to select spaces
- MVHRs to all occupied main areas and mechanical extract ventilation to other spaces
- DHW generated at point-of-use via electric water heaters
- 60m² PV array

Summarised SBEM calculation, extracted from Section 6.0:

Reference	Target Rate	Building Rate	Percentage Improvement
Carbon Emissions Rate	2.11 kg.CO2/m ²	2.04 kg.CO2/m ²	3.32%
Primary Energy Rate	22.64 kg.CO2/m ²	21.62 kg.CO2/m ²	4.51%

6.2 GMCA Energy & Carbon Proforma

The Greater Manchester Combined Authority (GMCA) Energy and Carbon Proforma is a tool to summarise the energy and carbon performance of a development, to be submitted alongside this energy statement. This development falls under the 'non-residential minor development (100-999m²)' assessment, with the proposed superstore floor area approximately 700m².

As a result, the proforma requires the following detail:

- Summary of main building services (U-Values, efficiencies associated with space and water heating, form factor, etc.)
- BREEAM 'Excellent' rating
- Energy use intensity (EUI) calculation
- Total PV footprint including percentage of ground floor area, annual yield, and compared to total predicted energy demand
- Overheating assessment (if required)
- Confirmation that a summary of efforts has been made to design a lean, low carbon structure

From the Part L2 calculation included within this Energy Statement, Futureserv have provided the required figures where necessary. At this stage, the BREEAM assessment, EUI calculation, and overheating assessment have been excluded. The guidance of GMCA states that an alternative calculation model must be employed for the calculation of EUI, such as CIBSE TM54: Operational Energy Analysis. CIBSE TM52: Overheating may be considered for any necessary spaces within the building that are occupied but do not feature mechanical cooling. At this stage, Futureserv have not been commissioned for these calculations.

Please refer to the image on the corresponding page for figures calculated for the proforma:

Energy and Carbon Proforma

Non-residential

Minor development (100-999m²)
Version 1.0

GMCA GREATER
MANCHESTER
COMBINED
AUTHORITY

Project Name: Moston Superstore, Ebbsworth Street

Application ref:

Date: 11/08/2025

		Ref. name	Moston Superstore
		Area (m ² GIA)	2072.11
		Target values	Building 1
Minimise energy demand	Space heating demand (kWh/m ² GIA/yr)	≤ 15	2.84
	Space cooling demand (kWh/m ² GIA/yr)	≤ 15	1.19
	Calculation methodology used to calculate space heating demand and confirmation that this covers all homes/blocks	Predictive energy model	SBEM
	Form factor per building	≤ 2	0.58
	Average external wall U-value (W/m ² K)	≤ 0.15	0.15
	Average window U-value (W/m ² K)	≤ 1 (triple)	1
	Air permeability rate (m ³ /h/m ² @ 50 Pa)	≤ 1	3
Maximise energy efficiency	BREEAM Ene 01 rating	Excellent	TBC
	Energy use intensity (kWh/m ² GIA/yr)	-	Not undertaken at this stage
	Calculation methodology used to calculate energy use intensity and confirmation that this covers all homes/blocks	Predictive energy model	Not undertaken at this stage
Use renewable energy	PV footprint area (% of ground floor space)	-	8.69%
	Annual renewable energy generation (kWh/m ² building footprint/yr)	-	4.47 kWh/m ²
	Renewable energy balance (%)	-	24%
	Total energy used (kWh/yr)	-	38168.08
	Total energy generated on-site (kWh/yr)	-	9262.29
Use low carbon energy	Fossil fuel free (yes/no)	Yes	Yes
	Heat source - Where the system for generating space heating and hot water is a heat pump and it achieves a SCOP of 3.5 or higher (then a Low Carbon Heat Appraisal not required)	Electric	4.50), Water
Reduce overheating risk	Has CIBSE TM52 been used to calculate overheating and does the building pass?	Yes	Not undertaken at this stage
	What percentage of spaces are cooled? (% of GIA)	-	37%
Minimise embodied carbon	Confirmation that a summary of the efforts made to design a lean, low carbon structure and building design has been submitted?	Yes	Yes

