

Report

Energy and Environmental Standards Statement

Addendum to the energy statement for planning

New Victoria Office

Commercial Development

Sweco UK Limited

Sweco Manchester,
Abbey House,
4th Floor
33 Booth Street
Manchester,
M2 3LW
+44 161 927 4810

MAY 2023
Project Reference: 65205124
Document Reference: NV-SWE-XXX-XXX-RP-YE-00001
Revision: P01
Prepared For: Toriview Ltd

Status / Revisions

Rev.	Date	Reason for issue	Prepared		Reviewed		Approved	
P00	18.05.23	Issue for Planning	UR	18.05.23	MP	19.05.23	AR	19.05.23
P01	23.05.23	Revision 01	UR	23.05.23	MP	23.05.23	AR	23.05.23

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Reg. Office Address:
Sweco UK Limited
Grove House
Mansion Gate Drive
Leeds, LS7 4DN
+44 113 262 0000

Reg. No.: 2888385
Reg. Office: Leeds
www.sweco.co.uk

Sweco UK Limited
Sweco Manchester,
Abbey House,
33 Booth Street
Manchester,
M2 3LW
+44 161 927 4810

1 Executive Summary

This report has been prepared on behalf of Toriview Ltd (the “Applicant”) for the amendment to the planning application of the New Victoria Development (“the Proposed Development”) for Manchester City Council (“MCC”).

The energy statement (ES) for the proposed development has been developed in accordance with the requirements of MCC Core Strategy 2012-2027 Policies EN4, EN6 and Appendix A, to demonstrate the achievable regulated carbon emission reductions against EN6 Table 12.2, which states a target of a minimum 10% increase on Part L 2010. The Greater Manchester Places for Everyone Joint Development plan supersedes this requirement with a target of at least 19% against Part L 2013, which has been far exceeded by the proposed development.

The ES also takes account of the additional advice provided as part of the Manchester Climate Change Framework (MCCF), Draft Manchester Zero Carbon Framework (DMZCF) and Greater Manchester Places for Everyone Plan (PfE), as evaluated in Section 3 of this statement, and further explored in the sustainability statement. The regulated carbon emissions have been determined through assessment against Building Regulations Part L2A 2013 and reported using SAP 10 figures.

The key headlines for the development from this application document are as follows:

- ‘Fabric first’ approach to low energy and zero carbon development, in accordance with current industry best-practice approaches.
- Energy Hierarchy Stage 1 (passive + energy efficiency) emissions reduction of **22%** against Building Regulations Part L2A 2013.
- Overall regulated emissions reduction of **27%** and **34%** against Building Regulations Part L2A 2013, using SAP12 and SAP10 carbon factors respectively.
- Innovative all electric highly efficient energy strategy, to future proof the development in working towards operational zero carbon by taking advantage of future grid decarbonisation. The strategy perfectly aligns with the MCC goal of achieving net zero carbon by 2038.

BREEAM 2018 New Construction, target of ‘**Outstanding**’ for Office Shell & Core

- Bespoke sustainability strategy, drawing on industry best-practice & benchmarking to create a custom set of sustainability targets (please refer to Appendix C for the most up to date BREEAM tracker inclusive of credit review).

1.1 Non-domestic Operational Carbon Dioxide Emissions

Policy EN4 of the MCC Core strategy requires the following principles of Energy Hierarchy to be applied within the development’s design:

1. Stage 1: to reduce the need for energy through energy efficient features such as improved insulation and glazing
2. Stage 2: to meet residual energy requirements through the use of low or zero carbon energy generation technologies

The proposed design will be compared against the notional target building (known as the Target Emissions Rate - TER), will have the same size and shape as the proposed development, but with Building Regulations minimum performance values applied to fabric and energy systems from Part L2A.

The results presented below demonstrate the development regulated operational energy and carbon performance based on SAP 10 figures for CO₂ emissions, measured against Building Regulations Part L2A 2013, and in accordance with the MCC Energy Hierarchy approach, and as provided in Section 7 of this report.

Table 1-1 Part L2A 2013 regulated energy consumption & savings based on the MCC EN6 Energy Hierarchy approach for the Proposed Development using SAP 2012.

MCC Energy Hierarchy Stage (SAP 2012)	Regulated energy (kWh/m ² /year)	Savings (kWh/m ² /year)	%Reductions vs. previous stage
Target Emissions Rate (TER)	46.79	n/a	n/a
MCC Energy Hierarchy Stage 1 Energy Efficiency	36.44	10.35	22.1%
MCC Energy Hierarchy Stage 2 LZC Technologies	30.82	5.62	15.4%

Table 1-2: Part L2A 2013 regulated CO2 emissions & savings based on the MCC EN6 Energy Hierarchy approach for the Proposed Development using SAP 10.

MCC Energy Hierarchy Stage (SAP 10)	Regulated CO ₂ emissions (tonnes)	Total CO ₂ Reductions (tonnes)	% Reduction vs. previous stage
Target Emissions Rate (TER)	163	n/a	n/a
MCC Energy Hierarchy Stage 1 Energy Efficiency	127	36	22%
MCC Energy Hierarchy Stage 2 LZC Technologies	108	19	12%

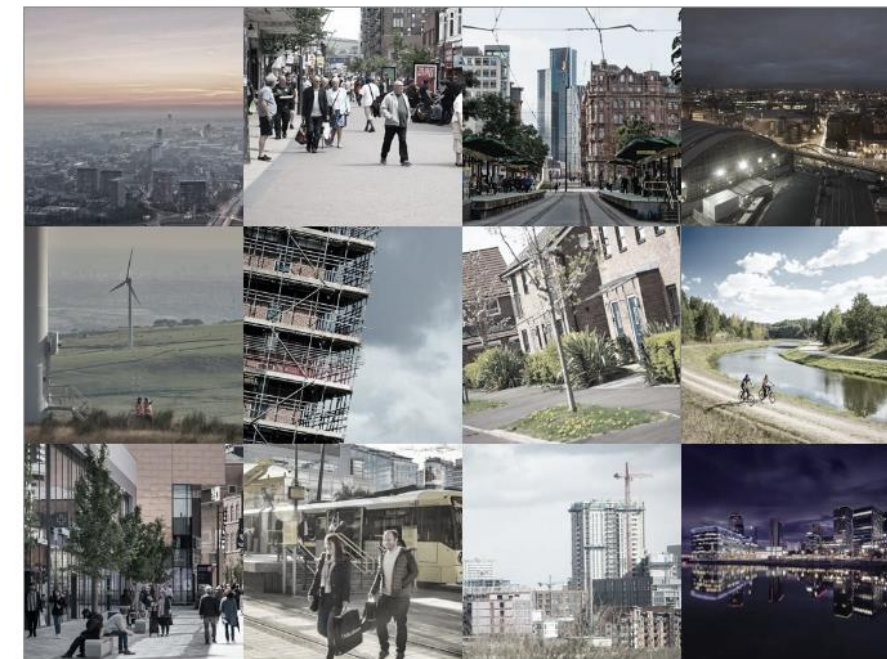
2 Introduction

2.1 Purpose of the Report

Manchester City Council unanimously declared a climate emergency in July 2019, underwriting the acknowledgement of the serious threat presented by climate change to the city and its occupants. The city has also committed to the goal of achieving net zero emissions by 2038, some 12 years ahead of the 2050 net zero target set by the UK Government in July 2019. The built environment, and new development, will have a significant role to play in addressing the climate emergency and responding to the requirements for a zero-carbon city.

This report presents the energy strategy and sustainability approach for the Proposed Development in Manchester. The content of this submission document has been informed by the various planning policy documents as listed in Section 3, including the Guide to Development SPD (2007) and the Manchester Core Strategy 2012-2027. In response to the Manchester declaration of a climate emergency, the document also seeks to respond to the issues raised in the Manchester Climate Change Framework 2020-2025 (MCCF), and the Draft Manchester Zero Carbon Framework 2020-2038 (DMZCF) and Greater Manchester Place for Everyone (GMPfE). This report will set out how the Proposed Development will, where relevant to building design, construction and operation, address the aims, objectives and headline areas of these guidance documents.

Delivery of a market-leading development in Manchester that embraces the ethos of holistic sustainable design in its entirety has been at the top of the pre-planning development agenda. To facilitate this, the development team have reviewed relevant industry sustainability benchmarking schemes that are currently available, in order to shape a robust yet contextually achievable delivery strategy. The outcome of this assessment process was the development of the core sustainability 'themes' for the development, which formed the focus areas around which targets and methodological approaches to sustainable development were established.



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The figures presented in this report are calculated for the purpose of initial estimates only, using the preliminary information currently available. Hence whilst they can be used to gain an understanding of the benefits of each technology, they must not be taken out of context; establishing the best economic and energy-efficient operation will require more complex analysis of building projected load profiles when these are developed.

2.2 The Energy Statement - Development Baseline Information

In accordance with MCC Core Strategy 2012-2027 Policy EN6 and Appendix A, an Energy Statement (ES) is required to be submitted at the outset of any development with >1,000m² of floorspace. This is to demonstrate the total regulated energy that the final development would use, and the equivalent carbon emissions that this would generate. The development should use the energy hierarchy approach detailed in EN4, EN6 and Appendix A to help determine opportunities for carbon emissions reductions through design and specification of the development and include consideration of a variety of low and zero-carbon (LZC) technologies. Baseline information for the Proposed Development is required to be presented in accordance with Appendix A, and this is set out in the sub-sections below.

Additionally, the Supplementary Planning Document and Planning Guidance (SPD) set out by MCC requires the energy statement to outline how the proposed development meets the environmental standards on energy efficiency, integration of renewable energy systems and water and waste management set out in Chapter 4 of the SPD.

2.2.1 Development Location & Local Context

The Proposed Development is bounded by Manchester Victoria train station to the east, the Metrolink tramlines to the southwest, Corporation Street to the west and the Phase 1 New Victoria: residential development to the north.

The site primarily comprises hardstanding, a small number of temporary cabins are present on the site, supporting Phase 1 of New Victoria. The Site is currently partially fenced off restricting access, as it is located within the boundary of the construction

compound for New Victoria Phase 1: residential development and currently accommodates site access, parking and storage facilities. The site benefits from proximity to a range of amenities including Victoria Train Station.

Construction of a 12 storey office building plus basement, comprising up to 19,296 m² (GIA) of office accommodation, ground floor commercial unit, roof terrace, plant, cycle parking, hard and soft landscaping, access and servicing and other associated works.

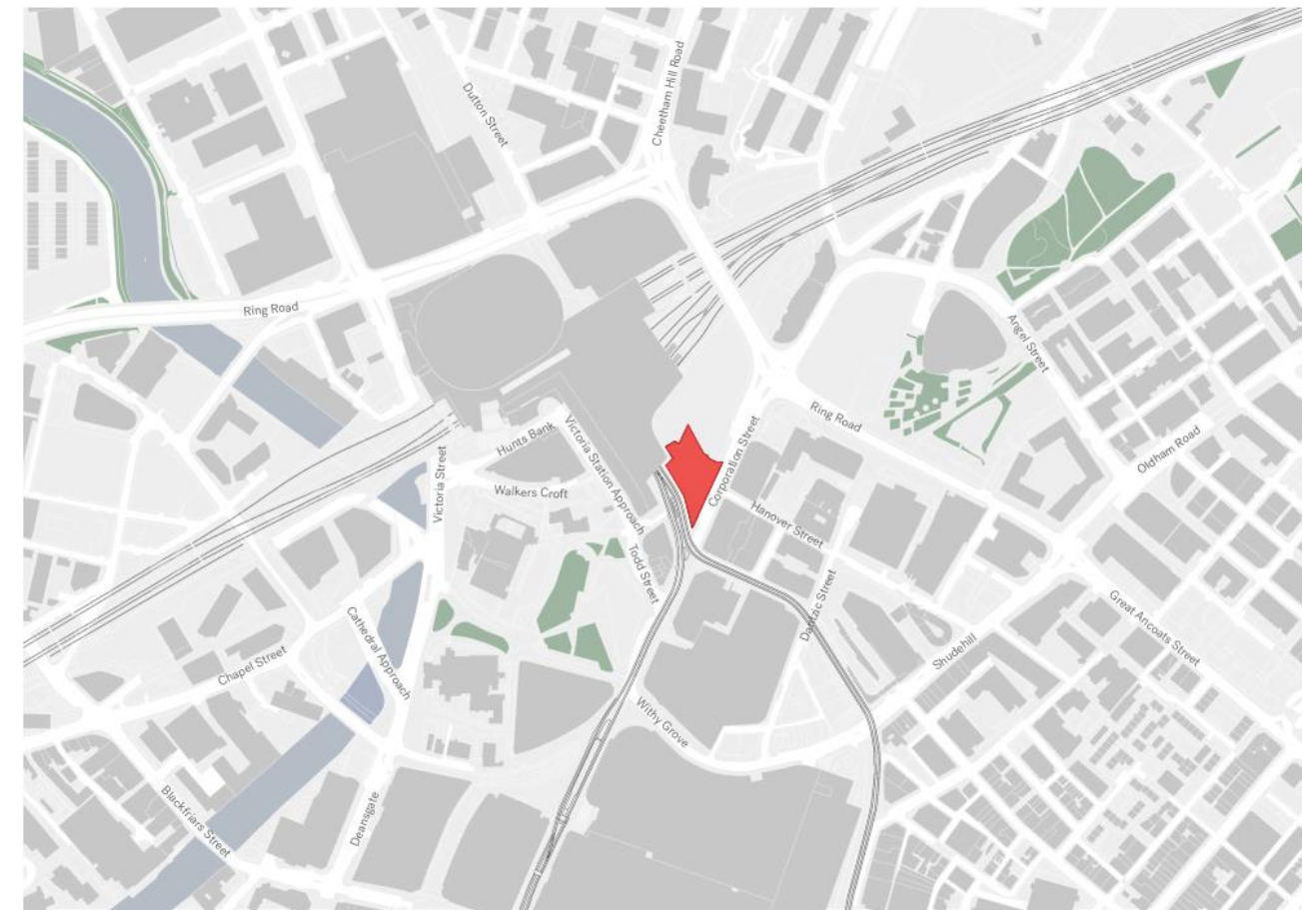


Figure 2-1 Site context drawing (site in red)

