



EAL CONSULT BUILDING SUSTAINABILITY SINCE 2008

ENVIRONMENTAL STANDARDS STATEMENT

102 SHERBORNE STREET

PROPERTY ADDRESS

**102 SHERBORNE STREET
MANCHESTER
M8 8ND**

DATE

April 2025

PREPARED BY

EAL Consult

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1.EXECUTIVE SUMMARY

Site description

This Energy and Sustainability Assessment has been prepared to support the planning application for a community project at 102 Sherborne Street, including the erection of a sports hall building with swimming pool and a main building with prayer hall and education facilities.

Strategy

The strategy highlights how the proposed development will promote sustainability throughout both design and operation and responds to the UK Planning and regulatory framework, National Planning Policy Framework 2023 and Manchester Council's Local Plan Strategic Policies, summarising how the relevant targets will be addressed and achieved.

Energy Hierarchy

In accordance with the Energy Hierarchy, this statement outlines an overall commitment to reducing energy consumption under occupancy through the adoption of a 'Fabric First' principle, which will seek to enhance insulation standards and improved heating and lighting efficiencies in comparison to the standard requirements of Approved Document Part L 2021. The viability of district heating will be explored. Further carbon emission reduction will be achieved by using renewable technologies.

- **Be 'Lean':** Passive design principles including a high level of insulation and reduced air permeability to deliver Part L compliant Building in absence of renewable technologies. It will achieve **27%** reduction in carbon emissions over Part L 2021 baseline.
- **Be 'Clean':** district heating was deemed not viable for this project
- **Be 'Green':** Air Source Heat Pumps and Solar Photovoltaic Panels have been proposed for the specific scheme and will deliver a further **28%** reduction in regulated carbon emissions over Part L 2021 baseline

Energy Efficiency & Carbon Reduction

- This report demonstrates that the proposed development by incorporating the measures above can achieve an **overall** carbon emission reduction of **55%**

Overheating

The development proposal will minimise adverse impacts on the urban heat island through design, layout, orientation and materials.

Ventilation

The development utilises natural ventilation in the building.

Sustainable Design:

- Natural lighting is incorporated to prevent excessive demand for artificial lighting
- The development will not increase the air pollution of the area
- Total internal water consumption will not exceed 105 litres/person/day
- All contractors should sign up to the nationally recognised Considerate Constructors Scheme
- Designated space for waste and recycling facilities
- Low Flood Risk area

Reducing Waste and Supporting the Circular Economy:

- Minimising the use of virgin materials during construction by recycling and reusing where feasible.
- Promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible
- Encourage waste minimisation and waste prevention through the reuse of materials and using fewer resources in the production and distribution of products
- Low waste benchmark levels will be targeted during construction with requirements identifying that the diversion of waste from landfill is to be achieved by the contractor.

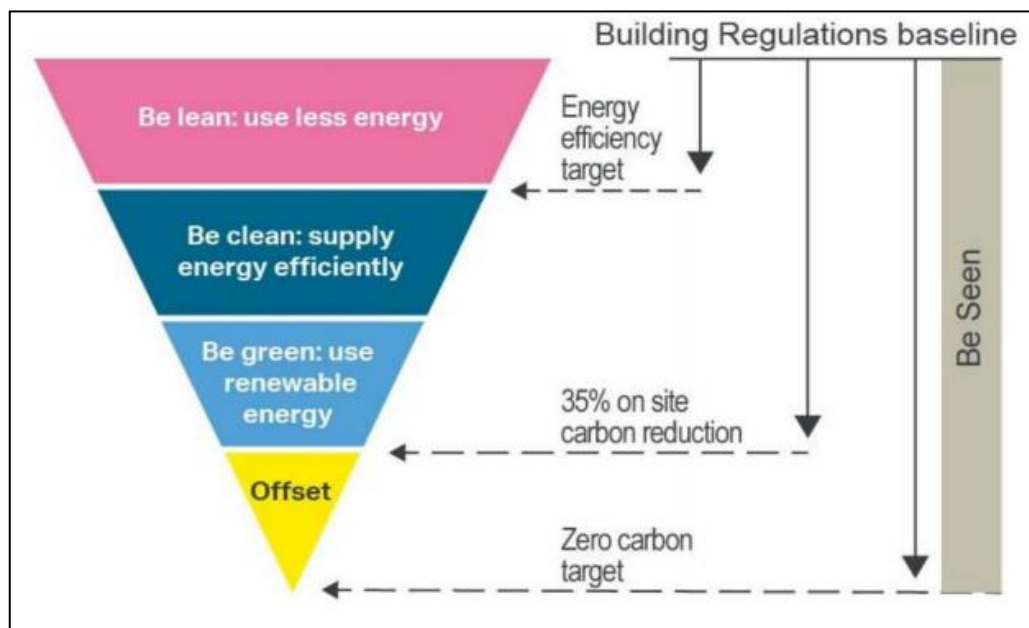
2.METHODOLOGY

This energy assessment outlines the energy demand from the development together with the associated CO₂ emissions, using Building Regulations Part L 2021 as a baseline. It demonstrates how the emissions from energy use in the development will be reduced through energy efficiency measures.

The proposed scheme is required to achieve carbon emission reduction principles in accordance with the UK Planning and regulatory framework.

The methodology employed to determine the potential CO₂ savings is in accordance with the three-step Energy Hierarchy.

Figure 1: The Energy Hierarchy



- **Be 'Lean'** - Improve the energy efficiency of the scheme;
- **Be 'Clean'** - Supply as much of the remaining energy requirement with low carbon; technologies such as district heating if available or combined heat and power (CHP); and
- **Be 'Green'** - Offset a proportion of the remaining carbon dioxide emissions by using renewable technologies.
- **Be 'Seen'** - monitor, verify and report on post-construction energy performance

The government approved Simplified Building Energy Model (SBEM) software has been used to determine the CO₂ emissions and energy requirements. It compares CO₂ emissions from regulated energy use (BER) with those of an equivalent building built to Part L 2021 (TER), a notional building of the same size and shape.