7.0 Conclusion

This energy statement has summarised the design proposal for the development, outlining technologies that were considered for the scheme and weighing benefits against practicality. The purpose of this analysis was to identify the carbon and energy targets of the development and provide evidence that with the proposal outlined in this report, the building can achieve compliance with the requirements and targets of Approved Document: Part L2 2021, Places for Everyone Joint Development Plan, Manchester Core Strategy, and the Greater Manchester Combined Authorities.

The proposed development shall incorporate a fabric first approach through passive energy techniques available in modern construction industry to reduce the ongoing requirement to consume energy to heat, ventilate, and light the building. This is achieved via highly efficient fabric design in excess of the thermal properties outlined within the Building Regulations. In addition to passive energy measures, the development will employ energy efficient Building Services to minimise the carbon footprint of the site below the passive improvement stage. As stated in the report, this is achieved through the use of electric VRF systems, heat recovery ventilation units, efficient lighting systems, and photovoltaics.

As outlined, the approach for the development is to implement energy saving options which reduce the requirement for regulated energy, such as a more efficient building envelope, and utilising those high efficiency low carbon technologies which are suitable and feasible for a building of this type. Undertaking the 'lean, clean, and green' approach allows for the design of a building that achieves a significant reduction in carbon emissions compared against Building Regulations standards, this is accomplished by means of both passive and active measures in terms of highly improved U-Values, reduced air permeability, and energy efficient MEP systems.

Overall, the calculated emissions for the scheme developed through the 'VE Compliance' module of the IES VE 2025 modelling software demonstrate potential a weighed block compliance average carbon dioxide reduction of 3.32% over the Part L1 2021 calculated notional target.

The strategy improves on the fundamental principles of the English Building Regulations, and will make a significant contribution to reduce the annual carbon dioxide emissions of the proposed development.



Appendix A: BRUKL Document

Project name

Moston Superstore**As designed****Date:** Thu Aug 28 11:34:01 2025

Administrative information

Building Details

Address: Ebsworth Street, Manchester,

Certifier details

Name: Futureserv**Telephone number:** 0161 827 1760**Address:** 10 Oxford Court, Manchester, M2 3WQ

Certification tool

Calculation engine: Apache**Calculation engine version:** 7.0.29**Interface to calculation engine:** IES Virtual Environment**Interface to calculation engine version:** 7.0.29**BRUKL compliance module version:** v6.1.e.1**Foundation area [m²]:** 284.13The 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	2.11
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	2.04
Target primary energy rate (TPER), kWh _{PE} /m ² annum	22.64
Building primary energy rate (BPER), kWh _{PE} /m ² annum	21.62
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	0.15	0.15	0000000A:Surf[0]
Floors	0.18	0.13	0.13	00000012:Surf[1]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.13	0.13	01000002:Surf[0]
Windows** and roof windows	1.6	1.2	1.2	00000008:Surf[0]
Rooflights***	2.2	1.3	1.3	01000004:Surf[0]
Personnel doors^	1.6	1.6	1.6	00000009:Surf[2]
Vehicle access & similar large doors	1.3	1.3	1.3	00000009:Surf[1]
High usage entrance doors	3	-	-	No high usage entrance doors in building
U _{a-Limit} = Limiting area-weighted average U-values [W/(m ² K)] U _{a-Calc} = Calculated area-weighted average U-values [W/(m ² K)] U _{i-Calc} = Calculated maximum individual element U-values [W/(m ² K)] * 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/m ² K 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	3

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- AC + MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.83	6.5	0	-	0.8
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

2- EPH + MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	-	0.8
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

3- EPH + Extract Vent.