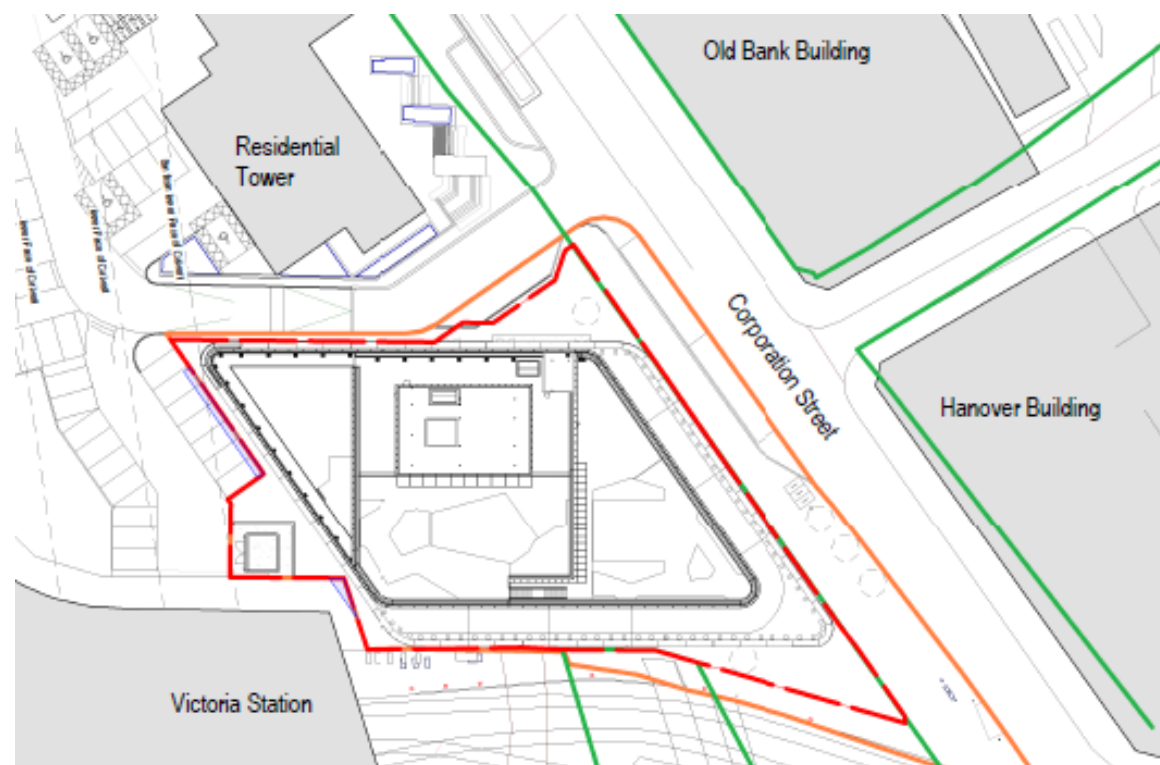


Figure 2-2 Red line planning application boundary for the development

Office Area Schedule (NIA)			
Level	Name	Area	Area Sqf
Level 11	L11 NIA - Office	165 m ²	1780 ft ²
Level 10	L10 NIA - Office	766 m ²	8240 ft ²
Level 09	L09 NIA - Office	1244 m ²	13392 ft ²
Level 08	L08 NIA - Office	1244 m ²	13392 ft ²
Level 07	L07 NIA - Office	1244 m ²	13392 ft ²
Level 06	L06 NIA - Office	1244 m ²	13392 ft ²
Level 05	L05 NIA - Office	1244 m ²	13392 ft ²
Level 04	L04 NIA - Office	1244 m ²	13392 ft ²
Level 03	L03 NIA - Office	1245 m ²	13397 ft ²
Level 02	L02 NIA - Office	1244 m ²	13392 ft ²
Grand total		10885 m ²	117162 ft ²

Retail Area Schedule (NIA)			
Level	Name	Area	Area Sqf
Level 00	L00 NIA - Retail	96 m ²	1031 ft ²
Grand total		96 m ²	1031 ft ²

Co-working Area Schedule (NIA)			
Level	Name	Area	Area Sqf
Level 01	L01 NIA - Co Working	1199 m ²	12902 ft ²
Level 0M	L0M NIA - Co Working	771 m ²	8304 ft ²
Grand total		1970 m ²	21205 ft ²

Total Area Schedule (NIA)		
Occupancy	Area	Area Sqf
Co Working	1970 m ²	21205 ft ²
Office	10885 m ²	117162 ft ²
Retail	96 m ²	1031 ft ²
Grand total	12951 m ²	139399 ft ²

Figure 2-3 Piercy & Co schedule of areas for the Proposed Development.

2.2.2 Proposed phasing and anticipated timescale of completion

The proposed development is proposed to be completed by late 2024.

2.2.3 Services strategy for the development

The development intends to provide an exceptional low-energy building services strategy, which responds to the climate challenge and is futureproofed to deliver significant carbon savings over the development life. The services strategy and provision of energy efficient building systems is described in detail in Section 5 of this report, and therefore is not repeated in full within this section. This section is primarily intended for completeness of the requirements of MCC Core Strategy Policy EN6/Appendix A with respect to provision of information for the ES. A brief overview of the building services solutions employed for this application are as follows:

- The building energy supply strategy is a gas-free, all-electric solution to support the futureproofing strategy and to take advantage of future grid decarbonisation in working towards operational zero carbon.
- Heating and cooling via roof mounted air cooled, four pipe reverse cycle heat pumps. The units will include air to water and water to water heat exchangers to provide simultaneous heating and cooling.
- Heat pumps have potential to use heat recovery from the water side to maximise the overall heating/cooling efficiency of the building systems.
- Primary ventilation of the office tenancies will be provided locally via the floor. Air will be drawn via the façade to Air Handling Units (AHU) which will distribute heated or cooled fresh air via a displacement ventilation system via an underfloor volume-controlled network and draw exhaust air from high level to be discharged externally.
- Perimeter zone will be heated and cooled via high efficiency fan coil units.
- The development will be provided with a microprocessor-based digital building management system (BMS), to assist in monitoring and interrogation of system and energy performance.
- Energy monitoring and metering will be provided in accordance with the onerous requirements of CIBSE TM31, 39 and 41, and the meters will connect to the BMS system.
- Low-energy lighting will be applied throughout, which will generally comprise of LED luminaires with minimum luminous efficacy requirements applied (see Table 5.2 in Section 5).
- All HVAC equipment will have minimum performance and efficiency requirements applied as per Table 5.3 in Section 5.

2.3 Methodology

The determination of carbon figures set out within this ES is derived from assessment against the requirements of Building Regulations Part L 2013 (incorporating 2016 amendments), specifically Part L2A for new-build commercial development. This is the latest version of Part L; it should be noted that the targets set out in MCC Core Strategy 2012-2027 Policy EN6 (Table 12.2) asks for carbon reductions against Building regulation Part L 2010, an earlier and less onerous version of this Approved Document. It is appreciated that at the time of Core Strategy approval, only the 2010 version of Part L was available. Further detail on Part L 2013 is included within Section 3.1.3 of this document.

Sweco UK uses Integrated Environmental Systems' (IES) VE Compliance software to demonstrate Part L2A compliance for the non-domestic areas.

The IES VE Compliance software has been approved by the Department for Communities and Local Government (DCLG) for use as a Dynamic Simulation Model (DSM) software package. As part of its approval process, the IES software had to demonstrate that it satisfies all the tests and other requirements defined in accordance with ISO 90003:2004 – 'Guidelines for the application of ISO 9001:2000 to computer software.

The methodology used by the IES accredited software is summarised below:

- A three-dimensional software model of the proposed non-domestic areas of the building is generated using the software's Model IT component. This model is based on the latest architectural drawings and is an accurate geometric representation of the building.
- The building usage is defined for the building in line with the National Calculation Method's (NCM) various definitions for building uses.
- The building systems are defined and allocated to each of the rooms within the building.
- The software calculates a Building Emissions Rate (BER) based on the geometry of the building, its use and the efficiency of the building systems defined.
- The software automatically generates a notional building using the geometry for the proposed building, but allocating glazing coverage, U-values and plant efficiency in accordance with the Elemental Method as defined in NCM modelling Guide 2013.
- The software calculates an Emissions Rate for the Notional building, which is the Target Emission Rate (TER) for the actual building.

It is also appreciated that the carbon factors used to determine carbon emissions within the Part L 2013 document are now out of date, due to the significant decarbonisation of grid-supplied electricity in the last 5 years. The emissions factor for electricity has more than halved compared to the factors used for Part L analysis (see section 3.1.2.1 and Table 3-1). Therefore, all carbon emissions have been reported using SAP 10 figures.

2.4 Architectural Design

The architectural design for the Proposed Development is based upon Piercy & Co Stage 2 information.

2.5 Energy Assessors

The energy assessment has been carried out and approved by CIBSE Energy Registered Low Carbon Energy Assessors based at Sweco UK – 1 Bath Road, Maidenhead, SL6 4AQ.

Mr Kartik Amrania

Head of Energy and Sustainability Department
CEng, BEng, MSc, LCC, LCEA

CIBSE LCEA Registration No: LCEA 133950

Email: Kartik.amrania@sweco.co.uk

3 Legislation and Planning Policies

3.1 Legislation

3.1.1 Climate Change Act 2008 (2050 Target Amendment)

The Climate Change Act sets legally binding greenhouse gas emission reductions targets of 100% by 2050 (with an interim target of 26% by 2020) against a 1990 baseline, which are to be achieved through action taken in the UK and abroad. It contains provisions to enable the Government to require public bodies and statutory undertakers to carry out their own risk assessment and make plans to address the risk of climate change.

In May 2019, the Climate Change Committee recommended a new emissions target for the UK: net-zero greenhouse gases by 2050 to respond to the Paris Agreement commitments. The recommendation has been adopted by the government and the targets have been amended accordingly in June 2019.

3.1.2 Building Regulations Part L 2013

The development will need to conform to the requirements set out in Part L (Conservation of Fuel and Power) of the Building Regulations 2013.

The Approved Documents are issued by the Secretary of State to provide guidance on compliance with specific aspects of building regulations in some of the more common building situations. They set out what, in ordinary circumstances, may be accepted as a reasonable provision for compliance with the relevant requirement(s) of the Building Regulations to which they refer.

Approved Document Part L of the Building Regulations covers the carbon emissions that are attributable to buildings in use, resulting from lighting, heating, cooling and ventilation, excluding small power. This is known as ‘regulated’ energy, and therefore emissions reduction results derived from a Part L assessment are for regulated energy only. Regulated emissions are required to be reported for the Proposed Development as per MCC Core Strategy 2012-2027 Appendix A, which accords with Policy EN6.

The Proposed Development will need to conform to the requirements set out in Approved Document L of the Building Regulations 2013 (incorporating 2016 amendments). In summary:

- Non-domestic developments come under Part L2A of the Building Regulations 2013 for new buildings.
- A rigid calculation methodology is set out to show compliance. This is the National Calculation Method (NCM) for non-domestic buildings.
- The required maximum carbon emissions can be achieved by any mixture of passive design features (i.e., reducing energy demand) and energy efficiency measures, but minimum standards of thermal performance apply.

In all cases, the carbon emissions achieved are calculated by comparing the proposed design specified in this application (Building Emissions Rate – BER) against the emissions rate from a

notional target building (known as the Target Emissions Rate - TER), which is the same size and shape as the proposed development, but with Building Regulations minimum performance values applied to fabric and energy systems from Part L2A.

3.1.2.1 *Applicability of Part L 2013 and accounting for future decarbonisation*

The development will be assessed under Building Regulations Part L2A 2013, as is appropriate for new non-domestic buildings. This document supersedes the Building Regulations Part L 2010 document that is specifically required for assessment of regulated carbon emissions reduction as part of MCC Core Strategy 2012-2027 Policy EN6 Table 12.2.

It is a requirement under Part L2A 2013 of the Building Regulations that the building meets the minimum performance requirements in terms of the façade U-values, minimum values for energy efficiencies and minimum values for CO₂ reductions as listed within the Part L requirements, and as shown in the following section, ‘Baseline Carbon Emissions – TER’. Additional performance requirements for carbon emissions reductions are set out in MCC Core Strategy 2012-2027 Policy EN6, but these are again against the 2010 Building Regulations and not the 2013 version. The performance requirements of the notional building in Part L 2013, which creates the TER are more onerous than the 2010 version, and therefore any emissions reduction declared against the 2013 regulations is reflective of a larger emissions reduction under 2010 regulations. As described in the later sections of this report, the intent is to significantly exceed the suggested target emissions reduction (currently based on Part L 2010 assessment) within MCC Core Strategy, even when using the more onerous 2013 regulation modelling methodology, as a demonstration of the development team’s approach and commitment to driving towards a zero-carbon development of the future.

Fuel CO₂ emission factors are based on SAP 2012 and the NCM document for Part L 2013 compliance, considered within the energy model to calculate the CO₂ emissions that will be produced as a result of the running of the systems, as outlined within the report. Carbon emission factors are used to calculate the equivalent carbon dioxide emissions associated with different fuels. For example, 1 kWh of power from grid electricity will have a different environmental impact than 1 kWh of power from natural gas as presented in the table below. As described in Section 2.3, grid electricity has significantly decarbonised since the last update of Part L in April 2014, and in July 2018, the Government published updated carbon emission factors (SAP 10) demonstrating this.

Table 3-1 Fuel factors for Part L 2013 and SAP 10, demonstrating the level of decarbonisation for grid electricity.

System	Fuel Source	Emission Factor (KgCO ₂ /kWh)	
		SAP 2012	SAP 10
LTHW Heating Energy	Natural Gas	0.216	0.210
Chiller Energy	Grid Electricity	0.519	0.233
Lighting Energy	Grid Electricity	0.519	0.233
Pump / Fan Energy	Grid Electricity	0.519	0.233
DHW Energy	Natural Gas	0.216	0.210

The above carbon factors in Table 3.1 reflect the SAP 10 carbon factors as of 2018 and are provided here to show an example of the step change in electricity carbon factors. An all-electric energy strategy is part of the development futureproofing strategy, in that grid carbon emissions are reducing over time and therefore an all-electric approach can capitalise on this. Further underlining this fact, the National Grid released grid decarbonisation factors to 2050 as part of the Future Energy Scenarios (FES), which can be used to demonstrate diminishing emissions from the grid-supplied electricity thanks to increased input from renewable sources. Even under a ‘slow progression scenario’, as is required for reporting in the RICS Whole Life Carbon methodology, there is expected to be a very significant downward trend of grid-associated carbon emissions, as shown in Figure 3.1 below.

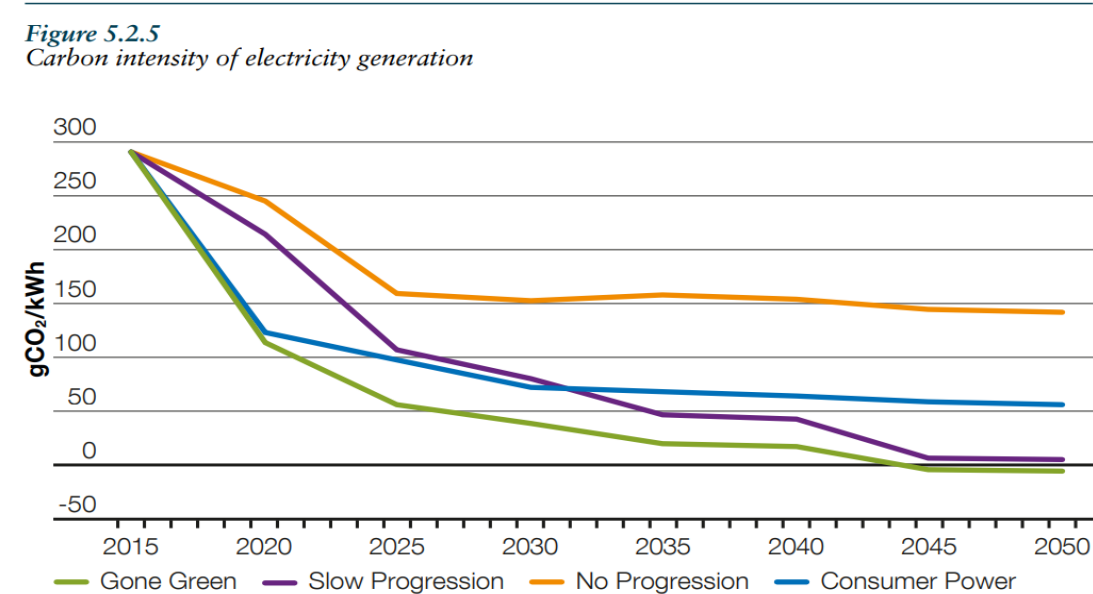


Figure 3-1 Graph to show National Grid's Future Energy Scenarios, demonstrating the reduction of the carbon factor associated with grid electricity to 2050 (via National Grid).