Opportunities for incorporating features into the development that contribute to the objectives of sustainable development were explored during the design process, to ensure that where possible, the proposals achieve best practice.

3. PLANNING POLICY CONTEXT

National Planning Policy Framework (NPPF) 2023

Emphasised the concept of sustainable development by encouraging local authorities to adopt proactive strategies to mitigate and adapt to climate change. It recommends the move to a low carbon future by:

- Avoiding increased vulnerability to the range of impacts arising from climate change. When new development is 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
- Contributing 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 standards.
- To help increase the use and supply of renewable and low carbon energy and heat, plans should:
 - provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);
 - consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
 - identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for colocating potential heat customers and suppliers.
- New updates emphasised that when determining planning applications, local planning authorities should give significant weight to the need to support energy efficiency and low carbon heating improvements to existing buildings, both domestic and non-domestic.

Core Strategy Development Plan Document Adopted 11th July 2012 including 2024 amendments

Policy EN4 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:

- 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 EN6: Target Framework for CO2 Reductions from Low or Zero Carbon Energy Supplies

Applications for residential developments of 10 or more units, and all other developments over 1,000 sqm will be expected as a minimum to meet the target unless this can be shown not to be

viable. This should be demonstrated through 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 energy statement will need to be submitted at the outset of any proposed development (outline application or before). Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees, and waterways to contribute to compliance with CO₂ mitigation, subject to the energy statement including evidence such as modeling to demonstrate compliance.

Guidance on what the energy statement should contain and how to decide which target applies to a development proposal is provided in Appendix A.

Provisional timetable for Building Regulation CO₂ reduction targets over 2006 compliant building

Table 12.3

Year	CO ₂ reduction target over 2006 compliant building			
	Residential (subsidised)	Residential (private)	Non-domestic (subsidised)	Non-domestic (private)
2006	25%	0%	0%	0%
2010	44%	25%	25%	25%
2013	Zero carbon	44%	44%	44%
2016		Zero carbon	100%	100%
2018			Zero carbon	100%
2019				Zero carbon

Policy EN8 Adaptation to Climate Change

All new development will be expected to be adaptable to climate change in terms of the design, layout, siting and function of both buildings and associated external spaces. In achieving developments which are adaptable to climate change developers should have regard to the following, although this is not an exhaustive list:

- Reduction in urban heat island effect through the use of Green Infrastructure such as green roofs, green walls, increased tree cover and waterways
- The need to control overheating of buildings through passive design

Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO₂ mitigation under Policy EN6, subject to sufficient evidence to quantify their contribution to compliance.

PLACES FOR EVERYONE JOINT DEVELOPMENT PLAN DOCUMENT FOR BOLTON, BURY, MANCHESTER, OLDHAM, ROCHDALE, SALFORD, TAMESIDE, TRAFFORD AND WIGAN 2022 to 2039 ADOPTED 21 MARCH 2024

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. a. Be net zero carbon(29) 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 2022 Part L Building Regulations unless superseded by changes to building regulations and/or national or local planning policies.

- b. Incorporate adequate electric vehicle charging points, in line with Part S of the Building Regulations, unless superseded by relevant Local Plan policies, to future proof for the likely long-term demand, taking account of the potential maximum energy demand for the site;
- c. Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date;
- d. 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 technologies will be appropriate where the equivalent generation is evidenced.

- e. For non-residential developments, achieve at least BREEAM excellent standard (or equivalent) for the ‘Ene 01 – reduction of energy use and carbon emissions’ category rising to ‘BREEAM outstanding’ equivalent for ENE 01 from 2028.
- f. Include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets, including the minimisation of overheating risks and appropriate measures for post occupancy evaluation. Whole life cycle emissions should be considered where possible.

Policy JP-S6: Resource Efficiency

The achievement of a circular economy and a zero-waste economy will play a key role in meeting Greater Manchester's ambition of becoming a leading green city region by 2038. The following measures will help achieve this:

1. Development and implementation of the Zero Waste Strategy for Greater Manchester which promotes overall reduction in the level of waste produced and supports resource efficiency within the Plan area in order to gain the maximum value from the things we produce;
2. Recognition of the role of existing infrastructure in managing our waste and protecting such facilities to ensure adequate waste management capacity is maintained; and
3. 'Using sustainable design and construction techniques to reduce carbon emissions, adapt and future proof to the impact of climate change, reduce and recycle waste and minimise water use.

4. ENERGY STRATEGY

The Energy strategy for the proposed development is based on the Building Regulations Part L; it adopts a set of principles to guide design and decisions regarding energy, balanced with the need to optimise environmental and economic benefits. It seeks to incorporate energy efficiency through the approach detailed below.

The following tables demonstrate the carbon emissions and savings.

Table 1. Carbon Dioxide emissions after each stage of the Energy Hierarchy

	Carbon dioxide emissions (Tonnes CO ₂ per annum)	
	Regulated	
Baseline: Part L 2021 of the Building Regulations Compliant Development	31.47	
After Energy Demand Reduction (Be Lean)	23.05	
After Heat Network Connection (Be Clean)	0	
After Renewables (Be Green)	14.18	

Table 2. Carbon Dioxide Savings from each stage of the Energy Hierarchy

	Regulated Carbon dioxide savings	
	Tonnes CO ₂ per annum	%
Be Lean: Savings from Energy Demand Reduction	8.14	27
Be Clean: Savings from Heat Network	0	0
Be Green: Savings from Renewable Energy	8.88	28
Cumulative savings	17.29	55

a. Baseline Model

A baseline model is run with Building Regulations Part L target values as set out in SAP 10.2 Appendix R and the National Calculation Methodology Modelling Guide. Any energy generating technologies that are to be included at Be 'Green' stage are also included in the baseline model. This model is then used in the Energy Strategy process in comparison to the Be 'Lean', Be 'Clean' and Be 'Green' scenarios of the Energy Hierarchy, to establish the regulated CO₂ emissions from the development.

