

BRIDGE COLLEGE – MANCHESTER

PROPOSED EXTENSION

ENERGY STATEMENT



Prepared by:

Environmental Services Design Limited
1.04 Boat Shed
12 Exchange Quay
Salford
Manchester
M5 3EQ

Project No: EJ1913
Date: January 2025
Rev: A

Tel: 0161 848 1260
Email: admin@esd-uk.com

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1.0 EXECUTIVE SUMMARY

Environmental Services Design Ltd has been appointed to complete an Energy Strategy to support a Planning Application for a proposed extension to Bridge College, Openshaw Campus, M11 2GR.

This report acts as a summary of the energy strategy for the proposed development.

The report sets out the brief and the factors influencing the energy strategy and responds to current policy from Manchester City Council which apply to this development site.

The report will demonstrate the measures proposed by the Bridge College / The Together Trust for this development to deliver a scheme which surpasses the current (2021) Building Regulations and that has been designed with a strategy that follows established energy hierarchy.

The report provides results of calculations undertaken to date, which support the use of an electric heat pump energy provision to provide space heating and conditioning for the development, coupled with the use of energy efficient light, heat recovery ventilation and a fabric first approach to the building – within the limitations of the aesthetic design requirements

This report will demonstrate that the brief for the sites design, is much improved in terms of energy use and carbon emissions performance, compared to the policy set by Manchester City Council.

2.0 INTRODUCTION

Bridge College is a specialist further education college based in Openshaw, Manchester. It is dedicated to supporting students aged 16 to 25 with learning difficulties, disabilities, and complex needs – including Autism and physical disabilities. The college offers a person-centred approach, focusing on individualised education and support to help young people achieve their aspirations and lead fulfilling lives.

The college is looking to propose an extension to their existing shell which will redevelop existing areas as well as the inclusion of newly proposed spaces, specifically for teaching.

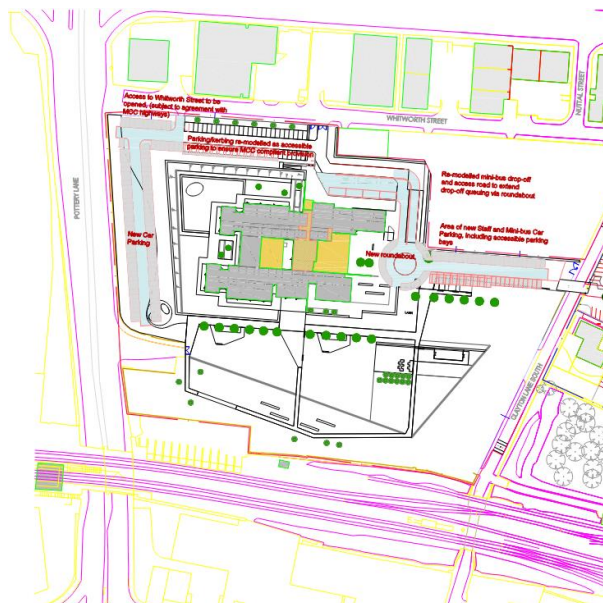
Full details of the proposals under consideration by this application are included in the Design and Access statement prepared by the architect Walker Simpson.

The development will feature specialist facilities designed to enhance the learning and therapeutic experience for students. These will include sensory rooms that cater to sensory stimulation and regulation needs, dedicated therapy space to support physical & occupational therapy, and advanced assistive technologies to ensure accessibility and personalized learning opportunities for all students.

Additionally, the project will incorporate four new teaching spaces equipped with modern resources, fostering an inclusive and engaging educational environment. These improvements aim to create a nurturing and innovative setting that supports diverse learning needs, promoting independence, skill development, and personal growth for every student.

The site is located east of the Manchester city centre, approximately 4506m (2.8 miles) from the centre.

The site is bounded by the existing development limits of Openshaw to the north and east. The site is bound by commercial properties both north and east, with Whitworth Street which runs along the north boundary of the site. 365 Self Storage units is located along the eastern boundary of the site. Ashbury's train station run behind the Southern boundary of the site.



3.0 MANCHESTER CITY COUNCIL POLICY

Manchester City Council Core Strategy (adopted 2012) applies to this development site. During 2024 MCC adopted their Places for Everyone Joint Development Plan Document which materially changes elements of the Core Strategy.