3.2 Planning Polices

3.2.1 National Planning Policy Framework (NPPF), England

In July 2021, the Ministry of Housing, Communities, and Local Government revised the issue of National Planning Policy Framework (NPPF), which sets out the Government's planning policies for England, and how development should happen in the country.

This framework aims to achieve sustainable development according to the three pillars: economic, social and environmental for both plan-making and decision-making. Local planning authorities must incorporate the visions of this framework within their local development plans. Therefore, by complying with the requirements of the Local Plan and Core Strategies, a development is also compliant with the NPPF. The term sustainable development is defined as “meeting the needs of the present without compromising the ability of future generations to meet their own needs”.

Chapter 14: “Meeting the challenge of climate change, flooding and coastal change” is NPPF’s relevant section to this energy and sustainability statement. That chapter provides a framework for

local authorities to address the following issues as regards planning applications: (Only relevant clauses)

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

- New development should be planned for in ways that:
 - a) Avoid increased vulnerability to the range of impacts arising from climate change. When a 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
 - b) Can help 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:
 - a) Provide a positive strategy for energy from these sources, that maximises the potential for a suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape, and visual impacts).
 - b) Consider identifying suitable areas for renewable, and low carbon energy sources, and supporting infrastructure, where this would help secure their development.
 - c) Identify opportunities for development to draw its energy supply from decentralised, renewable, or low carbon energy supply systems, and for co-locating potential heat customers, and suppliers.

Local planning authorities should support community-led initiatives for renewable, and low carbon energy, including developments outside areas identified in local plans or other strategic policies that are being taken forward through neighbourhood planning.

- In determining planning applications, local planning authorities should expect new development to:
 - a) Comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved, and its design, that this is not feasible or viable; and
 - b) Take account of landform, layout, building orientation, massing, and landscaping to minimise energy consumption.

- In determining planning applications, local planning authorities should expect new development to:
 - a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions; and
 - b) approve the application if its impacts are (or can be made) acceptable. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.

The Local Planning Policies are based on this framework and adapted to account for regionally specific requirements. The concept design of the Proposed Development considers the NPPF guidelines and comply with all the above-listed ethos.

3.3 Local Policies

3.3.1 Manchester Core Strategy 2012-2027

The Manchester Core Strategy was adopted by Manchester City Council on 11th July 2012, and it is the key document in Manchester's Local Development Framework. The strategy describes the vision for Manchester in 2027 and contains planning policies that should be implemented in order to support the delivery of that vision. With respect to the wider Greater Manchester Strategy (GMS), and in reference to the relevance of this document, there is a recognition of the fact that climate change is an issue that must be addressed, and that growth will only be sustainable if it includes measures to mitigate the levels of CO₂ that accompany it. The Core Strategy supports this, with the vision of making Manchester a "sustainable and accessible city" which meets the challenge of climate change at the forefront of environmental initiatives and improvements. There is a drive to continue to deliver sustainable development and more effective green infrastructure.

Strategic Objective 6 (SO6) is particularly relevant to the context of this application. SO6 includes the majority or relevant policies that are referenced throughout this report. The Core Strategy describes the aims of SO6 as:

"Protect and enhance both the natural and built environment of the City and ensure the sustainable use of natural resources, in order to mitigate and adapt to climate change, support biodiversity and wildlife, improve air, water and land quality, recreational opportunities and provide networks of high quality green infrastructure, ensuring that the City is inclusive and attractive to residents, workers, investors and visitors".

Specific requirements are set out by the policies that follow the opening statements of SO6, and those that are most relevant to this application document are established below. Many of these policies are directly addressed within the sustainability strategy section of this document and are not expanded upon in full within this section. Dependant on their scope and intent, they have been included within relevant sub-sections of that strategy piece. The policies relevant to the delivery of a compliant energy strategy are covered in the sections below.

3.3.1.1 Policy EN4

Policy EN4 is particularly relevant, as it covers development design for reducing CO₂ emissions by enabling low and zero carbon development. The policy states that all developments must provide an energy strategy for planning submission which follows the principles of the Energy Hierarchy (refer to following EN6 section), and should include features that:

- Reduce the need for energy through design features that provide passive heating, natural lighting and cooling.
- Reduce the need for energy through energy efficient features such as improved insulation and glazing
- Meet residual energy requirements using low or zero carbon energy-generating technologies.

Policy EN4 is mainly a recognition of the climate change issues that Manchester will face in the future, and how the development is located, accessed, designed and constructed to address this. The policy requires consideration of futureproofing to be made in respect of plant location and technologies employed, and consideration of future connection to low-energy district schemes, where these may be available in the vicinity of the development and subject to applicability to the development under consideration. This also links with some of the requirements set out in EN7, as applicable to the location of the application development.

EN4 also requires consideration of use of building materials with low embodied carbon, The full approach to this is covered in the 'Materials' section of the sustainability strategy.

3.3.1.2 Policy EN6 & Appendix A

Policy EN6 is the key policy which requires completion of an energy statement (ES) to be submitted at the outset of the proposed development. The policy also links closely with Appendix A of the MCC Core Strategy 2012-2027, which sets out the methodology for how an energy statement should be conducted. The baseline information is set out within Section 2.2 of this statement. The calculation methodology for determination of the CO₂ emissions reductions is set out in Section 2.4.

Policy EN6 also includes the key project targets in respect of CO₂ emissions reductions against Part L of the Building Regulations. Applications of >1000 m² of floorspace are expected to comply with the minimum CO₂ reductions requirements set out in table 12.2 (as applicable to non-domestic development in Manchester). This is subject to determination of the right performance band for the development in question, based on the Appendix A section "which target applies to my development?". An extract of Table 12.2 from Policy EN6 is set out below for reference.

Table 3-2 extract of Table 12.2 from the MCC Core Strategy 2012-2027 EN6 section (p.181), demonstrating CO2 emissions reduction targets against Part L 2010 of the Building Regulations.

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 CO2/m2))	+10%increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

The Greater Manchester Places for Everyone Joint Development plan supersedes this requirement with a target of at least **19% against Part L 2013**.

Policy EN6 and Appendix A also carry a requirement for emissions reduction opportunities to follow the ‘Energy Hierarchy’ approach, as set out in Figure 12.3 of the MCC Core Strategy 2012-2027 (and shown as Figure 3.2 below). As per Appendix A, the energy hierarchy should be applied in order to identify opportunities for carbon emissions reductions through design and specification of the development. The energy statement should set out the carbon savings that are achieved by applying each measure within the hierarchy. The development should consider how to minimise energy use and increase use of efficient systems, while providing futureproofing and operational monitoring facilities such as advanced metering strategies and Building Management Systems (BMS).

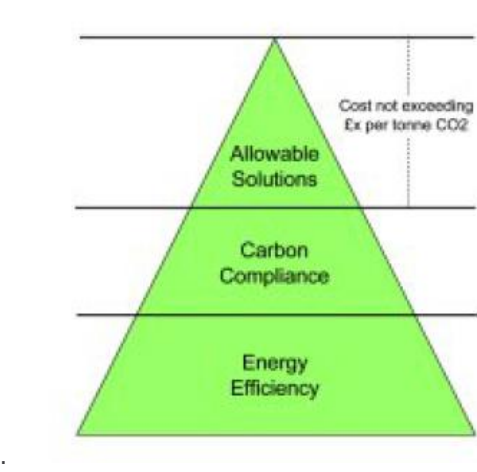


Figure 3-2 MCC Core Strategy 2012-2027 EN6 Energy Hierarchy approach.

It is important to note that the Policy EN6 and Appendix A required reductions in CO₂ emissions are calculated based on **regulated energy only**. The results tables that can be observed in the following sections only cover the regulated energy consumption and associated emissions. However, the development team appreciate that unregulated energy and emissions can be significant in the overall energy and operational carbon of a development and should not be ignored. Engagement with a CIBSE TM54 advanced operational energy modelled exercise, facilitated by the project target of BREEAM ‘Outstanding’ under the 2018 scheme for the office, will ensure that unregulated energy and emissions will be given due consideration for this scheme.

EN6 and Appendix A also ask the applicant to consider the application of appropriate low and zero carbon (LZC) technologies to site; those that should be considered are set out in Point F of MCC Core Strategy 2012-2027 Appendix A. Section 7 of this report covers the assessment of appropriate LZC technologies for this application development.

3.3.1.3 Other relevant MCC Core Strategy policy

There are numerous other policies set out in MCC Core Strategy 2012-2027 that are applicable to this application document. The Sustainability Statement has also been established to directly address the requirements of these policies, seeking to exceed the expectations contained within and push them forward for compliance with later and more onerous aspirations as set out in MCCF and DMZCF. Alongside EN4 and EN6, this includes focus on EN8 (adaptation to climate change), as well as EN9, EN14, EN16, EN18, EN19, EN20 and T1.

In the more general sustainability context, the statement also references compliance with Policy DM1 – Development Management, which itself contains policy guidance for a development that encourages appropriate materials, mitigates the impacts of air/noise/light pollution, provides development led by health & wellbeing initiatives and encourages urban greening and biodiversity improvements. DM1 also contains the statement on BREEAM, which notes that for new commercial developments, sustainable best practice will include the application of BREEAM standards. There is no specific requirement to achieve a certain BREEAM rating or apply a specific scheme methodology under Policy DM1. The highest possible standards of BREEAM under the latest and most onerous version of the scheme methodology, BREEAM 2018 New Construction v3, are applied to this application. Please refer to the BREEAM section within the sustainability statement for further details.

3.3.2 Draft Manchester Zero Carbon Framework 2020-2038 (DMZCF)

As part of the adoption of new science-based carbon targets for Manchester, and in recognition of the urgent action required locally to address the impacts of climate change, the Draft Manchester Zero Carbon Framework (DMZCF) was released in February 2019. The primary aim of this document is to ensure that:

“Manchester will play it’s full part in limiting the impacts of climate change, locally and globally, by acting in line with the latest climate science, the Paris Agreement, and the views of the city’s residents and businesses.”

The DMZCF sets out three core objectives, which can be briefly summarised as environmental, social and economic measures, in accordance with what the National Planning Policy Framework calls ‘the presumption in favour of sustainable development’. These three core themes create the ‘golden thread’ of holistic sustainable design. The core objectives cover the following key items, with objectives 1 & 2 being particularly relevant to the context of this application document.

Objective 1 – Carbon reduction & contributing to the Paris Agreement

Manchester has adopted a c.15m tonne carbon budget from 2018-2100, with what is described as ‘deep and urgent cuts’ required over the next few years to achieve the required reductions set out in this document. This includes a 50% total reduction by 2022 vs. 2018 levels, and an aim to be ‘zero carbon’ by 2038, although it is unclear how the delivery of these targets at the independent building level is supported by the City, or how this might be achieved in the context of new development in Manchester. This objective is particularly relevant to the energy strategy of this application, but also to many aspects within the sustainability statement, particularly the Whole Life Carbon approach being taken for this development.

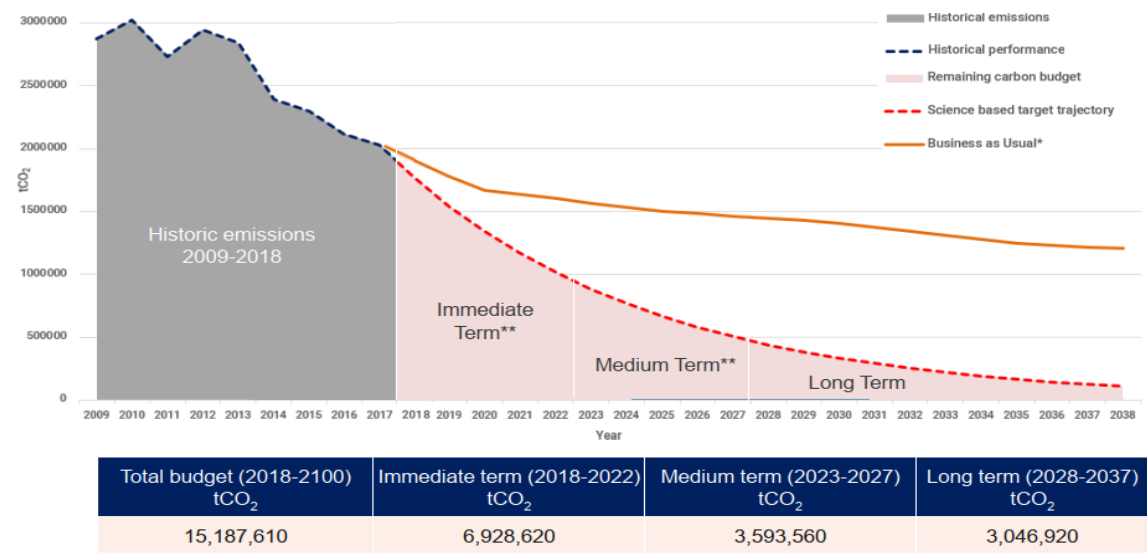


Figure 3-3 Manchester’s carbon emissions pathway consistent with 20C Paris Agreement targets (via DMZCF).

Objective 2 – Improving residents’ health, wellbeing and quality of life

This objective is focused on delivering a healthy future city for residents, in conjunction with the changes being made with regards to CO₂ emissions reduction. With regards to new development, this would be associated with providing developments that are designed encourage health and wellbeing initiatives, create a safe and healthy operational environment, provide outside space, consider and mitigate impacts on noise/air/light pollution and provide measures to encourage sustainable travel. Much of the work done for this application to address this objective is evidenced within the sustainability statement. Focus on measures to improve health is also a key aspect of “living and working in a zero carbon Manchester”.

Objective 3 – creating good jobs, supporting successful businesses and attracting investment

Focus on supporting business to succeed and attract investment by developing the ‘green’ sector and enabling other city sectors to reduce CO₂ emissions to zero. Manchester will use climate change and sustainable development credentials to attract investors, students and workers from around the world. This very much aligns with what the application development is hoping to provide – by pushing the boundaries of what is possible to achieve for a new development in the current market, the outcome is likely to attract high-end tenants who will support Manchester’s growth and sustainability approach. The development team fully expects potential tenants of the office to have sustainability considerations high on their requirements list prior to leasing a workspace (as is becoming common in the marketplace), and therefore delivery of a development with high sustainability credentials will attract the kind of tenants that Manchester needs to support this objective.

The DMZCF also highlights new development as a key action area, given that such new development generally equates to more energy-consuming buildings, increases in the movement of people and goods, the consumption of more materials and the generation of increased levels of waste. The document sets out four key actions that should be considered to support sustainable and low-carbon development.

1. New buildings need to generate zero emissions when occupied and have significantly less emissions embodied in their materials at the construction stage.
2. Renewable energy generated within the city and city region, and the supplies for the National Grid, are needed to power buildings and the transport system.
3. Well-connected walking and cycling routes, public transport and electric vehicle charging points need to be key components of all new development.
4. Materials and waste will need to come from a new circular economy, involving the reuse and recycling of materials already in circulation, and significantly increased use of sustainable and renewable materials.