The baseline model used for this project assumed that any heating and hot water supply would be provided by heatpump with notional efficiency figures and any active cooling would be provided by electrically powered equipment. The comparative Be 'Lean' model assumes the same heating strategy.

b. Be 'Lean' - Demand Reduction

The building fabric performance and engineering systems have been optimised in order to use less energy prior to the inclusion or consideration of Low and Zero Carbon (LZC) Technology.

Through passive design measures, efficient building fabric and engineering systems the building is estimated to achieve **27%** reduction in annual regulated CO₂ emissions over Part L benchmark, therefore demonstrating compliance with Building Regulations Through passive means alone without the utilisation of renewable technologies.

Passive Design Measures

Fabric Performance - The fabric performance values aim to reduce unwanted heat loss and heat gains, whilst maintaining a comfortable internal environment.

The heat loss of different building elements is dependent upon their U –value. A building with low U values provides better levels of insulation and reduced heating demand.

The development will incorporate high levels of insulation and efficient glazing; thereby reduce demand for space heating. The table below shows the proposed U-values for the development and the associated improvements over Building Regulations.

Table 3. Energy Efficient Design Specification

Element	Building Regulations 2021 Standard	Specification
Walls	0.26 W/m ² k	0.15 W/m ² k
Roof	0.18-16 W/m ² k	0.15 W/m ² k
Floors	0.18 W/m ² k	0.18 W/m ² k
Windows, Rooflights & Doors	1.6 W/m ² k	1.2 W/m ² k

Air Permeability – designed to achieve an air permeability score of 4.

Efficient Lighting and Controls - Throughout the development natural lighting will be optimised. The development will also incorporate low energy light fittings throughout. All light fittings will be specified as low energy lighting and will accommodate LED luminaires only.

Ventilation – local mechanical exhaust with heat recovery applied to toilets, changing room and kitchen

Space Heating & Cooling - Space heating and cooling will be provided by and air source heat pump

Hot Water system – Hot water is supplied via built in cylinders

c. Be 'Clean' - Supply Energy Efficiently

The Be Clean step of the energy hierarchy refers to the use of 'Clean energy supply'. This includes, but is not limited to, the use of Combined Heat and Power (CHP) and District Heat Networks.

District Heating and Cooling

There is no existing heat network in the area so cannot be connected upon completion of the project. However, it is located within a potential heat network area as identified in the Department for Energy Security & Net Zero's Greater Manchester Pilot Project. The site will therefore be built with the capability of connecting to a heat network in the future.

Community heating and Combined Heat and Power (CHP system)

CHP systems are usually needed where there is a large heat demand (schemes with more than 100-150 dwellings), usually resulting from the building(s) being in continuous use. Community (or district) heating involves using a central boiler plant (or other heat sources) to heat a number of buildings through a network of well-insulated underground pipes. This system is not considered technically or financially unviable in this instance.

d. Be 'Green' - Renewable Energy

Once energy demand reduction measures have been applied, methods for generating low and zero carbon energy can be assessed. The following renewable technologies can be considered for the project: Biomass, Water source heat pump, air source heat pump, Wind energy and solar photovoltaic panels.

Table 4. Renewable Technologies Feasibility Table

Technology	Pros	Cons
Biomass Heating A biomass system designed for wood pellets, which have a high-energy content, would fuel this development. 	<ul style="list-style-type: none"> • Less volume of storage • Less maintenance and produce considerably less ash residue 	<ul style="list-style-type: none"> • Nox Emissions which may impacts • High Costs • Not suitable for the project

<p>Ground Source Heat Pump</p> <p>It circulates a mixture of water and antifreeze around a loop of pipe, called a ground loop, which is buried in the garden. Heat from the ground is absorbed into the fluid and passes through a heat exchanger into the heat pump</p> 	<ul style="list-style-type: none"> • Use all through the year 	<ul style="list-style-type: none"> • High Costs • Not suitable for this project
<p>Air Source Heat Pump</p> <p>They are an efficient and environmentally-friendly way of heating using air drawn freely from the atmosphere. They operate rather like a refrigerator in reverse, absorbing heat from the air into a working fluid which is passed into a compressor where its temperature is increased before it is transferred into the heating and hot water circuits of the building</p>	<ul style="list-style-type: none"> • Can generate less CO₂ than conventional heating systems. • Cheaper • Provides heating and hot water • Less maintenance • Can be used as air-conditioning in the summer 	<ul style="list-style-type: none"> • Needs electricity • Can be noisy
<p>Wind Turbines</p> <p>Wind turbines are available in various sizes from large rotors able to supply whole communities to small roof or wall-mounted units for individual dwellings.</p> 	<ul style="list-style-type: none"> • Cheaper • Less CO₂ 	<ul style="list-style-type: none"> • Local wind speeds in the area is likely to be below the level generally required for investment in large wind turbines. • Noise and signal interference. • Detrimental aesthetic impact
<p>Solar Photovoltaic Panels (PV)</p> <p>Photovoltaic panels extract the energy of the sun to generate electricity. They operate most efficiently when oriented to the south and are inclined to about 35 degrees.</p> 	<ul style="list-style-type: none"> • Cheaper • Less CO₂ • No input power in order to generate electricity. 	

Renewable Technologies Feasibility Review Conclusion

The renewable energy sources that have been reviewed for this project are Biomass Heating, Ground Source Heat Pump, Air Source Heat Pump, Domestic Wind Turbine and Solar Photovoltaic Panels (PV).

On review of the above technologies, it has been concluded that the use of air source heat pumps and PV panels are to be incorporated in the design because it achieves a CO₂ percentage reduction of **28%** contributing to an overall reduction of **55%** in carbon emissions. The air source heatpump will have a seasonal efficiency of 3.6.

Table 5. Photovoltaic Panels

	System size	Orientation	Degree
Solar Photovoltaic	40 kWp	South	30
Solar Thermal	10m2	South	30

e. Be 'Seen' - Monitoring Performance

The operational running costs will be low due to the high amount of PV reducing the electricity demand greatly. As the development includes renewable technologies it is less reliant on the main grid and will protect the consumer from high prices.