Where these changes relate to Energy and Sustainability, they are reflected in this strategy report.

In each case of a specific policy requirement, a summary response is offered, further supported by further sections of this report:

Manchester City Council Development Plan.

Core Strategy

Policy EN 4

Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development

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

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

The Energy Hierarchy in EN 4 is now supplemented by the following from Policy JP-S2 of the Places for Everyone Joint Development Plan Document:

Policy JP-S2: Carbon and Energy

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

1. Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling;
2. Promoting the use of life cycle cost and carbon assessment tools to ensure the long-term impacts from development can be captured;
3. Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities;
4. Increasing the range of nature-based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, tree-planting and natural flood management techniques;
5. An expectation that new development will, unless it can be demonstrated that it is not practicable or financially viable;
 - a. Be net zero carbon⁽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;

This report demonstrates that the Energy Strategy will reduce CO2 emissions by enabled low carbon development. – This will be measured against the current Building Regulations and calculations set out in **section 5**.

The calculations and energy strategy will be based on the use of on-site renewable energy systems,

The areas included in the development will be provided with both heating and cooling via reverse cycle heat pump VRF systems. This includes areas which are proposed for retrofitting together with new build areas.

Electric Heat Pumps are an efficient approach to provide heating energy as the Seasonal Co-efficient of Performance (SCOP) is typically between 3.0 to 5.0 (300-500% efficiency) meaning 3-5 units of heat will be generated for every unit of electricity consumed. Unlike other more direct forms of electric heating or modern condensing boiler which average around 0.9-0.95 (90-95% efficiency) units of heat produced for every unit of energy in the fuel.

Mechanical Ventilation with Heat Recover (MVHR) will be used to provide mechanical ventilation within areas that have no access to natural ventilation. The use of MVHR units will reduce the energy consumption by recovering and reusing heat from the buildings exhaust air, which will significantly reduce the demand for heating and contributes to the building's low carbon footprint.

Spaces surrounding the perimeter of the extension are designed to optimise natural daylight, in attempt to achieve a daylight factor of 3-5% in key areas. High performance glazing will be provided to minimize heat gain while reducing the reliance on artificial lighting. Roof lights have also been adopted to circulation spaces within the extension.

As stated in section 4 there will be a fabric specification which will surpass the minimum requirements stated within current UK Building Regulations Part L requirements and reducing energy demand. This includes improved insulation to the existing Flat roof areas of the building.

The combined strategy of MVHR, VRF heating and cooling, optimized natural lighting, and enhanced building fabric will ensure compliance with **Policy EN 4 and JP-S2** by reducing energy demand, improving efficiency, and lowering carbon emissions.

Calculations have been produced using industry standard IES Virtual environments software. The results of these calculations demonstrate the buildings performance against UK Building Regulations and specifically the residual energy and carbon emissions for the designed building. Results are included in section 5 of this report.

Core Strategy

Policy EN 6

Target Framework for CO₂ reductions from low or zero carbon energy supplies

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

Developments smaller than the above threshold, but involving the erection of a building or substantial improvement to an existing building will also be expected to meet the minimum target, where viable, but will not be expected to submit an energy statement.

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

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

Domestic CO₂ emissions reduction targets

Table 12.1

Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible a 15% increase on Part L 2010
Target 2: Electricity intense buildings	+15% increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

Non-domestic CO₂ emissions reduction targets

Table 12.2

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

Where the CO₂ emissions reduction required under any future revision to Part L of the building regulations becomes greater than the '% Minimum requirement', the reduction required under building regulations would apply.

Where the Council identifies an 'allowable solution', for example within an energy proposals plan, that would produce higher carbon reductions at no extra cost than that of achieving the '% Minimum requirement' (or required under building regulations if greater) the higher percentage reduction will be required. The cost comparison is based on the cost of incorporating the 'allowable solution' at design stage.

The energy statement will be required 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 incorporating evidence such as modelling to demonstrate compliance.

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

The Target Framework for CO₂ reductions is now supplemented by the following from Policy JP-S2 of the Places for Everyone Joint Development Plan Document: This is extracted earlier in this report.