How the application is working towards these goals is set out in the following sections of this report, and in a greater level of detail within the supporting sustainability statement section of this document.

3.3.3 Manchester Climate Change Framework 2020-2025 (MCCF)

To assist with and build upon the information and key actions set out in the DMZCF, MCC released the Manchester Climate Change Framework 2020-2025 (MCCF) in February 2020 (v1). The core aim of this document is established as follows:

“Manchester will play its full part in limiting the impacts of climate change and create a healthy, green, socially just city where everyone can thrive.”

There are eight 'key principles' that filter through and inform the document to guide the delivery of the MCCF, as follows:

1. Setting our objectives and targets in line with the latest science and the Paris Agreement.
2. Contributing to Manchester's social, environmental and economic goals.
3. Ensuring that social justice is at the heart of our approach.
4. The need for urgent action by everyone who lives, works and studies in Manchester, from our young people to our older people.
5. Everyone who lives, works and studies in Manchester enabled to act through support, incentives, standards and infrastructure provided by Manchester City Council, Manchester's strategic partners, Greater Manchester Combined Authority, UK Government and their agencies.
6. Advice, guidance and progress monitoring from independent experts.
7. Contributing to Greater Manchester, UK and international commitments.
8. The need for Manchester's growth and development to be zero carbon and resilient to the changing climate.

Following on closely from the eight key principles are four headline objectives, which are informed by the studies conducted as part of the DMZCF and uphold the principles of the document. Most of these objectives are relevant for the purposes of this application, as their content can be applied to new development. A summary of the four key objectives is given below; please refer to the MCCF for more expansive details.

Objective 1 – Staying within our carbon budgets

The carbon budgets are as per those reflected in the DMZCF document, as covered in section 3.3.2 of this report, in line with the Paris Agreement targets and achieved through addressing indirect/consumption-based CO₂ emissions, as relevant to this application submission. Covering

both direct and indirect emissions, a Whole Life approach can be taken to carbon emissions reduction, which is the most robust strategy to achieving overall carbon emissions reduction from new development. The sub-objective for direct CO₂ emissions, covering operational energy consumption, is to reduce emissions by 50% between 2020-20205; new development should play its part in working towards this target. There is also a sub-objective related to interrogating and understanding indirect/consumption-based emissions, but the sub-objective does note that this is more difficult to assess accurately. However, by utilising the whole life carbon approach to development as set out in the sustainability statement of this application, which covers embodied carbon (a 'consumption' emission associated with materials), this application does intend to address and quantify those emissions as well.

Objective 2 – Climate adaptation and resilience

Building on the policy set out in MCC Core Strategy 2012-2027 Policy EN8, this objective requires assessment and appreciation of the potential climate change impacts on Manchester assets, and identification of measures that will mitigate those impacts. This includes futureproofing measures and design for future adaptability, as well as increasing urban green infrastructure cover, which has associated benefits for mitigating the Urban Heat Island (UHI) phenomenon, air quality, surface water runoff and even carbon reductions through vegetation uptake. The delivery of this objective is supported by the BREEAM 2018 New Construction credit Wst05 (Adaptability to Climate Change), which requires formal and methodological assessment of potential climate change risks and impacts on new development during the early project stages. Ensuring that this credit section is targeted will assist with upholding the key actions of the objective.

Objective 3 – Health & Wellbeing

Strongly linked to Objective 2 of the DMZCF, this objective aims to improve the health and wellbeing of Manchester residents through actions that also contribute to the objectives for CO₂ reductions, adaptation and resilience. This includes promoting sustainable transport, focusing on our ability to be climate-resilient (see also MCCF Objective 2), increasing the amount of green space to enable better physical and mental wellbeing and improving energy efficiency for a more affordable outlook. New development can contribute positively to health and wellbeing of building occupants in many ways, from architectural and services design to provision of amenity spaces and facilities which encourage sustainable travel. There is a focus on measures employed in this application that facilitate a strong wellbeing-led approach, as set out in the sustainability statement.

Objective 4 – Inclusive, Zero Carbon and Climate Resilient Economy

This objective primarily looks to ensure that the climate-resilient economy in Manchester is inclusive, where everyone can contribute and play a role in the decarbonisation of the city. The city's businesses all have a part to play in this and can see the economic benefits of driving towards a climate-resilient economy. Many of the core actions for 2020-2025 are not directly relevant to this application document (but are to the application as a whole), but creating a futureproofed, climate-resilient development which attracts tenants with like-minded attitudes to the city is an attractive prospect, so this development will play its part in contributing to this objective in its own way.

New buildings also come up as an area of urgent action in Section 6 of the MCCF. There is a requirement for new buildings to be built to zero carbon standards as soon as possible, and that this should ideally be realised though the UK Government establishing a national zero carbon methodology for implementation, followed by MCC implementing this policy. At the time of this

application no such policy exists, and the new MCC Local Plan is not yet available. However, it should be demonstrated how a new development can work towards delivery of this, and the intent of this application is to show how other available industry schemes from RIBA, UKGBC, LETI, BBP and more have been used to set benchmark targets, understand impact and drive towards low whole life carbon development. References to this approach to address this area will refer to “**MCCF Section 6 item 1**”.

Generation and use of renewables is also highlighted as an urgent action area for development in Manchester. This includes increasing the use of PV panels in the city, assisting in decarbonising the national grid, and looking at ‘power purchase agreements’. Additionally, there is mention of a move away from gas-based combustion and its associated emissions, moving towards electric heating, heat pumps etc. This also includes working on increasing building efficiencies and taking a ‘fabric first’ approach to building design, reducing consumption in the first instance. This idea forms a core approach of the application energy stagey, both with the fabric-first approach to building design and passive design efficiencies, but also in the all-electric, heat-pump-led services design. References within this document to address this area will refer to “**MCCF Section 6 item 2**”.

Increasing use of sustainable transport is another urgent action area within the MCCF documentation, including reducing the use of private vehicles, providing measures that encourage walking and cycling (and providing sufficient facilities to accommodate and support this), and increase use of public transport. A new development can assist in supporting this aim, and where this is noted within this document (most specifically the ‘Transport’ section of the sustainability statement), the document will refer to “**MCCF Section 6 item 3**”.

‘Things we buy and throw away’ is linked to the consumption of products and materials within the development construction and over its design life. The consumption-based emissions can be a significant proportion of a city’s emissions, but are poorly understood, so it is important that new development helps to begin quantifying this. The approach noted in the MCCF aligns very closely with how whole life carbon assessments are undertaken, focusing on ‘use less’ before looking at sustainable materials and opportunities for recycling. There is very good evidence that this application supports the general approach noted in this section of the MCCF at the larger building scale. References within this document to address this area will refer to “**MCCF Section 6 item 5**”.

Finally, the last urgent action area in the MCCF is the encouragement of green infrastructure and nature-based solutions, and recognition of the fact that actions in this area often have dual benefits, such as improving air quality, reducing surface water runoff etc. There is a suggestion that urban green infrastructure should be increased by 10% by 2038, against 2018 levels of urban greening. For the purposes of this application, the BREEAM 2018 New Construction Ecology Framework will be used to determine existing site condition, and the % improvements vs. existing condition provided by the new development. References within this document to address this area will refer to “**MCCF Section 6 item 6**”.

3.4 Greater Manchester Places for Everyone

The Greater Manchester Places for Everyone Joint Development Plan August 2021 sets out proposals to support Greater Manchester to achieve the ambition to be carbon neutral by 2038 with a key element being to ensure all new development is carbon neutral by 2028. Key proposals include:

Policy JP-S-1 Sustainable Development

To help tackle climate change, development should aim to maximise its economic, social and environmental benefits simultaneously, minimise its adverse impacts, utilise sustainable construction techniques and actively seek opportunities to secure net gains across each of the different objectives.

The current site was a city centre brownfield carpark site

Policy JP-S-2 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. Key amongst these is the requirement that new development will be net zero carbon from 2028 by following the energy hierarchy, which in order of importance seeks to:

- i. Minimise energy demand;
- ii. Maximise energy efficiency;
- iii. Utilise renewable energy;
- iv. Utilise low carbon energy; and
- v. Utilise other energy sources.

With an interim requirement that all new dwellings should seek a minimum **19% carbon** reduction against Part L of the 2013 Building Regulations. The proposed overall carbon reduction based on the current Building Regulations 2013 SAP factors result in a 33% reduction in emissions compared to the notional building and so have considerably exceeded the target.

There is also a requirement for new developments to achieve BREEAM Excellent for ENE 01. The scheme is being designed to achieve BREEAM Outstanding and so will require a higher performance than the current target.

Policy JP-S-3 Heat Networks

The provision of decentralised energy infrastructure is critical to the delivery of our objectives for low carbon growth, carbon reductions and an increase in local energy generation.

There currently is no viable heat network within the locality but space within the plant area and riser has been allowed for to enable a future connection for a theoretical future network connection. Refer to Section 8 for further details.

Policy JP-S-4 Resilience

Development will be managed to increase considerably the capacity of its citizens, communities, businesses and infrastructure to survive, adapt and grow in the face of physical, social, economic and environmental challenges, including climate change. Key measures will include:

- Ensuring that developments make appropriate provision for response and evacuation in the case of an emergency or disaster
- Providing adaptable buildings and places that can easily respond to changing needs, future climate impacts and new technologies

- Designing indoor and outdoor environments to provide a reduction and respite from more extreme temperatures and winds associated with climate change and greater urbanisation
- Taking an integrated catchment-based approach to managing flood risk
- Supporting healthier lifestyles and minimising potential negative impacts on health including air pollution

The fire strategy details the proposed evacuation of the building.

The scheme is based on providing on floor air handling units with localised louvre connections which enhances the level of adaptability for the floor space. The heating and cooling loads will be assessed against CIBSE future design summer year weather files to ensure the scheme is capable of catering for future climate change and the anticipated weather variations.

The scheme is provided with a rainwater attenuation system to limit runoff from the site to ease the pressure on the existing utility infrastructure.

The scheme is based on an all electric solution to prevent and localised emissions. There is also significant cyclist facilities and no car parking space to ensure sustainable transport to the site is encouraged.

Policy JP-S-5 Flood Risk and Water Environment

An integrated catchment-based approach will be taken to protect the quantity and quality of water bodies and managing flood risk, by developments to manage surface water runoff through sustainable drainage systems and as close to source as possible (unless demonstrably inappropriate) so as to not exceed greenfield run-off rates or alternative rates specified in district local plans, such as those identified for areas with critical drainage issues. Conserving water and maximising water efficiency in new development.

The scheme design will include ambitious targets to restrict the usage of water from fittings in the first instance. There will also be provided a grey water system to recycle the water which is utilised. There will also be the provision of a rainwater tank. These steps will assist to limit the flood risk and water environment.

Policy JP-S-6 Clean Air

A comprehensive range of measures will be taken to support improvements in air quality, focusing particularly on locations where people live, where children learn and play, where there are impacts on the green infrastructure network and where air quality targets are not being met, including:

- Locating and designing development, and focusing transport investment, to reduce reliance on forms of transport that generate air pollution
- Promoting actions that help remove pollutants from the air, such as enhancing the green infrastructure network and using innovative building materials that capture air pollutants
- Development should be in areas that maximise the use of sustainable travel modes and be designed to minimise exposure to high levels of air pollution, particularly for vulnerable users.

The scheme is based on an all-electric solution to prevent and localised emissions. There is also significant cyclist facilities and no car parking space to ensure sustainable transport to the site is encouraged.

Policy JP-S-7 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 Ensuring the design of all new development incorporates storage space to facilitate efficient recycling and where appropriate, processing of waste on site; 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.

3.5

Compliance of the energy strategy with MCC Policy

This energy strategy is primarily concerned with setting out how the application development will meet and exceed the requirements of MCC Core Strategy Policies EN4 and EN6 (+ Appendix A). The minimum targets as per this documentation are:

- Achieve minimum regulated CO₂ emissions reduction of 19% over a Building Regulations Part L 2013-compliant development. (As per Places for Everyone)
- Follow the MCC energy hierarchy approach.
- Provision of information for the energy strategy as per the set requirements of Appendix A.

Section 4 onwards covers each stage of the energy hierarchy set out in EN6, from setting a baseline for comparison (Part L 'target' building), then assessing the reduction of energy and carbon through passive design and energy efficiency measures, to reductions associated with implementation of LZC technologies and 'allowable solutions'. The energy strategy looks to report the regulated emissions, as per the requirements of the policy, and the total regulated energy consumption of the development at each stage of the hierarchy.

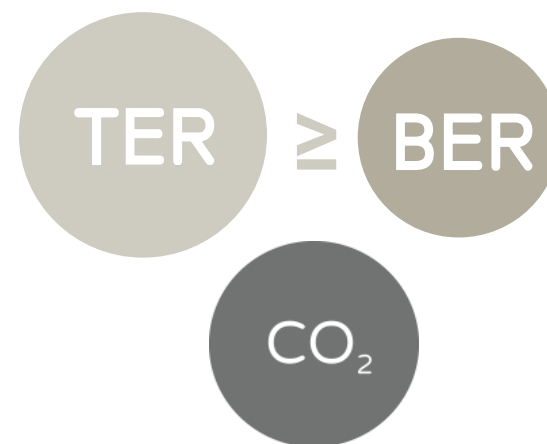
However, it is important that the other key messages and latest industry and Manchester-specific sustainability/zero carbon documentation does not get missed out from this approach. There will also be comment on how the statement supports and facilitates alignment with the relevant sections of the DMZCF and MCCF aims, and objectives set out in Section 3.3.2 of this report.

4 'Baseline' Carbon Emissions (TER)

As described in Section 3 of this application document, the first task is to establish the target performance for the development against Building Regulations Part L2A 2013. This will provide us with the baseline condition through which compliance with MCC Core Strategy 2012-2027 Policy EN6 and Appendix A can be realised, and the baseline state for comparison using the Energy Hierarchy approach. The 'baseline' building represents a development which just meets the minimum standards of regulated CO₂ emissions reduction (i.e., the Building Emissions Rate (BER) is equal to the Target Emissions Rate (TER), as defined by Part L of the Building Regulations 2013).

Allowances for energy consumption not included under Part L have been made by reference to published material or by calculation. These include small power (energy use for electrical appliances). The energy breakdown and carbon dioxide emissions by end-use and area are shown in the tables in this section.

As part of the study for the commercial areas of the building, a thermal model of the building was developed and analysed using the approved IES Virtual Environment (VE) Software 2023 (Version 4.0.0). This software models the carbon dioxide emission rates produced by a building in accordance with Part L2A of the Building Regulations (2013, including 2016 amendments). The software is approved for use by the Department for Communities and Local Government (DCLG) as a Dynamic Building Simulation Modelling Package (DSM). The full methodology for calculation is set out in Section 2.3 of this energy statement.



5 EN6 Energy Hierarchy Stage 1 – Energy Efficiency

5.1 Introduction

This stage of the Energy Hierarchy covers the application of passive design measures and active energy efficiency solutions to establish emissions reduction potential, in accordance with the requirements of MCC Core Strategy Policy EN6. There is generally a common approach to this, which begins with a passive design-based ‘fabric first’ approach to design & operation.

The ‘fabric first’ approach is widely recognised as the cornerstone of low and net zero carbon operational buildings and is the go-to starting point under frameworks such as the UKGBC Net Zero Carbon Framework and LETI’s Climate Emergency Design Guide. This is a focus on passive design measures to reduce heating and cooling demand of the development prior to the application of energy efficiency measures and LZC technologies. This approach intends to reduce consumption and consequent emissions as far as possible using only the building fabric in the first instance, before supplementing this with highly efficient services solutions (not including LZC tech, which is covered under the next stage of the hierarchy approach).