Smart metering equipment will be installed with display of energy usage and generation to raise awareness of occupants. This can help occupants to reduce demand and subsequent running costs. An on-site operational manual will be provided for the occupants on completion of the build to assist residents better understanding of appliances and cost management.

5.SUSTAINABILITY STRATEGY

a. Sustainable Design

The proposed project incorporates sustainable design and construction measures capable of mitigating and adapting to climate change to meet future needs. This section details site-specific initiatives which demonstrate how the project aims to meet the sustainability objectives set out in the National Planning Framework 2023.

Materials Efficiency

Materials can have a significant impact on environmental performance, both in construction but also ongoing use. Materials used for the building will have lower environmental impacts over their lifecycle. This applies to the materials used in the external walls, roof and glazing. This extends to elements of the materials category such as the basic building materials (internal walls) and the finishing elements (fascia, skirting, and furniture).

b. Overheating Strategy

Minimise Heat Generation Through Energy Efficient Design

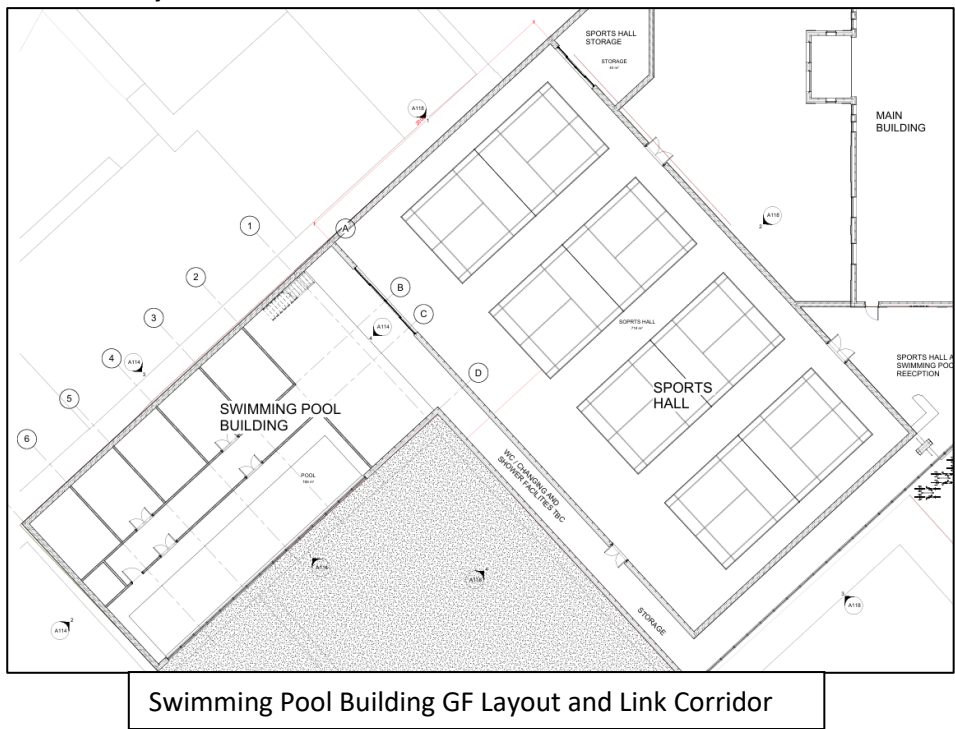
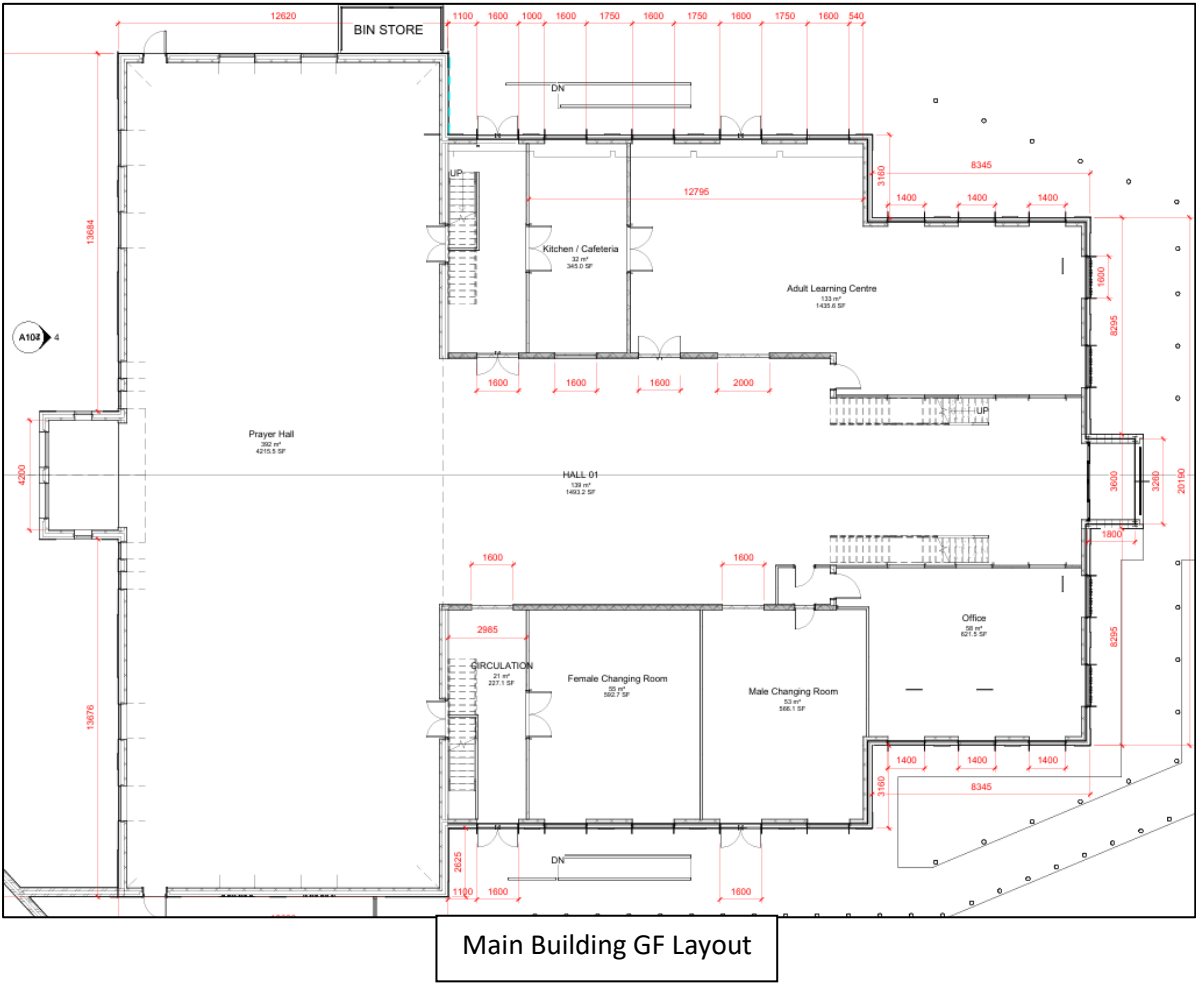
Through the use of passive and active design measures, the design team have enabled the development to require less energy through the use of optimised insulation, cross ventilation, improved window u-values, higher air tightness and reduced cold bridging.