The new building services have been designed to integrate with the existing college systems where feasible, ensuring a unified, energy-efficient approach

The proposed extension to the existing college incorporates sustainable building services and low-carbon technologies, in line with **Policy EN 6 of Manchester's Core Strategy and JP-S2**. The design prioritizes energy efficiency and carbon reduction to complement the college's existing infrastructure while meeting the increased energy demand of the new development.

In this, the existing building is currently served with Electric Air Source Heat Pumps to provide conditioning to the occupied rooms. This includes summer temperature control which is necessary to ensure the students are comfortable and in no way restricted by the internal environment. In the case of the students at Bridge College and their varying needs, this is especially significant.

The inclusion of reverse acting heat pumps allow the spaces to be heated in winter and comfort cooled in summer from a single energy efficient system.

The use of an MVHR system will allow heat recovery from extracted air, significantly reducing the demand for additional heating. This system supports **Policy EN 6 and JP-S2** by reducing operational energy requirements and associated CO2 emissions, ensuring compliance with Part L of the building regulations.

The adoption of Variable Refrigerant Flow (VRF) allows for a highly efficient system to provide heating and cooling to the new extension. With a SCOP of 3.0 to 5.0 units, the system offers zone-level climate control and heat recovery capabilities. Reliance on electricity rather than fossil fuels and enabling energy-efficient heat recovery – VRF systems significantly reduce the carbon footprint of the extension and aligns with Manchester's low carbon strategy.

The proposed measures ensure that the extension exceeds the minimum energy performance standards and aligns with **Policy EN 6 and JP-S2** by integrating low-carbon technologies, improving energy efficiency and reducing CO2 emissions. The services strategy has been carefully designed to support the college's existing sustainability commitments, contributing to both operation savings and environmental stewardship.

Core Strategy

Policy EN 7

Energy Infrastructure opportunities

There will be a general presumption in favour of low and zero carbon decentralised energy schemes, subject to the following considerations:

- That any new generating plant capable of producing heat and cooling as well as electricity should be located in a way that facilitates future connection to a local distributed energy system.
- That any energy centre, including generating plant, standby/boiler plant and substations, shall be located and designed to a high quality so as to integrate with and contribute to the townscape.
- Biofuels should be obtained from sustainable sources and processes and in a way that minimises transport impacts, following a sequential approach in order to minimise CO₂ emissions – firstly prioritising local and regional sources, followed by national, European and international.
- Consideration should be given to biofuel delivery by rail and waterways where possible. Where large-scale fuel or feedstock delivery is required by road the energy centre must be located in or adjacent to light industrial, industrial or leisure uses with any impact on local residential amenity minimised.
- The cumulative impact of energy schemes will be taken into account when considering applications, to include modelled impacts on air quality and landscape character, with reference to Policy EN16.
- Flood risk, through the Manchester-Salford-Trafford Strategic Flood Risk Assessment.

In determining proposals for development, consideration will be given to the need to safeguard strategic energy sites and network routes, both proposed or existing, where these have been identified as having strategic significance for the delivery of low or zero carbon energy infrastructure or, would be required in order to achieve the successful regeneration of an area in line with targets for reducing carbon emissions.

The proposed development acknowledges the policy EN7 however, the nature of the development is predominantly an extension and re-planning of existing building currently served by a standalone energy source.

The nature of the buildings use requires a continuation of the internal environmental control strategy and this in turn requires heating and temperature control in summer.

The development is not strategic in terms of energy use and the provision of primary energy will be delivered from existing supply capacity through grid electricity

Core Strategy

Policy EN 8

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:

- Minimisation of flood risk by appropriate siting, drainage, and treatment of surface areas to ensure rain water permeability
- 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
- The opportunity to provide linked and diverse green space to enhance natural habitats which will assist species adaptation

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.

The Core Strategy for climate change adaptation is now supplemented by the following from Policy JP-S2, of the Places for Everyone Joint Development Plan Document: This is extracted earlier in this report.

At Bridge College, the building layout and fenestration have been optimised to allow for natural ventilation where applicable, reducing the need for mechanical cooling during mild weather.