The development design team has been highly engaged in the passive design process. During the pre-planning stages, the team discussed minimum fabric performance standards that would be required to facilitate the success of the ‘fabric first approach, based on Sweco portfolio of successful projects and guidance on performance set out within recent industry documentation. The team also undertook solar shading and solar gains analysis to optimise the building facades in respect of glazing-to-opaque façade components, and how perimeter solar gains would impact cooling loads compared to notional BCO targets and benchmarks.

5.2 Passive Design Features: Regulated Energy Use

5.2.1 Building Envelope

The external envelope of a building acts as an important climatic modifier, with a well-designed façade significantly reducing the buildings energy demand and contributing to a comfortable internal environment by minimising cold draughts and excessive solar heat gains in summer.

It is therefore imperative to set onerous building fabric performance targets, which at the very least exceed the ‘limiting values’ of Part L2A of the Building Regulations for commercial developments, in order to facilitate strong passive design performance in the first instance. Additionally, the applied fabric performance values should also seek to exceed the values applied to the ‘notional’ building, i.e., those values that are applied to the model which generates the ‘TER’ as described in Section 4 of this report. During the early stages of design, the development design team have discussed the relative merits of enhancing U-values, g-value and building airtightness, alongside undertaking façade optimisation exercises in respect of window to wall ratios and finding a ‘balance’ between strong solar performance and good levels of daylighting/visual light transmittance.

The ‘target values’ set out in Table 5.1 overleaf are those that are currently reflected in the energy models and BRUKL output documents included in Appendix A, providing the emissions results in this and later sections of this ES. The values are seen to be in accordance with the overall aims of the project to drive down energy consumption in the first instance through focus on strong passive design measures. The values also show the % improvement over the ‘notional’ value (where relevant) that is applied to the model which created the TER in Section 4.

Table 5-1 Building Fabric Thermal Performance Non-Domestic Areas

Parameter		Limiting Value	Notional Value	% Improvement	Target Values
Building Airtightness (@ 50Pa)		10 m³/h/m²	3 m³/h/m²	-	3 m³/h/m²
U-values	External Wall	0.35 W/m²K	0.26 W/m²K	31%	0.20 W/m²K
	Roof	0.25 W/m²K	0.18 W/m²K	25%	0.12 W/m²K
	Floor	0.25 W/m²K	0.22 W/m²K	33%	0.12 W/m²K
	Curtain wall	2.2 W/m²K	1.6 W/m²K	25%	1.4 W/m²K Ground floor areas (overall: glazing + frame) 1.60 -1.70 W/m²K Lobby Entrance
Glazing U-value		2.2 W/m²K	1.6 W/m²K	25%	1.40 W/m²K
Pedestrian glazed doors		2.2 W/m²K	2.2 W/m²K	18%	1.8 W/m²K
High-usage entrance doors		3.5 W/m²K	2.2 W/m²K	0%	2.2 W/m²K
Glazing g-value (BS EN 410)		Office elevations			g = ≤ 0.28
		Ground floor/mezzanine elevations			g = ≤ 0.40
Glazing Visible Light Transmittance		-	71%	-	50-60% Subject to chosen glazing specification
Thermal Bridging (y-value)		To be calculated by specialist			

Notes on Table 5.1:

1. The “Target Values” are the construction parameters applied to the Actual Building simulation model and should be reflective of the average of the actual building element U-value.
2. Glazing g-value can vary based upon exposure to sunlight, in order to balance daylighting against the cooling loads. G-values will be confirmed after load calculations and Part L Criterion 3 check.

5.2.2 Facade Optimisation

During the pre-application stages of design, Piercy & Co and Sweco undertook a series of facade optimisation exercises to ensure that the building envelope performance was fit for purpose, in respect of responding to the energy performance targets set for the RIBA Climate Challenge and the MCCF/DMZCF, and to facilitate occupant health and wellbeing through good levels of daylighting.

The outcome was a façade that responds to the exposure, orientation and layout of each elevation, focusing on the provision of passive design measures that limited incident solar gains. Sun path and solar gains analyses were conducted for the development during early design, which helped to determine where the key pressure points were in respect of potentially excessive solar gains and overheating, which could lead to increased use of mechanical cooling having a significant negative impact on operational energy consumption. IES VE was used to run sun path analysis and solar gains/overheating modelling exercises, the early results of which were used to inform design progression. Minimum targets were set against BCO perimeter gains guidance, with more onerous project-specific targets set to assist in the drive towards a passive design strategy that supported a zero-carbon trajectory approach. The results of these studies, undertaken in tandem and through close collaboration within the design team, were instrumental in developing a strategy which responded challenge.

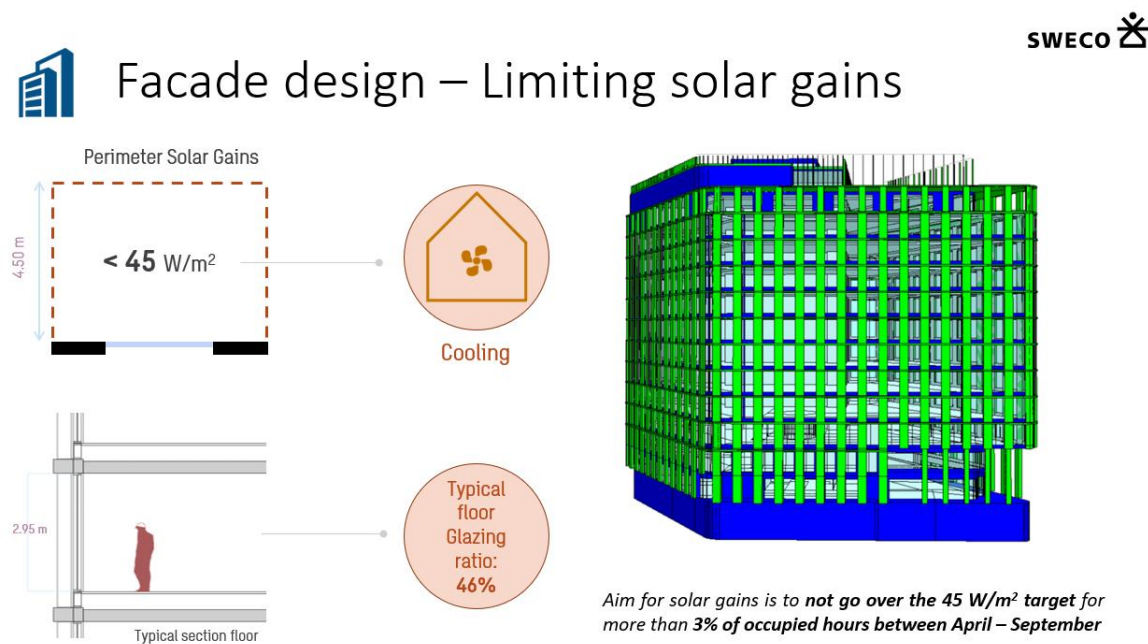


Figure 5-1 Sweco solar energy targets during pre-application stages.

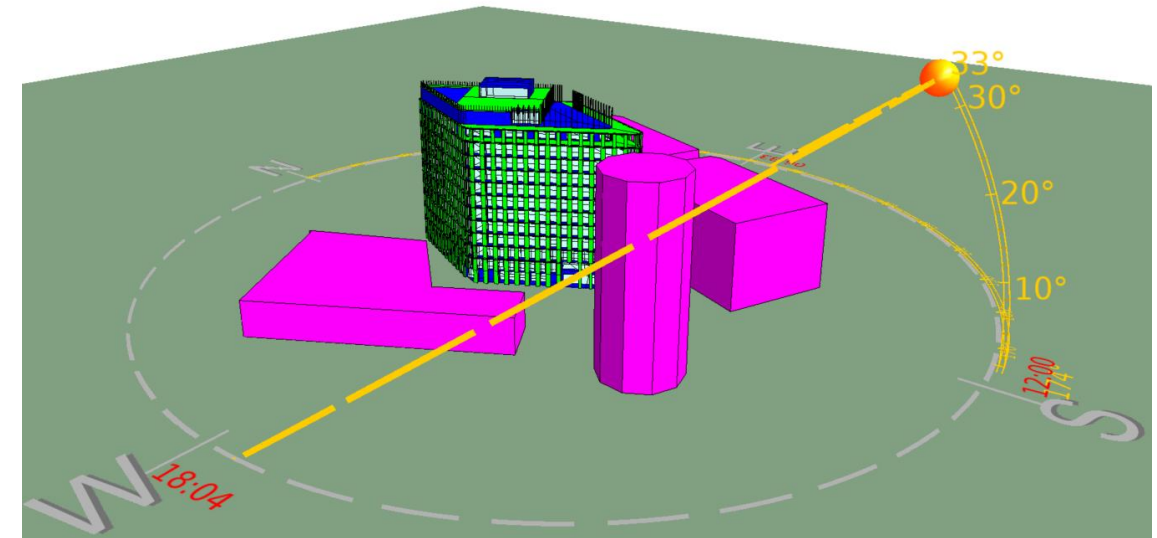


Figure 5-2 Sweco solar path analysis (via IES VE).

The use of these complimentary techniques resulted in a facade performance that was optimised to limit overheating and unwanted solar gains, and therefore had a net positive impact on building cooling loads (and consequently carbon emissions reduction). This was supplemented by the application of high-performance solar control glass, with a g-value of ≤ 0.28 applied to all office elevations at the time of application.

The façade also includes reveals between the glazed elements which assist with passive shading, further reducing the incident solar gains and positively impacting the development's cooling demand. During the façade optimisation process, these reveals have been modified, relocated and applied to different parts of the façade system depending on the outcomes of the results analysis, which demonstrates how these exercises have formed the design process and benefited the overall passive design strategy. The application design reflects the results of this exercise.

5.2.3 Thermal mass and free cooling potential

At the time of application, the structural design is based upon concrete slabs, which will be fully exposed to the internal environment to store the heat building up during the day and reduce fluctuations in temperature.

5.2.4 Daylight Strategy

As stated previously, the external façades have been optimised to minimise direct solar gains whilst maximising daylight provision into the occupied areas.

As well as improving occupant comfort by increasing natural daylight provision and visual stimulus, this will reduce the dependency on artificial lighting, thus resulting in energy consumption savings.

Internal daylighting levels are maximised in the perimeter zones across most of the floors, and levels of daylighting are continually improved as the building progresses upwards due to increased distancing from the surrounding obstructions. Generous floor to ceiling height is proposed to allow for deeper daylight penetration.

The daylighting benefits of removing the soffits/suspended ceiling systems, allowing high-level daylight into the office spaces not only improves the level of daylight to the space, but it also removes a material from the design and opens the opportunity for using exposed slabs as thermal mass, which has significant potential benefits for both operational and embodied carbon outputs.

The need for good daylighting has also been balanced against the need to control solar gains for the facades. The applied g-values will need to be balanced against the visual light transmittance of the window, and this will be an important factor in the specification of the glazing units to support passive design and daylighting potential. The values set out in Table 5-1 of this report are established to assist with this aim.

5.2.5 Cooling and Overheating

The proposed building is a commercial speculative office building. In order to achieve low noise levels and industry set comfort requirements for office environment, mechanical cooling is selected to mitigate summertime overheating within the occupancy spaces.

The proposed buildings form and massing has been developed in response to the surrounding buildings, micro-climate and planning thresholds. An appreciation of the surrounding buildings has influenced the location of the cores. The façade glazing percentages, solar performance and external façade reveals have been developed to respond to their orientation and the associated direct solar gains considering the surrounding buildings.

Detailed computer modelling analysis (using the DCLG approved dynamic simulation software (DSM) has been used during the early design process to ensure good levels of natural daylight penetration whilst limiting unwanted solar gain and heat loss.

As well as improving occupant comfort by increasing natural daylight provision and visual stimulus, this will reduce the dependency on artificial lighting, thus resulting in energy consumption savings.

Due to the extensive modelling and development of the facades, the proposed design and performance will greatly reduce the heating and cooling demands of the proposed office type building compared to the notional Part L2A figures. All the mechanically cooled occupancy areas pass the Part L2A Criteria 03 indicating effectiveness of the proposed design in mitigating unwanted solar gains and thus minimising the mechanical cooling energy of the building.

Refer to the Appendix A for the BRUKL report for compliance with Criteria 03.

5.3 Active Energy Efficiency Measures

To complete the exercise for modelling the first stage of the MCC Core Strategy Policy EN6 energy hierarchy, and to achieve the strong energy efficiency performance of the development required to achieve the overall project goals in respect of zero carbon trajectory, the below sets out the building services design strategy, focusing on those non-Low & Zero Carbon technology features which support this stage of the hierarchy. As with the passive and building fabric section, clear performance requirements for energy efficient services and complementary features have been set out. The performance values established in Table 5-2and Table 5-3 have been reflected in the IES VE energy model used to demonstrate compliance with Building Regulations Part L2A, as per the BRUKL reports included in Appendix A of this application document.

5.3.1 Heating, Cooling and Ventilation Strategy

The primary ventilation of the office tenancies will be provided locally to the floor. Air will be drawn via the façade to on floor air handling units (AHU). The units will be consist of thermal wheels for heat recovery and integrated heat pump's for heating and cooling. The units will distribute fresh air internally via the floor void displacement vent systems which will be controlled by CO2 sensors within the space. The exhaust air will be removed from high level to be discharged externally.

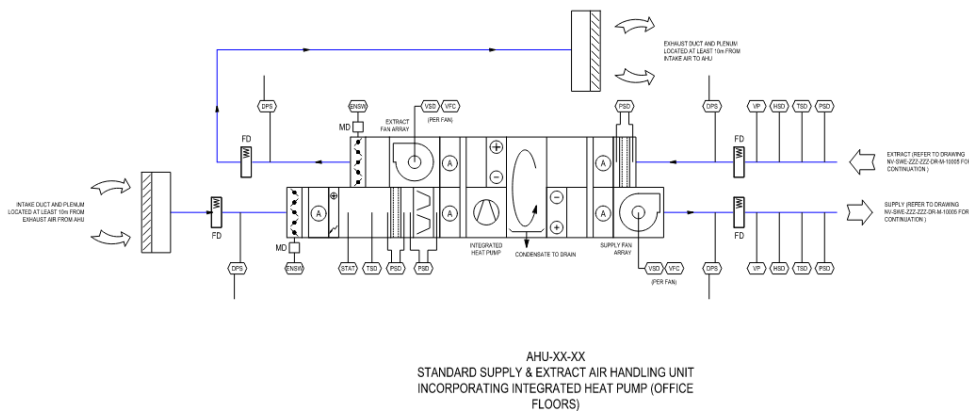


Figure 5-3 Sweco early design schematic showing the development of the ventilation system through the façade.

The perimeter fan coil units throughout the development will be served via hybrid variable refrigerant flow system with outdoor condenser units located at L11. Air source heat pumps at roof will provide low temperature hot water to serve the landlord cycle shower domestic hot water cylinders.

On a typical office floor the AHU will provide heated/cooled fresh air to the internal zones to cater the heating/cooling loads. The perimeter zone will be provided minimum levels of required fresh air and provided with additional heating and cooling from the fan coil units.