Daylight

The design of the development has taken into consideration day lighting to habitable spaces to improve the wellbeing of occupants. Good levels of daylight will offer occupants a pleasant and

highly valued connection to the outdoors and plenty of natural light. It will also reduce the use of artificial lighting and therefore energy use. All light fittings will be specified as low energy lighting. No external lighting is required. The location and orientation of windows help to create a design that avoids overheating in the summer.

Figure 3. Internal layout



c. Water Efficiency

Water: Water Efficiency

In domestic and non-domestic buildings, the demand for water can be reduced as much as 50% using a variety of simple and innovative strategies that are integrated into the plumbing and mechanical systems. In order to reduce water consumption the proposed development will include efficient fixtures with low flow rates. Total internal water consumption will not exceed 105 litres/person/day.

Table 6. Water Fittings Standards

Schedule Appliance Water Consumption		
Appliance	Flow rate or Capacity	Total Litres
WC	Dual flush WC 4/2.6 litre	14.72
Basin	1.7 litres/min	5.98
Shower	8 litres/minute flow	24.00
Bath	160 litres	25.60
Sink	4 litres/min	14.13
W/machine	Default used	16.66
Dish Washer	Default used	3.90
		104.99

d. Pollution: Light, Air and Noise

Light

Light pollution can best be described as artificial light that is allowed to illuminate or intrude upon areas not intended to be lit. Light in the wrong place at the wrong time can be intrusive.

Intrusive light is over bright or poorly directed lights shining onto neighbouring property which affect the neighbours' right to enjoy their property. Therefore, the proposal will incorporate lighting measures in order to avoid causing a nuisance.

Air and Noise

The layout of the development can provide good internal air quality for habitable areas but not too much so as to waste heat.

The use of openable windows will create horizontal airflow. By achieving a good naturally ventilated building the energy demand for air conditioning and mechanical ventilation will thereby be eliminated within the development.

The development will not increase the air pollution of the area by reducing as a start, its energy use, which in turn will reduce emissions that lead to air pollution.

Other measures will include:

- Use of eco-friendly building materials
- Non-toxic paints
- Installation of energy efficient appliances and devices
- Use of renewable technologies

e. Waste Management

Considerate Construction

All contractors would be required to sign up to the nationally recognised Considerate Constructors Scheme which requires, amongst other things that dust emissions, potential noise pollution, impacts on water quality and the potential for ground contamination are minimised during demolition and construction. The Contractor would also be obliged to adhere to a site-specific Code of Construction Practice to reduce potential nuisance effects.

Diversion of waste from landfill

- Where possible, segregation of recyclable and non-recyclable material will be employed for all waste generated throughout the construction process. Furthermore, material will be re-used on-site where feasible;
- Pre-fabrication of materials/elements such as bathroom pods, pipework and riser materials will be considered;
- Reusable packing solutions with key product manufacturers will be explored at the earliest opportunity. Solutions may include flat pallets, bulk bags, steel stillages and returnable cable drums;
- Construction waste – minimum 80% diversion from landfill rate;
- Demolition waste – minimum 90% diversion from landfill rate;

A space for reuse and recycling will be included.

f. Flood Risk

The development site is located in a Low Flood Risk Area on the Environment Agency Flood Risk Map.

g. Sustainable Procurement

It is expected that all timber used in the development will come from a legal Source (FSC Scheme). At least 20% of the total value of materials used should derive from recycled and reused content in the products and materials selected, Steel will have a high recycled content and Concrete will have a Ground Granulated Blast Furnace Slag (GGBS) value of 50%.

h. Biodiversity and Green Infrastructure

The site is predominantly greyfield, with mostly sealed surfaces from prior development so there is not a significant amount of biodiversity nor green infrastructure on site at present. The proposed development will include grassy areas on the western and southern areas surrounding the main building as amenity space. The development also includes an extensive green roof proposed on the main building. As Solar PV panels are also required, some part of this will be a biosolar roof.

i. Sustainable Transport

The nearest bus stop to the site is along Queens Road/Elizabeth Street, a 3 minute walk away, and serves bus route 715. There are also bus stops along Waterloo Road, a 6 minute walk away, serving bus routes 59 and 717, or along Cheetham Hill Road, a 10 minute walk away, serving bus routes 41 and 135. There is a car park on site to provide accessibility to those not able to travel via public transport. The car park will have EV charging facilities.