The glazing specified will aim to reduce overheating risk whilst maintaining high levels of daylight. Overhangs and shading devices are incorporated to block excessive solar radiation during summer while allowing for beneficial solar gain in winter.

Daylight optimisation will be based on large strategically positions windows to maximise natural daylight, reducing reliance on artificial lighting and supporting the overall energy efficiency.

The extension will also feature enhanced fabric specifications (outlined in section 4), with U values for walls, roofs and glazing that exceeds Part L standards, ensuring minimal heat loss in winter and reduced heat gain in summer.

The building materials and finishes have been selected for durability and resilience to higher temperatures and more frequent extreme weather events anticipated with climate change. The roof and external walls will incorporate high-performance insulation materials to maintain internal thermal comfort under varying conditions.

The services strategy integrates flexible systems that can adapt to future technological advancements and stricter regulations. Passive design reduces immediate energy demand whilst supporting long-term sustainability goals.

Prioritising passive design measures and incorporating climate resilient strategies, the proposed extension addressed **Policy EN 8** and supports Manchester's broader climate adaptations and mitigation objectives. This approach ensures a sustainable, efficient, and future proofed development that meets the needs of both current and future users of the college.

Core Strategy

Policy DM 1

Development Management

All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:-

- Appropriate siting, layout, scale, form, massing, materials and detail.
- Impact on the surrounding areas in terms of the design, scale and appearance of the proposed development. Development should have regard to the character of the surrounding area.
- Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise.
- Accessibility: buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes.
- Community safety and crime prevention.
- Design for health.
- Adequacy of internal accommodation and external amenity space.
- Refuse storage and collection.
- Vehicular access and car parking.
- Effects relating to biodiversity, landscape, archaeological or built heritage.
- Green Infrastructure including open space, both public and private.
- The use of alternatives to peat-based products in landscaping/gardens within development schemes.
- Flood risk and drainage.
- Existing or proposed hazardous installations.
- Subject to scheme viability, developers will be required to demonstrate that new development incorporates sustainable construction techniques as follows (In terms of energy targets this policy should be read alongside policy EN6 and the higher target will apply):-

a) For new residential development meet as a minimum the following Code for Sustainable Homes standards. This will apply until a higher national standard is required:

Year 2010 – Code Level 3;
 Year 2013 - Code Level 4;
 Year 2016 - Code Level 6; and

(b) For new commercial developments to demonstrate best practice which will include the application of the BREEAM (Building Research Establishment Environmental Assessment Method) standards. By 2019 provisions similar to the Code for Sustainable Homes will also apply to all new non-domestic buildings.

Reference to the applications Design and Access statement should be made for more detail.

As the building extension is not a new commercial development, a BREEAM assessment has not been considered.

Through the incorporation of energy efficient technologies, the building will achieve significant energy savings and reduce CO2 emissions, showing improved performance versus UK Building Regulations Part L. Enhanced building fabric specifications, including high-performance insulation and glazing will minimise energy loss and optimize thermal comfort. Passive design strategies, such as maximising natural light and ventilation, will further contribute to sustainability.

4.0 DESIGN PROPOSALS

This project is a partial refurbishment and re-ordering of internal accommodation together with a new build extension.

The new build element of the project is circa 13% of the existing 2687m² of existing building.

In preparing this energy strategy, Bridge College have undertaken a series of design calculations which demonstrate how the requirements of Policies set out in section 3 will be achieved. These calculations take account of new building fabric selections, the current Building regulations for Part L and also the operational requirements of the building and its users.

The existing building has been modified since original construction to include parts of temperature-controlled spaces and the use of ASHP to supplement the gas fired heating and provide temperature lopping. These changes to the building have been successful and have been used as a basis for design brief by the college.

To meet the obligations required of the Manchester City Council Core Strategy and subsequent planning policy guidance, the design has adopted:

- The use of improved building fabric specification (improved beyond the minimum standards set by BRUKL2) to create a lean design.
- Use of Low Carbon Renewable energy heat pump technology to provide heating to the occupied spaces
- The use of energy efficient lighting, automatic optimised heating controls and heat recovery ventilation to further improve energy and carbon efficiency

The work to develop this energy strategy has confirmed that:

- There are no local, existing heat networks which the project can connect with, nor are there any planned.
- The use of site wide gas CHP and gas boilers is not feasible to meet a low Carbon brief nor Manchester City Council wider policy objectives. The use of carbon intensive gas as a primary heat energy source is counter to a Net Zero Carbon policy.
- The use of air source heat pumps, individual and communal, will deliver the most sustainable and carbon efficient energy strategy which also meets the design aspirations for the building.