5.3.2 Building Management System and Metering

The development will be provided with a microprocessor based digital Building Management System (BMS). The BMS will automate the building services systems within the building, helping building managers understand how the building is operating and allow them to control and adjust systems to optimise performance, in a simple, efficient manner.

BMS control of landlord plant and equipment will be designed with energy efficiency as the key driver. Some examples of the energy efficient controls include;

Demand led control strategies - The BMS shall use demand led strategies where appropriate, demands for heating/cooling shall be monitored by the BMS, evaluated and processed, prior to commanding systems operational.

Time program control - The BMS shall provide time schedules that can be programmed to define when an operation signal is to be sent to the controlled plant. The time schedules shall allow different on/off times for building/plant control strategies to be defined throughout the year.

Optimisation Control - The BMS shall provide individual optimisation programmes for the time schedules associated with temperature control of a space/zone, to enable the operation of the related heating and/or cooling systems prior to normal operating periods, in order to bring the zones within comfortable temperatures at the start of normal occupancy times. The optimisation programme shall be self-adaptive using an iterative process after each period of operation to improve its performance.

Seasonal Operation - Plant controls shall be pre-programmed for seasonal operation, allowing plant start-up routines and temperature control set points to be determined and automatically adjusted based on the season of operation.

5.3.3 Energy Metering and Billing

All landlord meters shall be connected and interfaced with the building management system (BMS) to enable energy consumption data to be collated, analysed and distributed as required by the metering and billing strategy.

The energy metering and sub metering strategy will be in line with best practice as outlined in CIBSE TM31, 39 and 46 to ensure compliance with current legislation, together with Parts L2A of the Building Regulations.

The strategy will be compliant with the EU Energy Efficiency Directive. All notifications and assessments as required by the regulations shall be made by the Contractor.

5.3.4 EC Motors for Mechanical Ventilation Heat Recovery Units

The current Part L Building Regulations set stringent efficiencies for the fans used in all air conditioning and mechanical ventilation systems. Recent advances in fan motor technology have resulted in substantial reductions in energy consumption, and otherwise significant proportion of building energy use. EC (electronically commutated) motors will be used in place of conventional AC motors.

5.3.5 High-Efficiency Variable Speed Drives

By varying the fan and pump speeds for the water and air distribution systems to match the building load profiles, fan and pump energy consumption will be considerably reduced. This functionality will be afforded and managed via the intelligent Building Management System (BMS).

5.3.6 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 systems 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 between the return/exhaust air and outside air shall be provided on all supply and extract units via a plate heat exchanger and thermal wheels with efficiencies of at least 83%. The efficiencies will conform to the European Directive 2009/125/EC, which requires increased efficiencies from 1st January 2018.

5.3.7 High-Efficiency Air Source Heat Pumps

Mechanical cooling will be minimised by passive design features, as discussed earlier within this report. Having limited loads, the intention is to provide a central system using high-efficiency mechanical ventilation heat recovery units supplying fresh air to the tenancies. Heating and cooling will be derived from high efficiency air sourced heat pumps.

5.3.8 Low Energy Lighting

A full lighting installation will be provided throughout the landlord and common areas of the buildings, generally comprising LED luminaires, with functional lighting. All luminaires will be provided with dimmable control gear (addressable) to suit its type and application. All landlord lighting will be controlled through the addressable lighting control system.

Lighting will be provided to the external areas, including public space at ground floor and on the external terraces. External luminaires will generally comprise suitably IP-rated LED luminaires to suit the architectural design. Luminaires will be provided with DALI-addressable dimmable control gear. All external lighting will be controlled through the building lighting control and management system and minimised wherever possible to avoid light pollution. Lighting levels are listed in the next table.

Table 5-2 Applied lighting parameters for the application.

System	Parameter	Applied Value
Lighting Efficiency ¹ :	Office Areas	6 W/m ² Lighting level: 300-500 Lux
	Entrance	8 W/m ²
	Storage Areas	95 lm/W
	Toilet Areas	95 lm/W
	Circulation Areas	95 lm/W
	Plant Areas	95 lm/W
Lighting Controls	Transient Spaces	Presence Detection On/Off
	Occupied Spaces	Presence Detection On/Off Daylight Dimming Control

Note 1: All installed Lighting will be LED and all-day lighting areas to have daylight dimming controls with local sensors with presence detectors. All transient areas will have presence detectors.

5.3.9 Automatic Monitoring and Targeting

The Building Regulations Approved Document L2A identifies that the provision of automatic monitoring and targeting with alarms for out-of-range values, can provide significant savings in energy consumption of the building services systems. A saving in energy consumption of 5% is awarded for complete installations that measures, records, transmits, analyses, reports and communicates meaningful energy management information to enable the operator to interrogate and manage the energy it uses.

5.3.10 Power Factor Correction

The Building Regulations Approved Document L identifies that the provision of power factor correction to the building electrical supply can provide significant savings in electrical consumption. A saving in electrical energy consumption of 1% is awarded for power factor correction to 0.9 and a saving of 2.5% awarded for power factor correction to 0.95 power factor. This development intends to have a power factor correction of 0.95 as a minimum.

5.3.11 Efficient HVAC Parameters

The following design parameters were assigned to the base building to establish its CO₂ emission rate over a year.

Table 5-3 Applied HVAC Parameters for Main Central Plant

System	Parameter	Applied Value
Cooling System	Nominal Efficiency (SEER)	5.47
Heating System	Nominal Efficiency (SCOP)	3.5
Air Handling Units	SFP	1.56-1.60 W//sec

System	Parameter	Applied Value
	Ventilation Heat Recovery Efficiency	84% (Thermal Wheel)
	Demand Control Ventilation	Yes
WC Mechanical Ventilation Heat Recovery	SFP	1.4 W//sec
	Ventilation Heat Recovery Efficiency	75% (Thermal Wheel)
	Demand Control Ventilation	Yes
Pumps	Pump Type	Variable speed multiple pressure sensors
General Domestic Hot Water	System type	Instantaneous electrical system
	Storage Losses	0.004 (kWh/(l.day)
	Circulation Losses	5 W/m
	DHW Controls	Timed Control
Basement Domestic Hot Water	System type	Water to Water Heat Pump
	Storage	25000 L
	Circulation Losses	5 W/m
	DHW Controls	Timed Control
Electrical / Metering	Power Factor	Greater Than 0.95
	Lighting system have provision for metering	Yes
	Automatic Monitoring of energy Data?	Yes
	Controls	Central Start & Stop Optimum Start & Stop Local time & temperature Control Weather Compensation Control

5.4 Active Design Features: Unregulated Energy Use

It is appreciated that MCC Core Strategy Policy EN6 asks for carbon emissions to be reported for regulated energy emissions only, and therefore this is what has been reported in the following section of this energy statement. Unregulated energy has not been reported in the carbon emissions data. Unregulated energy refers to 'plug loads' such as:

- Lifts, escalators.
- Refrigeration systems.
- Computers, laptops, printers, photocopiers, audio visual equipment.
- Server rooms and other electrical loads.

The development team appreciate that unregulated energy use can account for a large portion of the total energy consumption within office buildings according to CIBSE TM54 – prediction of operational energy use (Figure 5.7). Therefore, to bridge the performance gap of design performance versus actual measured performance during operation of the building, it is important to address unregulated energy use as it is not considered under Part L of the Building Regulations.

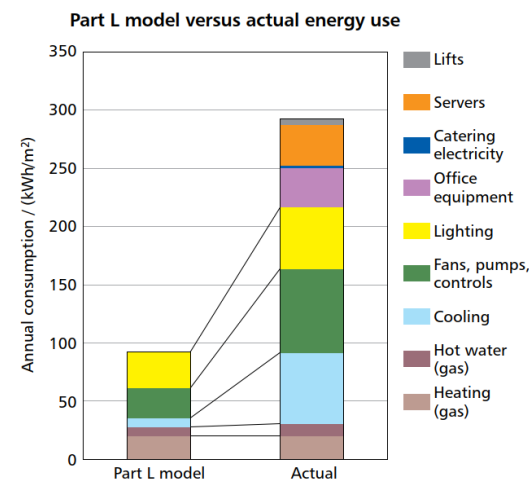


Figure 1 Comparison of ADL2A calculations and operational performance for a case study

Figure 5-4 Comparison of operational energy use: Part L versus actual measured energy use (extracted from CIBSE TM54:2013)

As the development is undertaking BREEAM assessment against the 2018 New Construction scheme, and targeting the highest 'Outstanding' rating, the process will need to include formal advanced energy modelling against the CIBSE TM54 methodology. This process will establish total building energy consumption and provide the full picture on carbon emissions, accounting for both regulated and unregulated sources. This process is mandatory for achieving BREEAM 'Outstanding', and therefore a commitment to this target also reflects a commitment to undertake the CIBSE TM54 advanced modelling process. The usefulness of this process to understanding actual energy performance, closing the 'performance gap' and reporting more accurately on trajectory towards the achievement of zero carbon goals. As per the requirements of BREEAM 2018 Ene01, the TM54 process started at RIBA Stage 3 (most appropriate stage for this type of modelling to take place), and will involve all design, construction and operation stakeholders in the modelling and scenario development process.

This section summarizes how the Proposed Development will control unregulated energy use which accounts for both regulated and unregulated energy/emissions.

5.4.1 Low Energy Culture

Providing building users and operators with practical guidance on the importance and methods of energy efficiency can lead to effective, cost-free reductions in energy usage and carbon emissions. Savings can be expected in, for example:

- Operating comfort cooling systems efficiently.
- Lighting Energy: a culture of 'turn-it-off', providing task lighting wherever possible.
- Small Power: prefer electrical equipment with an Energy Star rating and avoiding monitors and PCs etc. in stand-by mode.

- Cooling/Heating Energy: widening 'acceptable' temperature range.

Training of operators and facility managers is particularly important to provide them with the skills and knowledge to implement and continue to improve an energy management programme.

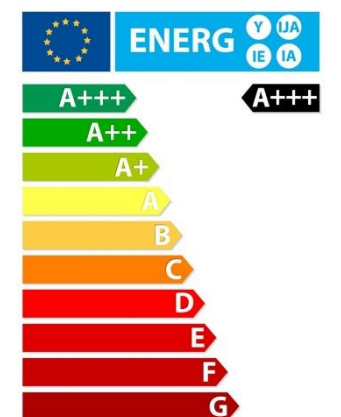
The amount of energy that can be saved will be dependent upon the motivation of the occupants and the effectiveness of the awareness programmes. The development will actively encourage a low energy culture as part of its building operation and commercial leasing strategy.

5.4.2 Low Energy White Goods

White goods are to be provided with a certified energy label. These are rated from A+++ to D, with D being the least efficient.

Wherever white goods are provided within the development, including washing machines, dryers, dishwashers and fridge/freezers, they will achieve:

- Minimum "A+" for fridges, freezers or fridge-freezers.
- Minimum of "A" for washing machine and dishwasher; and
- Minimum of "B" for washer dryer or tumble dryer.



Information on the EU Energy Efficiency Labelling Scheme of efficient white goods will be provided to the white goods supplied by the developer.

5.4.3 High-Efficiency Vertical Transportation

The vertical transportation systems are to be specified with several energy-saving features intended to reduce energy use both whilst moving and when in standby mode. Such measures can be particularly beneficial when applied to passenger lifts in large workplaces which typically deal with high numbers of people moving in, out and around the building. These measures may include:

- Specification of modern VVVF drive systems.
- Quantity, size and speed of passenger lifts minimised to meet agreed performance benchmarks and thereby minimise base energy load.
- Real-time monitoring of prevailing passenger demand and switching of lifts in and out of service in order to minimise the energy consumption whilst maintaining specified performance benchmarks.
- Energy-efficient lighting.

6 Cooling and Overheating

6.1 Cooling Hierarchy

This section takes inspiration from the Greater London Authority’s (GLA) London Plan, as Manchester does not have any specific guidance on how to address the impacts of overheating for commercial buildings, other than the brief note in Policy EN8. The GLA ask that developments provide narrative evidence that cooling demand is reduced through considered and sustainable design, further underlining the importance of the ‘fabric first’ approach. This is widely considered best-practice to show resilience against overheating and reductions in the significant energy consumption associated with cooling plant and equipment. Table 6-1 below demonstrates the key measures that need to be assessed, and how the Proposed Development addresses these considerations through design.

Table 6-1 Cooling Hierarchy and Proposed Development Strategy

Cooling Hierarchy	Proposed Strategy
1. Minimise internal heat generation through energy-efficient design	Glazing ratio optimised throughout the building to provide sufficient daylight and solar control glass applied to minimise solar gains. LED lighting is proposed to reduce internal heat gains.
2. Reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and walls.	The glazing ratio has been derived by data-driven design in limiting solar gains and managing daylight levels and respond to the solar exposure and façade orientation. The glazing has been recessed to assist in providing shading without significantly increasing embodied carbon. Perimeter solar gains analysis has been undertaken to ensure that façade and services systems are optimised.
3. Manage the heat within the building through exposed internal thermal mass and high ceilings	A minimum 2.9m of floor to ceiling height is proposed to the office areas. The floor slabs will be exposed to allow the thermal mass to temper the internal environment.
4. Passive ventilation	Given the site context and external acoustic environment, natural ventilation has been deemed inappropriate.
5. Mechanical ventilation	Highly efficient mechanical ventilation with heat recovery is proposed for fresh air supply all year round.
6. Active cooling systems	All previous measures contributed to reduce peak cooling demand for thermal comfort.

6.2 MCC Core Strategy Policy EN8

MCC Core Strategy Policy EN8 covers adaptation to climate change and includes a requirement for “the need to control overheating of buildings through passive design”. As per section 5.1 of this report, there has been significant focus on the ‘fabric first approach’. For the purposes of this application, the success of the development in controlling overheating is established through compliance with Part L2A criterion 3. Additionally, an assessment of thermal comfort for building occupants will be completed as per the methodology requirements of the BREEAM 2018 Hea04 process, which requires verification of optimal levels of thermal comfort under current and future weather files. This will be in accordance with CIBSE AM11 and Guide A, and the future weather file demonstrates that suitable levels of thermal comfort can be maintained under an anticipated climate change scenario.

7 EN4 Energy Hierarchy Stage 2 – Low & Zero Carbon Technologies

Further energy and carbon dioxide emissions savings could, in principle, be made through the adoption of renewable technologies. The suitability of available technologies is sensitive to several factors, including site constraints, development footprint, surrounding environment, access limitations and development type. MCC Core Strategy Policy EN6 and Appendix A list the potential Low and Zero Carbon (LZC) technologies that could be assessed for the purposes of further reducing the operational carbon impact of the development. The inclusion of these technologies is subject to a feasibility review as part of the energy statement. The potential carbon emissions benefits realised through application of LZC technologies is represented in the energy and emissions results as part of the MCC energy hierarchy approach.

The following renewable energy technologies have been investigated to establish their suitability and feasibility.

7.1 Consideration of Low and Zero Carbon Technologies

7.1.1 Photovoltaic

Photovoltaic panels convert solar energy into electricity and are best placed in an unobstructed location, ideally in a south facing orientation at 30° inclination. When located vertically, the output can be reduced by about 15%. PV panels provide a visible green label for the building and make use of space at the top of the buildings.

At present, as demonstrated within this application document, the development can significantly exceed the carbon emissions reduction requirements of MCC Policy EN6 through the fabric first approach and a carefully considered, all-electric building services solution, without the need for resorting to additional on-site generation to ‘top up’ carbon emissions reduction performance which is considered the optimal position.