6. CONCLUSION

The development has been designed to exceed Part L building regulations requirements. In line with the national and local policies, regulated CO₂ emissions from the development will be reduced by **55%** from the notional emissions once energy efficiency measures and lean measures are taken into account.

The use of air source heat pumps and photovoltaic panels are to be incorporated in the design because they achieve a CO₂ percentage reduction of **28%** contributing to the overall reduction of **55%** in carbon emissions. The remainder is made up from a fabric first approach with U-values outlined in the specification column of Table 3 on Page 11 of this report.

An appraisal of the proposed development has been undertaken against key sustainability objectives identified from relevant policy guidance. The framework for the appraisal was guided by the National Plan. This process has ensured that the development responds to the sustainable development objectives that are relevant to the area. Key sustainability initiatives in ecology, waste management, water, health and wellbeing, materials, pollution and Surface water management have been incorporated in the design of the proposed Development.

7. APPENDIX

A. SBEM Calculations

i. Baseline

Project name

102 Sherbourne Street, Manchester**As built****Date:** Fri Mar 21 10:57:08 2025

Administrative information

Building Details

Address: 102 Sherbourne Street, Manchester, M8 8ND

Certifier details

Name: Stephen Shillingford**Telephone number:** 07966424143**Address:** Montrose, Cannon Lane, Pinner, HA5 1HY

Certification tool

Calculation engine: SBEM**Calculation engine version:** v6.1.e.0**Interface to calculation engine:** iSBEM**Interface to calculation engine version:** v6.1.e**BRUKL compliance module version:** v6.1.e.0**Foundation area [m²]:** 1353.25The CO₂ emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	5.13
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	10.81
Target primary energy rate (TPER), kWh _{PE} /m ² .annum	54.17
Building primary energy rate (BPER), kWh _{PE} /m ² .annum	115.74
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	0.52	0.55	Z0/01 Prayer Room & Hall/se
Floors	0.18	0.11	0.14	Z0/13 SWIM POOL HALL/f
Pitched roofs	0.16	0.18	0.18	Z0/10 SPORTS HALL/c
Flat roofs	0.18	0.18	0.18	Z0/11 SWIMMING POOL/c
Windows** and roof windows	1.6	1.6	1.6	Z0/01 Prayer Room & Hall/se/g
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.6	1.6	PD Z0/01 nw
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	8

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- RADIATORS

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.64	-	-	-	-
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- WATER STORAGE CYLINDER

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0.015
Standard value	N/A	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	Zone	Standard
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
Z0/01 Prayer Room & Hall		1.5	-	-	-	-	-	-	-	-	-	N/A
Z0/03 KITCHEN & CAFÉ		1.5	-	-	-	-	-	-	-	-	-	N/A
Z0/06 MALE CHANGING		1.5	-	-	-	-	-	-	-	-	-	N/A
Z0/07 FEMALE CHANGING		1.5	-	-	-	-	-	-	-	-	-	N/A
Z1/02 WC1		1.5	-	-	-	-	-	-	-	-	-	N/A
Z1/10 WC2		1.5	-	-	-	-	-	-	-	-	-	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
Z0/02 STAIR 1		28	-	-
Z0/08 STAIRS 2		28	-	-
Z0/12 STORAGE		28	-	-
Z1/03 STAIRS BY WC1		28	-	-

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
Z1/11 STAIRS BY WC2		28	-	-
Z0/01 Prayer Room & Hall		50	-	-
Z0/03 KITCHEN & CAFÉ		28	-	-
Z0/04 ADULT LEARNING		28	-	-
Z0/05 OFFICE		28	-	-
Z0/06 MALE CHANGING		28	-	-
Z0/07 FEMALE CHANGING		28	-	-
Z0/09 SWIMMING RECEPTION		28	15	9
Z0/10 SPORTS HALL		33	-	-
Z0/11 SWIMMING POOL		28	-	-
Z0/13 SWIM POOL HALL		28	-	-
Z1/01 CLASSROOM 1		28	-	-
Z1/02 WC1		28	-	-
Z1/04 OFFICE		28	-	-
Z1/05 IT ROOM		28	-	-
Z1/06 MEETING ROOM 01		28	-	-
Z1/07 MEETING ROOM 02		28	-	-
Z1/08 MEETING ROOM 03		28	-	-
Z1/09 STAFF ROOM		28	-	-
Z1/10 WC2		28	-	-
Z1/12 CENTRAL WALKWAY		28	-	-
Z1/13 CLASSROOM 2		28	-	-

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?
Z0/01 Prayer Room & Hall	YES (+125.4%)	NO
Z0/03 KITCHEN & CAFÉ	YES (+238.2%)	NO
Z0/04 ADULT LEARNING	YES (+247.1%)	NO
Z0/05 OFFICE	YES (+222.3%)	NO
Z0/09 SWIMMING RECEPTION	N/A	N/A
Z0/10 SPORTS HALL	N/A	N/A
Z0/11 SWIMMING POOL	YES (+72.7%)	NO
Z1/01 CLASSROOM 1	N/A	N/A
Z1/04 OFFICE	N/A	N/A
Z1/05 IT ROOM	N/A	N/A
Z1/06 MEETING ROOM 01	N/A	N/A
Z1/07 MEETING ROOM 02	N/A	N/A
Z1/08 MEETING ROOM 03	N/A	N/A
Z1/09 STAFF ROOM	N/A	N/A
Z1/13 CLASSROOM 2	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?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	2910.8	2910.8
External area [m ²]	7461	7461
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	8	4
Average conductance [W/K]	2228.68	2121.25
Average U-value [W/m ² K]	0.3	0.28
Alpha value* [%]	12.59	32.17

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

Building Use

% Area Building Type

Retail/Financial and Professional Services
Restaurants and Cafes/Drinking Establishments/Takeaways
Offices and Workshop Businesses

2 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

63 Non-residential Institutions: Community/Day Centre

Non-residential Institutions: Libraries, Museums, and Galleries

19 Non-residential Institutions: Education

Non-residential Institutions: Primary Health Care Building
Non-residential Institutions: Crown and County Courts