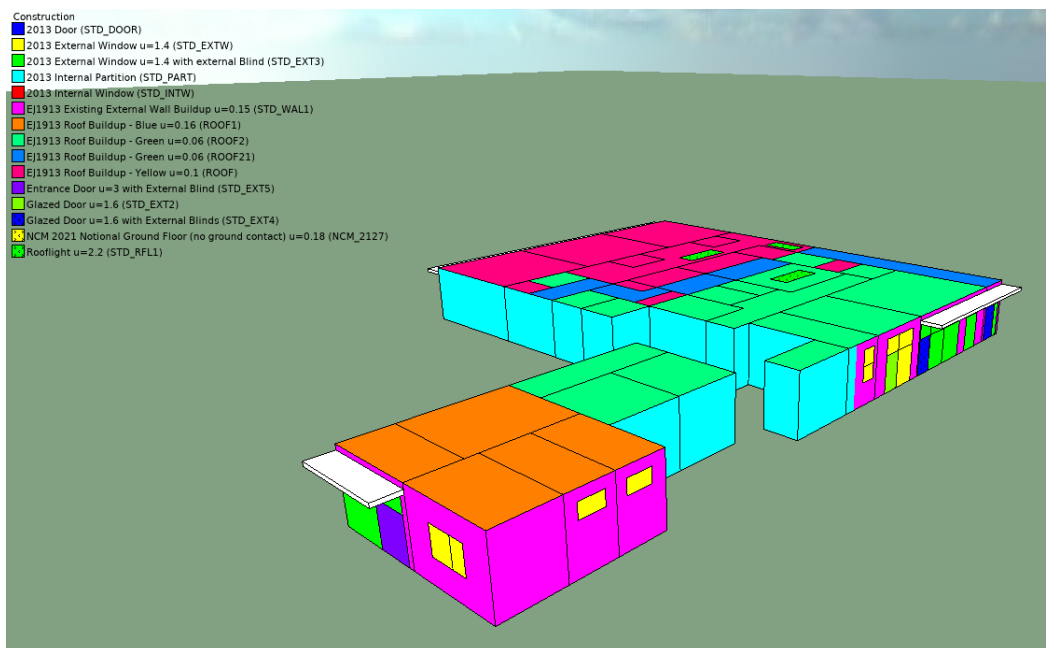
Fabric Specification / U Values used in design – Enhanced

The external envelope of a building acts as an important climatic modifier, with a well-designed façade significantly reducing the building's heating demand.

The façade system will be designed to minimise energy requirements and improve thermal comfort.

The characteristics for u-values and air permeability for the proposed development will be significantly better than the limiting values set out by Part L 2021 edition and listed below.

The applied building values for the development are set out against the Part L1 2021 edition notional building parameters in table below.



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	GF000002:Surf[4]
Floors	0.18	0.18	0.18	GF000004:Surf[0]
Pitched roofs	0.16	0.06	0.06	GF000016:Surf[1]
Flat roofs	0.18	0.09	0.16	GF000026:Surf[1]
Windows** and roof windows	1.6	1.49	3	GF000026:Surf[2]
Rooflights***	2.2	2.2	2.2	GF000008:Surf[1]
Personnel doors [^]	1.6	1.6	1.6	GF000000:Surf[9]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	3	3	GF000026:Surf[2]
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	5		

Active Design Measures: Regulated Energy Use

Building Energy Management System

The building has a comprehensive Building Energy Management Systems ('BEMS') installed to monitor and report on the overall energy consumption of the buildings. The system will highlight any 'out of range' consumption figures and readings, allowing a preventative approach through interrogation and resolution of potential problems.

The BEMS will also provide intelligent control of the building services systems to ensure that occupant comfort is maintained throughout and that the systems are running to their peak 'as designed' efficiencies.