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

4- AC (Cooling Only)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.83	6.5	0	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

1- DHW (POU)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard	
00 - Butchery	-	-	-	1.2	-	-	-	-	-	-	N/A	
00 - Butchery Prep. Room	-	-	-	1.2	-	-	-	-	-	-	N/A	
00 - DDA Toilet	-	-	0.4	-	-	-	-	-	-	-	N/A	
00 - FOH Store Area	-	-	-	1.2	-	-	-	-	-	-	N/A	
01 - DDA Toilet	-	-	0.4	-	-	-	-	-	-	-	N/A	
01 - Female Toilets	-	-	0.4	-	-	-	-	-	-	-	N/A	
01 - General Office	-	-	-	1.2	-	-	-	-	-	-	N/A	
01 - Male Toilets	-	-	0.4	-	-	-	-	-	-	-	N/A	
01 - Managers Office	-	-	-	1.2	-	-	-	-	-	-	N/A	
01 - Meeting Room	-	-	-	1.2	-	-	-	-	-	-	N/A	
01 - Staff Room	-	-	-	1.2	-	-	-	-	-	-	N/A	

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80	0.3
00 - Butchery		110	95	1.579
00 - Butchery Prep. Room		110	95	1.579
00 - Corridor 01		110	-	-
00 - Corridor 02		110	-	-
00 - DDA Toilet		110	-	-
00 - FOH Store Area		110	95	1.579
00 - Fresh Cold Store		110	-	-
00 - Loading Bay		110	-	-
00 - Stairs 01		110	-	-
00 - Stairs 02		110	-	-
01 - Cleaners Store		110	-	-
01 - Corridor 01		110	-	-
01 - Corridor 02		110	-	-
01 - DDA Toilet		110	-	-
01 - Female Toilets		110	-	-
01 - General Office		110	-	-
01 - General Storage		110	-	-
01 - Male Toilets		110	-	-
01 - Managers Office		110	-	-
01 - Meeting Room		110	-	-
01 - Plant/Comms Room		110	-	-
01 - Staff Room		110	-	-
01 - Stairs 01		110	-	-
01 - Stairs 02		110	-	-
B1 - Cold Store		110	-	-
B1 - Corridor		110	-	-
B1 - General Store		110	-	-
B1 - Stairs 01		110	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
B1 - Stairs 02		110	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00 - Butchery	N/A	N/A
00 - Butchery Prep. Room	N/A	N/A
00 - FOH Store Area	NO (-19.6%)	NO
00 - Fresh Cold Store	N/A	N/A
01 - General Office	NO (-18.7%)	YES
01 - Managers Office	NO (-49.7%)	YES
01 - Meeting Room	N/A	N/A
01 - Plant/Comms Room	N/A	N/A
01 - Staff Room	N/A	N/A
B1 - Cold Store	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	2072.1	2072.1
External area [m ²]	2607.3	2607.3
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	547.42	0
Average U-value [W/m ² K]	0.21	0
Alpha value* [%]	25.19	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area Building Type

100	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	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	2.84	3.41
Cooling	1.19	0.96
Auxiliary	4.61	2.88
Lighting	9.22	8.29
Hot water	0.68	0.64
Equipment*	17.6	17.6
TOTAL **	18.53	16.18

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	4.47	0.95
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>4.47</i>	<i>0.95</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	46.12	43.32
Primary energy [kWh _{PE} /m ²]	21.62	22.64
Total emissions [kg/m ²]	2.04	2.11

HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	43.5	65.1	2.7	3.9	5.6	4.5	4.62	4.83	6.5
	Notional	36.5	50.6	3.7	3	2.5	2.78	4.63	----	----
[ST] Single room cooling system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	117.7	2.8	7.3	0.2	0	4.5	4.62	4.83	6.5
	Notional	143.3	11.7	14.3	0.7	0	2.78	4.63	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	46.2	0	12.8	0	5.3	1	0	1	0
	Notional	72	0	14.2	0	2.9	1.41	0	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	244.1	0	67.8	0	2.9	1	0	1	0
	Notional	281.8	0	55.5	0	4.1	1.41	0	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type