15 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	25.97	22.78
Cooling	0	0
Auxiliary	9.89	3.7
Lighting	36.45	6.55
Hot water	3.44	3.91
Equipment*	14.34	14.34
TOTAL **	75.75	36.95

* 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	0	0.83
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>0.83</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	290.77	255.19
Primary energy [kWh _{PE} /m ²]	115.74	54.17
Total emissions [kg/m ²]	10.81	5.13

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] No Heating or Cooling										
	Actual	275.4	30.8	0	0	0	0	0	0	0
	Notional	242.6	26.3	0	0	0	0	----	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	228.9	61.3	27	0	10.3	2.36	0	2.64	0
	Notional	225	29.7	23.7	0	3.4	2.64	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

ii. Be Lean

Project name

102 Sherbourne Street, Manchester**As built****Date:** Fri Mar 21 11:11:05 2025

Administrative information

Building Details

Address: 102 Sherbourne Street, Manchester, M8 8ND

Certifier details

Name: Stephen Shillingford**Telephone number:** 07966424143**Address:** Montrose, Cannon Lane, Pinner, HA5 1HY

Certification tool

Calculation engine: SBEM**Calculation engine version:** v6.1.e.0**Interface to calculation engine:** iSBEM**Interface to calculation engine version:** v6.1.e**BRUKL compliance module version:** v6.1.e.0**Foundation area [m²]:** 1353.25The CO₂ emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	4.98
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	7.92
Target primary energy rate (TPER), kWh _{PE} /m ² .annum	52.51
Building primary energy rate (BPER), kWh _{PE} /m ² .annum	84.36
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	0.18	Z0/01 Prayer Room & Hall/nwi
Floors	0.18	0.11	0.14	Z0/13 SWIM POOL HALL/f
Pitched roofs	0.16	0.15	0.15	Z0/10 SPORTS HALL/c
Flat roofs	0.18	0.15	0.15	Z0/11 SWIMMING POOL/c
Windows** and roof windows	1.6	1.46	5.28	Z1/12 ROOFLIGHT TO CENTRAL WALKWAY
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.2	1.2	PD Z0/01 nw
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_{i-Calc} = Calculated maximum individual element 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
m ³ /(h.m ²) at 50 Pa	8	8

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- RADIATORS

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.64	-	-	-	-
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- WATER STORAGE CYLINDER

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0.015
Standard value	N/A	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	Zone	Standard
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
Z0/01 Prayer Room & Hall		1.5	-	-	-	-	-	-	-	-	-	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
Z0/02 STAIR 1		50	-	-
Z0/08 STAIRS 2		50	-	-
Z0/12 STORAGE		50	-	-
Z1/03 STAIRS BY WC1		50	-	-
Z1/11 STAIRS BY WC2		50	-	-
Z0/01 Prayer Room & Hall		50	-	-
Z0/03 KITCHEN & CAFÉ		50	-	-
Z0/04 ADULT LEARNING		50	-	-
Z0/05 OFFICE		50	-	-

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
Z0/06 MALE CHANGING		50	-	-
Z0/07 FEMALE CHANGING		50	-	-
Z0/09 SWIMMING RECEPTION		50	15	9
Z0/10 SPORTS HALL		50	-	-
Z0/11 SWIMMING POOL		50	-	-
Z0/13 SWIM POOL HALL		50	-	-
Z1/01 CLASSROOM 1		50	-	-
Z1/02 WC1		50	-	-
Z1/04 OFFICE		50	-	-
Z1/05 IT ROOM		28	-	-
Z1/06 MEETING ROOM 01		50	-	-
Z1/07 MEETING ROOM 02		50	-	-
Z1/08 MEETING ROOM 03		50	-	-
Z1/09 STAFF ROOM		50	-	-
Z1/10 WC2		50	-	-
Z1/12 CENTRAL WALKWAY		50	-	-
Z1/13 CLASSROOM 2		50	-	-

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?
Z0/01 Prayer Room & Hall	YES (+125.4%)	NO
Z0/03 KITCHEN & CAFÉ	YES (+238.2%)	NO
Z0/04 ADULT LEARNING	YES (+247.1%)	NO
Z0/05 OFFICE	YES (+222.3%)	NO
Z0/09 SWIMMING RECEPTION	N/A	N/A
Z0/10 SPORTS HALL	N/A	N/A
Z0/11 SWIMMING POOL	YES (+72.7%)	NO
Z1/01 CLASSROOM 1	N/A	N/A
Z1/04 OFFICE	N/A	N/A
Z1/05 IT ROOM	N/A	N/A
Z1/06 MEETING ROOM 01	N/A	N/A
Z1/07 MEETING ROOM 02	N/A	N/A
Z1/08 MEETING ROOM 03	N/A	N/A
Z1/09 STAFF ROOM	N/A	N/A
Z1/13 CLASSROOM 2	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?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	2910.8	2910.8
External area [m ²]	7461	7461
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	8	4
Average conductance [W/K]	1437.98	2121.25
Average U-value [W/m ² K]	0.19	0.28
Alpha value* [%]	19.62	32.17

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

Building Use

% Area Building Type

Retail/Financial and Professional Services
Restaurants and Cafes/Drinking Establishments/Takeaways
Offices and Workshop Businesses

2 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

63 Non-residential Institutions: Community/Day Centre

Non-residential Institutions: Libraries, Museums, and Galleries

19 Non-residential Institutions: Education

Non-residential Institutions: Primary Health Care Building
Non-residential Institutions: Crown and County Courts

15 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	23.78	22.78
Cooling	0	0
Auxiliary	5.47	2.52
Lighting	22.38	6.55
Hot water	3.44	3.91
Equipment*	14.34	14.34
TOTAL **	55.08	35.77

* 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	0	0.78
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>0.78</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	267.38	255.19
Primary energy [kWh _{PE} /m ²]	84.36	52.51
Total emissions [kg/m ²]	7.92	4.98