There is however balanced against the requirement of the GM Places for Everyone requirement to prioritise PV generation where technically feasible and so:

Photovoltaics have been included in the design.

7.1.2 Wind Turbines

Wind turbines produce electricity directly from the energy in wind. This is then fed into the buildings electrical system via a control gear. Two types of wind turbines are available: horizontal axis and vertical axis. The former tends to be noisy and produce vibration. The latter are quieter in operation and more suited to installation on buildings but are generally less efficient and more expensive.

Although wind turbines are a highly visible form of renewable energy, they can normally provide only a very small contribution to the total electrical consumption of buildings in city and urban locations. Probably visually unacceptable in planning terms, there are also concerns that such a turbine would create unacceptable noise levels during day and night. Therefore, wind turbines are not considered to be viable for this project.

7.1.3 Solar Hot Water

Solar hot water panels must be in a generally south facing position, ideally at about 30° to the horizontal. If located vertically, output is reduced by about 15%.

Although efficient and cost-effective in implementation, solar hot water systems can only offset a fraction of the domestic hot water demand for the site. Solar hot water panels are therefore not recommended for this development.

7.1.4 Ground Source Heat Pumps

The proposed building is a commercial office type space, designed to balance heating and cooling demand. A heat recovery type energy strategy is adapted with the use of air-source heat-pumps, which adequately balance the heating and cooling demand of the building throughout the year and therefore, provides significant energy efficiency in heating and cooling generation. Therefore, there is no requirement to store energy and hence a GSHP will not be suitable application as part of the energy strategy.

7.1.5 Variable Refrigerant Flow (VRF) Air Source Heat Pumps

Variable Refrigerant Flow (VRF) systems are typically all-electric systems that use heat pumps to provide space heating and cooling to building spaces. They can serve multiple zones in a building, each with different heating and cooling requirements. These systems can modulate the amount of refrigerant sent to each zone in accordance with conditioning requirements. When these units are used to provide space heating, air source heat pumps (ASHP) work similarly to a fridge, but in reverse. It extracts heat from the outside air in the same way that a fridge extracts heat from its inside. The heat they extract from the air is constantly being naturally renewed.

As the space heating is also provided by the heat pump, they should be considered as a renewable heat source and included in the ‘Green’ carbon emission.

As mentioned in the Stage 1 section heat pumps will be used to provide space heating and cooling for the building. The hybrid operation and the ability to provide heat recovery will increase the seasonal efficiency of the units which will make the system suitable for similar applications like the building.

Air Sourced Heat Pumps have been included in the design.

7.1.6 Combined Heat and Power (CHP)

As a result of reviewing project location, site context, energy demand and load profiles, CHP technology was not considered in the building design due to facts below;

1. The development aims to have no on-site combustion sources to significantly contribute to improving local air quality.

2. The decarbonization of the grid with increased share of renewable energy in the mix make the on-site generation from natural gas fuelled CHPs a more carbon-intensive process
3. The development is seeking to respond to the MCCF – Section 6 item 2 demonstrates the requirement for Manchester to move away from gas-based combustion energy supply system.
4. The proposed building intends to support a trajectory towards zero carbon in line with the UK electricity grid and therefore, a natural gas run CHP will not be suitable for the proposed energy strategy.

8 EN4 & EN6 – Potential for DHN Connection

8.1 District Heating and Cooling Networks

The MCC Core Strategy Policy EN4 requires new developments establish their location in respect of determining the feasibility to connect to or incorporate future provision to connect to existing/potential decentralised energy schemes. Therefore, connection to such networks must be considered. This is also an important part of the final stage of the energy hierarchy approach, which wants developments to consider “allowable solutions” (see energy hierarchy triangle in Figure 3-2). As per the advice given in MCC Core Strategy Appendix A, this includes investigating the potential for connection to local district heating networks.

The Civic Quarter Heat Network (CQHN), delivered by Vital Energi, is not available for localised connection to the proposed development.

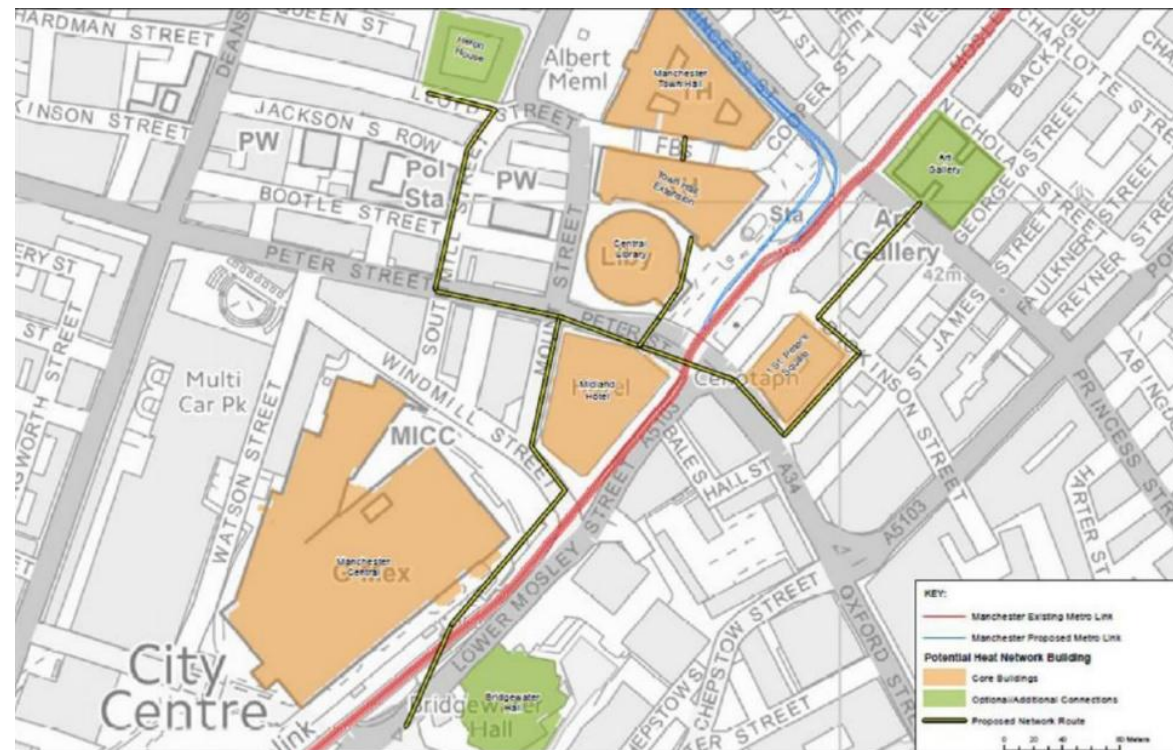


Figure 8-1 Sketch map showing locations of the currently proposed DHN extent (CQHN).

The Proposed Development is designed to allow for future network connections from high or low temperature networks of the future with space allowance in the basement plant and riser allocation. The building energy strategy allows it to adapt to either heat or energy networks of the future. Should the network expand in the future, a connection can be offered to the proposed building.

9 Conclusion

This report has been prepared on behalf of Toriview Ltd (the “Applicant”) for an amendment to the planning application of the New Victoria Development (“the Proposed Development”) for Manchester City Council (“MCC”).

The energy statement (ES) for the proposed development has been developed in accordance with the requirements of MCC Core Strategy 2012-2027 Policies EN4, EN6 and Appendix A, to demonstrate the achievable regulated carbon emissions reductions against EN6 Table 12.2. The ES also takes account of the additional advice provided as part of the Manchester Climate Change Framework (MCCF), Draft Manchester Zero Carbon Framework (DMZCF) and Greater Manchester Places for Everyone Plan (PfE). The regulated carbon emissions have been determined through assessment against Building Regulations Part L2A 2013 and reported using SAP 10 figures.

The key headlines for the development from this application document are as follows:

- ‘Fabric first’ approach to low energy and zero carbon development, in accordance with current industry best-practice approaches.
- Energy Hierarchy Stage 1 (passive + energy efficiency) emissions reduction of 22% against Building Regulations Part L2A 2013.
- Overall regulated emissions reduction of 34% against Building Regulations Part L2A 2013 for SAP10.

BREEAM 2018 New Construction, target of ‘Outstanding’ for Office Shell & Core

- Bespoke sustainability strategy, drawing on industry best-practice & benchmarking to create a custom set of sustainability targets.
- The overall sustainability themes are further applied within the Sustainability Section of the Energy Report previously submitted of the full planning application.

9.1 Non-domestic Operational Carbon Dioxide Emissions

The results presented below demonstrate the development regulated operational energy and carbon performance based on SAP 10 figures for CO2 emissions, measured against Building Regulations Part L2A 2013, and in accordance with the MCC Energy Hierarchy approach, and as provided in section 7 of this report.

Table 9-1 Part L2A 2013 regulated energy consumption & savings based on the MCC EN6 Energy Hierarchy approach for the Proposed Development using SAP 2012.

MCC Energy Hierarchy Stage (SAP 2012)	Regulated energy (kWh/m²/year)	Savings (kWh/m²/year)	%Reductions vs. previous stage
Target Emissions Rate (TER)	46.79	n/a	n/a
MCC Energy Hierarchy Stage 1 Energy Efficiency	36.44	10.35	22.1%
MCC Energy Hierarchy Stage 2 LZC Technologies	30.82	5.62	15.4%

Table 9-2: Part L2A 2013 regulated CO2 emissions & savings based on the MCC EN6 Energy Hierarchy approach for the Proposed Development using SAP 10.

MCC Energy Hierarchy Stage (SAP 10)	Regulated CO2 emissions (tonnes)	Total CO2 Reductions (tonnes)	% Reduction vs. previous stage
Target Emissions Rate (TER)	163	n/a	n/a
MCC Energy Hierarchy Stage 1 Energy Efficiency	127	36	22%
MCC Energy Hierarchy Stage 2 LZC Technologies	108	19	12%

Appendix A – Part L2A - BRUKL Reports

BRUKL Output Document

Compliance with England Building Regulations Part L 2013



HM Government

Project name

New Victoria Manchester_Lean

As designed

Date: Fri May 19 17:22:01 2023

Administrative information

Building Details

Address: Corporate Street, Manchester, M3 1NX

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.20

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.20

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Kartik Amrania

Telephone number: 44(0)1628623423

Address: Sweco UK, 1 Bath Road, Maidenhead, SL6 4AQ

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

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	21.4
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	21.4
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	15.8
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.2	0.26	10000036:Surf[0]
Floor	0.25	0.12	0.12	B1000000:Surf[0]
Roof	0.25	0.12	0.18	10000036:Surf[7]
Windows***, roof windows, and rooflights	2.2	1.41	1.6	00000002:Surf[0]
Personnel doors	2.2	-	-	No personnel doors in building
Vehicle access & similar large doors	1.5	-	-	No vehicle access doors in building
High usage entrance doors	3.5	-	-	No high usage entrance doors in building

U_a-Limit = Limiting area-weighted average U-values [W/(m²K)]

U_a-Calc = Calculated area-weighted average U-values [W/(m²K)]

U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]

* There might be more than one surface where the maximum U-value occurs.

** 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.

N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- Basement Plant Heating

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	1.54	0.84
Standard value	0.91	N/A	N/A	1.5^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

2- WC_Electric Heater

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	-	0.8
Standard value	0.91*	N/A	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems ≤2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

3- Showers

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	-	0.83
Standard value	0.91*	N/A	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems ≤2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

4- Retail Heating/Cooling_VRF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	5.47	0	1.6	0.84
Standard value	0.91*	3.2	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems ≤2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

5- Cycle store heating

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	1.54	0.84
Standard value	0.91	N/A	N/A	1.5^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

6- Wellness Suite Heating/Cooling

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	2.5	0	1.6	0.86
Standard value	0.91*	3.2	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems ≤2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

7- Office Heating/Cooling__internal

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	5.47	0	1.6	0.84
Standard value	0.91*	3.2	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

8- Office Heating/Cooling__VRF__peri

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	2.5	0	1.6	0.84
Standard value	0.91*	3.2	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

9- On floor Office AHU Heating

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	1.6	0.84
Standard value	0.91	N/A	N/A	1.5^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

10- Reception Heating/Cooling

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	5.47	0	1.6	0.84
Standard value	0.91*	3.2	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

"No HWS in project, or hot water is provided by HVAC system"

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
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 supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard	
B1_WC_3	-	-	-	0.7	-	-	-	-	-	-	N/A	
B1_WC_1	-	-	-	0.7	-	-	-	-	-	-	N/A	
B1_KITCHEN	-	-	-	-	-	-	-	0.2	-	-	N/A	
00_WELLNESS_3	-	-	-	-	-	-	-	0.2	-	-	N/A	
M_coworking_SE	-	-	-	-	-	-	-	0.3	-	-	N/A	
M_coworking_INNER	-	-	-	-	-	-	-	0.3	-	-	N/A	
M_WC_1	-	-	-	0.7	-	-	-	-	-	-	N/A	
M_OFFICE_NW	-	-	-	-	-	-	-	0.2	-	-	N/A	
M_OFFICE_SW	-	-	-	-	-	-	-	0.2	-	-	N/A	
M_OFFICE_NE	-	-	-	-	-	-	-	0.2	-	-	N/A	
M_coworking_E1	-	-	-	-	-	-	-	0.3	-	-	N/A	
01_OFFICE_SE	-	-	-	-	-	-	-	0.2	-	-	N/A	
01_WC_1	-	-	-	0.7	-	-	-	-	-	-	N/A	
01_OFFICE_NW	-	-	-	-	-	-	-	0.2	-	-	N/A	
01_OFFICE_SW	-	-	-	-	-	-	-	0.2	-	-	N/A	
01_OFFICE_NE	-	-	-	-	-	-	-	0.2	-	-	N/A	
01_OFFICE_E1	-	-	-	-	-	-	-	0.2	-	-	N/A	
02_WC_1	-	-	-	0.7	-	-	-	-	-	-	N/A	
02_OFFICE_SW	-	-	-	-	-	-	-	0.2	-	-	N/A	
02_OFFICE_SE	-	-	-	-	-	-	-	0.2	-	-	N/A	
02_OFFICE_E	-	-	-	-	-	-	-	0.2	-	-	N/A	
02_OFFICE_NW	-	-	-	-	-	-	-	0.2	-	-	N/A	
02_OFFICE_N	-	-	-	-	-	-	-	0.2	-	-	N/A	
03_WC_1	-	-	-	0.7	-	-	-	-	-	-	N/A	
03_OFFICE_SW	-	-	-	-	-	-	-	0.2	-	-	N/A	
03_OFFICE_SE	-	-	-	-	-	-	-	0.2	-	-	N/A	
03_OFFICE_E	-	-	-	-	-	-	-	0.2	-	-	N/A	
03_OFFICE_NW	-	-	-	-	-	-	-	0.2	-	-	N/A	
03_OFFICE_N	-	-	-	-	-	-	-	0.2	-	-	N/A	
04_WC_1 (1)	-	-	-	0.7	-	-	-	-	-	-	N/A	
05_WC_1 (2)	-	-	-	0.7	-	-	-	-	-	-	N/A	
06_WC_1 (3)	-	-	-	0.7	-	-	-	-	-	-	N/A	
07_WC_1 (4)	-	-	-	0.7	-	-	-	-	-	-	N/A	
08_WC_1 (5)	-	-	-	0.7	-	-	-	-	-	-	N/A	
09_WC_1 (6)	-	-	-	0.7	-	-	-	-	-	-	N/A	
04_OFFICE_SW (1)	-	-	-	-	-	-	-	0.2	-	-	N/A	
05_OFFICE_SW (2)	-	-	-	-	-	-	-	0.2	-	-	N/A	
06_OFFICE_SW (3)	-	-	-	-	-	-	-	0.2	-	-	N/A	
07_OFFICE_SW (4)	-	-	-	-	-	-	-	0.2	-	-	N/A	
08_OFFICE_SW (5)	-	-	-	-	-	-	-	0.2	-	-	N/A	
09_OFFICE_SW (6)	-	-	-	-	-	-	-	0.2	-	-	N/A	
04_OFFICE_SE (1)	-	-	-	-	-	-	-	0.2	-	-	N/A	
05 OFFICE SE (2)	-	-	-	-	-	-	-	0.2	-	-	N/A	