Metering

Smart meters, along with an Energy Display Device enable the end user to monitor and control their energy usage. It is proposed the metering infrastructure will incorporate smart meters, which

along with the residential units' heat meter, will be linked to the apartments Energy Display Device.

EC/DC Motors

EC/DC motors will be used in place of conventional AC motors and in line with current Part L Building Regulations. The use of these motors reduces energy consumption by reducing to a minimum set back when possible.

Ventilation Heat Recovery

The energy required to heat or cool the incoming fresh air supply to the buildings will be significantly reduced by using an efficient heat recovery system. The heat recovery system will utilise the thermal properties of the return air to transfer 'free' heat/cooling to the incoming fresh air supply. These will be controlled to minimise the demand for any heating and cooling of the fresh air supply.

Heat recovery shall be provided on all Mechanical Ventilation with Heat Recovery ('MVHR') units with efficiencies of $\geq 90\%$ and $\geq 70\%$ respectively.

Low Energy Lighting and Efficient Lighting Control

In residential units, Part L of the 2021 Building Regulations require that 100% of all fixed internal light fittings must be capable of accepting only low energy lamps.

All light fittings across the buildings will be specified as low energy lighting, such as LED.

Internal areas of infrequent use such as lobbies, stairs, stores and plant rooms within communal areas, will be fitted with occupant sensors to monitor occupancy and switch off the lights when an area is vacant for a sustained length of time.

High Efficiency Variable Speed Drives

The site-wide heating systems pump speeds for water will vary to match the building loads, thereby reducing the energy required to run the fan and pump. This will be maintained through the BEMS systems.

5.0 ENERGY AND CARBON CALCULATIONS

BRUK Part L2 Compliance

Updates to Part L of the Building Regulations were published in December 2021, replacing the previous 2013 edition. These updates to Part L have now taken effect from 15th June 2022. The methodology used to determine the CO₂ emissions for the proposed development is in accordance with the 2021 edition of Building Regulations Part L as the regulation in force at the time of this application.

Energy calculations were carried out using IES Virtual Environments software which is used to determine the energy demand for heating, domestic hot water, lighting, pumps, and fans (regulated energy) for the building 'as designed' and the associated annual Carbon Dioxide (CO₂) emissions.

These calculations were adapted from Architects designed scheme using much construction and fabric specification with building types and layouts agreed between the design team members.

These calculations results, indicated in this section, show a step change in the carbon emissions for the new and remodelled spaces against the previously constructed building.

Presented below are the results – for the same building – against 2010 Building regulations and 2021 Building regulations.

These results show that with the improved fabric performance, the use of heat recovery ventilation and the change to fully Electricity powered environmental control – using primarily Air Source Heat Pumps, the carbon emissions for the proposed building fall dramatically by circa 53% by comparison.

BRUKL Output Document

Compliance with England Building Regulations Part L 2021

Project name

EJ1913 Bridge College_ Photoelectric

20250203

Date: Mon Feb 03 15:32:54 2025

As designed

Administrative information

Building Details

Address: Bridge College Openshaw Campus, Manchester, M11 2GR

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.27

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.27

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

Foundation area [m²]: 520.83

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	6.85
Building CO ₂ emission rate (BER), kgCO ₂ /m ² :annum	6.35
Target primary energy rate (TPER), kWh _e /m ² :annum	55.92
Building primary energy rate (BPER), kWh _e /m ² :annum	51.74
Do the building's emission and primary energy rates exceed the targets?	BER =< TER BPER =< TPER

BRUKL Output Document

HM Government

Compliance with England and Wales Building Regulations Part L 2010

Project name**EJ1913 Bridge College_ 20250203**

As designed

Date: Mon Feb 03 15:51:29 2025

Administrative information**Building Details**Address: Bridge College Openshaw Campus, Manchester,
M11 2GR**Certification tool**

Calculation engine: SBEM

Calculation engine version: v4.1.h.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v6.4.0

BRUKL compliance check version: v4.1.h.0

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Criterion 1: The calculated CO₂ emission rate for the building should not exceed the target

1.1	CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	18.1
1.2	Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	18.1
1.3	Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	13.4
1.4	Are emissions from the building less than or equal to the target?	BER =< TER
1.5	Are as built details the same as used in the BER calculations?	Separate submission