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] No Heating or Cooling									
Actual	237	26.5	0	0	0	0	0	0	0
Notional	242.6	26.3	0	0	0	0	0	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	209.6	57.9	24.7	0	5.7	2.36	0	2.64	0
Notional	225	29.7	23.7	0	2.2	2.64	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

iii. Be Green

Project name

102 Sherbourne Street, Manchester**As built****Date:** Tue Apr 08 10:27:08 2025

Administrative information

Building Details

Address: 102 Sherbourne Street, Manchester, M8 8ND

Certifier details

Name:**Telephone number:****Address:**

Certification tool

Calculation engine: SBEM**Calculation engine version:** v6.1.e.0**Interface to calculation engine:** iSBEM**Interface to calculation engine version:** v6.1.e**BRUKL compliance module version:** v6.1.e.0**Foundation area [m²]:** 1353.25The 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	4.95
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	4.87
Target primary energy rate (TPER), kWh _{PE} /m ² annum	52.22
Building primary energy rate (BPER), kWh _{PE} /m ² annum	51.33
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	0.18	Z0/01 Prayer Room & Hall/nwi
Floors	0.18	0.11	0.14	Z0/13 SWIM POOL HALL/f
Pitched roofs	0.16	0.15	0.15	Z0/10 SPORTS HALL/c
Flat roofs	0.18	0.15	0.15	Z0/11 SWIMMING POOL/c
Windows** and roof windows	1.6	1.2	1.2	Z0/01 Prayer Room & Hall/se/g
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.2	1.2	PD Z0/01 nw
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_{i-Calc} = Calculated maximum individual element 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
m ³ /(h.m ²) at 50 Pa	8	4

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- RADIATORS

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.6	-	-	-	-
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- WATER STORAGE CYLINDER

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0.021
Standard value	N/A	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		Zone	Standard
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
Z0/03 KITCHEN & CAFÉ	0.4	-	-	-	1.5	-	-	-	-		0.85	N/A
Z0/06 MALE CHANGING	0.4	-	-	-	1.5	-	-	-	-		0.85	N/A
Z0/07 FEMALE CHANGING	0.4	-	-	-	1.5	-	-	-	-		0.85	N/A
Z0/10 SPORTS HALL	-	-	-	-	1.5	-	-	-	-		0.65	N/A
Z1/02 WC1	0.4	-	-	-	1.5	-	-	-	-		0.85	N/A
Z1/05 IT ROOM	0.4	-	-	-	1.5	-	-	-	-		0.85	N/A
Z1/10 WC2	0.4	-	-	-	1.5	-	-	-	-		0.85	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
Z0/02 STAIR 1		50	-	-
Z0/08 STAIRS 2		50	-	-
Z0/12 STORAGE		50	-	-

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
Z1/03 STAIRS BY WC1		50	-	-
Z1/11 STAIRS BY WC2		50	-	-
Z0/01 Prayer Room & Hall		50	-	-
Z0/03 KITCHEN & CAFÉ		50	-	-
Z0/04 ADULT LEARNING		50	-	-
Z0/05 OFFICE		50	-	-
Z0/06 MALE CHANGING		50	-	-
Z0/07 FEMALE CHANGING		50	-	-
Z0/09 SWIMMING RECEPTION		50	15	9
Z0/10 SPORTS HALL		50	-	-
Z0/11 SWIMMING POOL		50	-	-
Z0/13 SWIM POOL HALL		50	-	-
Z1/01 CLASSROOM 1		50	-	-
Z1/02 WC1		50	-	-
Z1/04 OFFICE		50	-	-
Z1/05 IT ROOM		50	-	-
Z1/06 MEETING ROOM 01		50	-	-
Z1/07 MEETING ROOM 02		50	-	-
Z1/08 MEETING ROOM 03		50	-	-
Z1/09 STAFF ROOM		50	-	-
Z1/10 WC2		50	-	-
Z1/12 CENTRAL WALKWAY		28	-	-
Z1/13 CLASSROOM 2		50	-	-

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?
Z0/01 Prayer Room & Hall	YES (+103.9%)	YES
Z0/03 KITCHEN & CAFÉ	YES (+201.6%)	YES
Z0/04 ADULT LEARNING	YES (+214.1%)	YES
Z0/05 OFFICE	YES (+209.2%)	YES
Z0/09 SWIMMING RECEPTION	N/A	N/A
Z0/10 SPORTS HALL	N/A	N/A
Z0/11 SWIMMING POOL	YES (+72.7%)	NO
Z1/01 CLASSROOM 1	N/A	N/A
Z1/04 OFFICE	N/A	N/A
Z1/05 IT ROOM	N/A	N/A
Z1/06 MEETING ROOM 01	N/A	N/A
Z1/07 MEETING ROOM 02	N/A	N/A
Z1/08 MEETING ROOM 03	N/A	N/A
Z1/09 STAFF ROOM	N/A	N/A
Z1/13 CLASSROOM 2	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?	NO
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]	2910.8	2910.8
External area [m ²]	7461	7461
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	4	4
Average conductance [W/K]	1334.43	2121.25
Average U-value [W/m ² K]	0.18	0.28
Alpha value* [%]	21.14	32.17

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
2	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
63	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
19	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
15	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	13.89	22.04
Cooling	0	0
Auxiliary	3.46	3.17
Lighting	22.46	6.55
Hot water	3.89	3.91
Equipment*	14.34	14.34
TOTAL **	43.7	35.67

* 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	10.42	0.87
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0.99	0
<i>Displaced electricity</i>	<i>10.42</i>	<i>0.87</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	229.3	248.13
Primary energy [kWh _{PE} /m ²]	51.33	52.22
Total emissions [kg/m ²]	4.87	4.95

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] No Heating or Cooling										
	Actual	210.7	27.7	0	0	0	0	0	0	0
	Notional	242.6	26.3	0	0	0	0	----	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	166.9	62.1	14.4	0	3.6	3.21	0	3.6	0
	Notional	217.6	29.7	22.9	0	2.9	2.64	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