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		Zone	Standard
06_OFFICE_SE (3)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
07_OFFICE_SE (4)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
08_OFFICE_SE (5)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
09_OFFICE_SE (6)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
04_OFFICE_E (1)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
05_OFFICE_E (2)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
06_OFFICE_E (3)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
07_OFFICE_E (4)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
08_OFFICE_E (5)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
09_OFFICE_E (6)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
04_OFFICE_NW (1)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
05_OFFICE_NW (2)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
06_OFFICE_NW (3)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
07_OFFICE_NW (4)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
08_OFFICE_NW (5)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
09_OFFICE_NW (6)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
04_OFFICE_N (1)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
05_OFFICE_N (2)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
06_OFFICE_N (3)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
07_OFFICE_N (4)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
08_OFFICE_N (5)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
09_OFFICE_N (6)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
10_OFFICE_SE	-	-	-	-	-	-	-	0.2	-	-	-	N/A
10_WC	-	-	-	0.7	-	-	-	-	-	-	-	N/A
10_OFFICE_SW	-	-	-	-	-	-	-	0.2	-	-	-	N/A
10_OFFICE_NW	-	-	-	-	-	-	-	0.2	-	-	-	N/A
11_WINTER GARDEN	-	-	-	-	-	-	-	0.2	-	-	-	N/A
11_WC	-	-	-	0.7	-	-	-	-	-	-	-	N/A
11_KITCHEN	-	-	-	-	-	-	-	0.2	-	-	-	N/A
11_M_WC	-	-	-	0.7	-	-	-	-	-	-	-	N/A
00_ATRIUM_S	-	-	-	-	-	-	-	0.2	-	-	-	N/A
00_RETAIL_INNER	-	-	-	-	-	-	-	0.2	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
B1_AHU		80	-	-	857
B1_RAINWATER HARVEST_1		70	-	-	96
B1_CIRC_1		322	-	-	18
B1_STORE_1		150	-	-	23
B1_CIRC_2		236	-	-	106
B1_PLANT_2		95	-	-	203
00_FIRE STAIRS_1		-	187	-	60

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
00_FIRE STAIRS_2		-	203	-	48
B1_STORE_2		150	-	-	25
B1_REFUSE STORE		61	-	-	211
B1_PLANT_1		101	-	-	180
B1_DOMESTIC WATER TANK		58	-	-	268
B1_SPRINKLER WATER TANK_1		56	-	-	291
B1_SPRINKLER WATER TANK_2		58	-	-	219
B1_PLANT_3		95	-	-	407
B1_RAINWATER HARVEST_2		66	-	-	131
B1_CIRC_1		259	-	-	43
B1_CIRC_1		136	-	-	270
B1_CIRC_3		246	-	-	32
B1_WC_3		-	117	-	103
B1_SHOWER CIRC_2		-	100	-	252
B1_SHOWER CIRC_1		-	104	-	162
B1_SHOWERS_1		-	123	-	111
B1_SHOWERS_2		-	123	-	111
B1_WC_1		-	226	-	12
B1_KITCHEN		-	44	-	710
B1_CIRC_2		-	215	-	127
B1_CIRC_3		-	249	-	181
B1_PLANT_2		116	-	-	142
00_CYCLE STORE		50	-	-	591
00_FIRE CONTROL		100	-	-	118
00_FIRE LOBBY_1		-	125	-	64
00_FIRE CIRC_2		-	190	-	31
00_FIRE LOBBY_3		-	125	-	64
00_FIRE STAIRS_1		-	147	-	57
00_CIRC_2		-	148	-	78
00_STAIRS_1		-	154	-	47
00_CIRC_3		-	217	-	21
00_FIRE CIRC_4		-	170	-	39
00_FIRE STAIRS_2		-	148	-	55
00_STAIRS_2		-	170	-	45
00_CIRC_1		-	137	-	78
00_STORE_3		122	-	-	14
00_CIRC_3		-	156	-	45
00_WELLNESS_3		78	-	-	1324
M_OFFICE_INNER		125	-	-	1545
M_coworking_SE		127	-	-	366
M_coworking_INNER		130	-	-	203
M_CYCLE STORE		54	-	-	187
M_STAIRS_2		-	179	-	40

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
M_WC_1	-	-	85	-	185
M_FIRE LOBBY_1	-	-	130	-	52
M_FIRE LOBBY_3	-	-	133	-	54
M_FIRE STAIRS_1	-	-	146	-	58
M_LOBBY_2	-	-	122	-	41
M_FIRE STAIRS_2	-	-	148	-	55
M_STAIRS_1	-	-	151	-	50
M_CIRC_3	-	-	198	-	33
M_meeting_2	140	-	-	-	289
M_CIRC_2	-	-	251	-	15
M_OFFICE_NW	124	-	-	-	1161
M_OFFICE_SW	125	-	-	-	753
M_OFFICE_NE	130	-	-	-	263
M_coworking_E1	130	-	-	-	185
01_OFFICE_INNER_1	121	-	-	-	2243
01_OFFICE_SE	123	-	-	-	1103
01_OFFICE_AHU	81	-	-	-	249
01_STAIRS_2	-	-	146	-	51
01_WC_1	-	-	84	-	186
01_FIRE LOBBY_1	-	-	125	-	52
01_FIRE LOBBY_3	-	-	128	-	54
01_FIRE STAIRS_1	-	-	142	-	58
01_LOBBY_2	-	-	117	-	41
01_FIRE STAIRS_2	-	-	144	-	55
01_CIRC_3	-	-	194	-	32
01_CIRC_2	-	-	238	-	15
01_OFFICE_NW	123	-	-	-	1116
01_OFFICE_SW	124	-	-	-	1357
01_OFFICE_NE	129	-	-	-	264
01_OFFICE_INNER_2	122	-	-	-	1086
01_OFFICE_E1	129	-	-	-	180
02_OFFICE_AHU	81	-	-	-	249
02_WC_1	-	-	84	-	185
02_FIRE LOBBY_1	-	-	125	-	52
02_FIRE LOBBY_3	-	-	128	-	54
02_FIRE STAIRS_1	-	-	142	-	58
02_LOBBY_2	-	-	117	-	41
02_FIRE STAIRS_2	-	-	144	-	55
02_CIRC_3	-	-	189	-	33
02_CIRC_2	-	-	238	-	15
02_OFFICE_SW	123	-	-	-	1419
02_OFFICE_SE	123	-	-	-	1096
02_OFFICE_E	129	-	-	-	180

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
02_OFFICE_NW	123	-	-	-	1115
02_OFFICE_N	129	-	-	-	262
02_OFFICE_INNER	121	-	-	-	3540
03_OFFICE_AHU	81	-	-	-	249
03_WC_1	-	-	84	-	185
03_FIRE LOBBY_1	-	-	125	-	52
03_FIRE LOBBY_3	-	-	128	-	54
03_FIRE STAIRS_1	-	-	142	-	58
03_LOBBY_2	-	-	117	-	41
03_FIRE STAIRS_2	-	-	144	-	55
03_CIRC_3	-	-	189	-	33
03_CIRC_2	-	-	238	-	15
03_OFFICE_SW	123	-	-	-	1419
03_OFFICE_SE	123	-	-	-	1096
03_OFFICE_E	129	-	-	-	180
03_OFFICE_NW	123	-	-	-	1115
03_OFFICE_N	129	-	-	-	262
03_OFFICE_INNER	121	-	-	-	3540
04_OFFICE_AHU (1)	81	-	-	-	249
05_OFFICE_AHU (2)	81	-	-	-	249
06_OFFICE_AHU (3)	81	-	-	-	249
07_OFFICE_AHU (4)	81	-	-	-	249
08_OFFICE_AHU (5)	81	-	-	-	249
09_OFFICE_AHU (6)	81	-	-	-	249
04_WC_1 (1)	-	-	84	-	185
05_WC_1 (2)	-	-	84	-	185
06_WC_1 (3)	-	-	84	-	185
07_WC_1 (4)	-	-	84	-	185
08_WC_1 (5)	-	-	84	-	185
09_WC_1 (6)	-	-	84	-	185
04_FIRE LOBBY_1 (1)	-	-	125	-	52
05_FIRE LOBBY_1 (2)	-	-	125	-	52
06_FIRE LOBBY_1 (3)	-	-	125	-	52
07_FIRE LOBBY_1 (4)	-	-	125	-	52
08_FIRE LOBBY_1 (5)	-	-	125	-	52
09_FIRE LOBBY_1 (6)	-	-	125	-	52
04_FIRE LOBBY_3 (1)	-	-	128	-	54
05_FIRE LOBBY_3 (2)	-	-	128	-	54
06_FIRE LOBBY_3 (3)	-	-	128	-	54
07_FIRE LOBBY_3 (4)	-	-	128	-	54
08_FIRE LOBBY_3 (5)	-	-	128	-	54
09_FIRE LOBBY_3 (6)	-	-	128	-	54
04_FIRE STAIRS_1 (1)	-	-	142	-	58

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
05_FIRE STAIRS_1 (2)	-		142	-	58
06_FIRE STAIRS_1 (3)	-		142	-	58
07_FIRE STAIRS_1 (4)	-		142	-	58
08_FIRE STAIRS_1 (5)	-		142	-	58
09_FIRE STAIRS_1 (6)	-		142	-	58
04_LOBBY_2 (1)	-		117	-	41
05_LOBBY_2 (2)	-		117	-	41
06_LOBBY_2 (3)	-		117	-	41
07_LOBBY_2 (4)	-		117	-	41
08_LOBBY_2 (5)	-		117	-	41
09_LOBBY_2 (6)	-		117	-	41
04_FIRE STAIRS_2 (1)	-		144	-	55
05_FIRE STAIRS_2 (2)	-		144	-	55
06_FIRE STAIRS_2 (3)	-		144	-	55
07_FIRE STAIRS_2 (4)	-		144	-	55
08_FIRE STAIRS_2 (5)	-		144	-	55
09_FIRE STAIRS_2 (6)	-		144	-	55
04_CIRC_3 (1)	-		189	-	33
05_CIRC_3 (2)	-		189	-	33
06_CIRC_3 (3)	-		189	-	33
07_CIRC_3 (4)	-		189	-	33
08_CIRC_3 (5)	-		189	-	33
09_CIRC_3 (6)	-		189	-	33
04_CIRC_2 (1)	-		238	-	15
05_CIRC_2 (2)	-		238	-	15
06_CIRC_2 (3)	-		238	-	15
07_CIRC_2 (4)	-		238	-	15
08_CIRC_2 (5)	-		238	-	15
09_CIRC_2 (6)	-		238	-	15
04_OFFICE_SW (1)	123	-	-	-	1419
05_OFFICE_SW (2)	123	-	-	-	1419
06_OFFICE_SW (3)	123	-	-	-	1419
07_OFFICE_SW (4)	123	-	-	-	1419
08_OFFICE_SW (5)	123	-	-	-	1419
09_OFFICE_SW (6)	123	-	-	-	1419
04_OFFICE_SE (1)	123	-	-	-	1096
05_OFFICE_SE (2)	123	-	-	-	1096
06_OFFICE_SE (3)	123	-	-	-	1096
07_OFFICE_SE (4)	123	-	-	-	1096
08_OFFICE_SE (5)	123	-	-	-	1096
09_OFFICE_SE (6)	123	-	-	-	1096
04_OFFICE_E (1)	129	-	-	-	180
05_OFFICE_E (2)	129	-	-	-	180

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
06_OFFICE_E (3)	129	-	-	-	180
07_OFFICE_E (4)	129	-	-	-	180
08_OFFICE_E (5)	129	-	-	-	180
09_OFFICE_E (6)	129	-	-	-	180
04_OFFICE_NW (1)	123	-	-	-	1115
05_OFFICE_NW (2)	123	-	-	-	1115
06_OFFICE_NW (3)	123	-	-	-	1115
07_OFFICE_NW (4)	123	-	-	-	1115
08_OFFICE_NW (5)	123	-	-	-	1115
09_OFFICE_NW (6)	123	-	-	-	1115
04_OFFICE_N (1)	129	-	-	-	262
05_OFFICE_N (2)	129	-	-	-	262
06_OFFICE_N (3)	129	-	-	-	262
07_OFFICE_N (4)	129	-	-	-	262
08_OFFICE_N (5)	129	-	-	-	262
09_OFFICE_N (6)	129	-	-	-	262
04_OFFICE_INNER (1)	121	-	-	-	3540
05_OFFICE_INNER (2)	121	-	-	-	3540
06_OFFICE_INNER (3)	121	-	-	-	3540
07_OFFICE_INNER (4)	121	-	-	-	3540
08_OFFICE_INNER (5)	121	-	-	-	3540
09_OFFICE_INNER (6)	121	-	-	-	3540
10_FIRE LOBBY_1	-	129	-	-	47
10_FIRE LOBBY_3	-	128	-	-	53
10_FIRE STAIRS_1	-	142	-	-	58
10_LOBBY_2	-	117	-	-	41
10_FIRE STAIRS_2	-	144	-	-	56
10_CIRC_3	-	195	-	-	29
10_CIRC_2	-	249	-	-	14
10_OFFICE_INNER	122	-	-	-	2103
10_OFFICE_SE	40	-	-	-	2926
10_STORE	68	-	-	-	54
10_WC	-	89	-	-	127
10_OFFICE_SW	39	-	-	-	3842
10_OFFICE_NW	40	-	-	-	1799
11_FIRE LOBBY_1	-	135	-	-	44
11_FIRE LOBBY_3	-	128	-	-	53
11_FIRE STAIRS_1	-	143	-	-	55
11_LOBBY_2	-	121	-	-	38
11_FIRE STAIRS_2	-	158	-	-	37
11_CIRC_3	-	195	-	-	29
11_CIRC_2	-	275	-	-	13
11_PLANT_1	75	-	-	-	1715

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
11_WINTER GARDEN	60	76	-	-	963
11_STORE	60	75	-	-	35
11_WC	60	-	89	-	122
11_PLANT_1	60	97	-	-	87
11_KITCHEN	60	-	39	-	435
11_LIFT LOBBY	60	-	88	-	234
11_M_FIRE LOBBY_1	60	-	133	-	59
11_M_FIRE STAIRS_1	60	-	195	-	42
11_M_CIRC_3	60	-	207	-	30
11_M_LIFT LOBBY	60	-	92	-	180
11_M_WC	60	-	185	-	19
11_M_STORE	60	115	-	-	18
00_ATRIUM_S	60	-	30	35	12118
00_RETAIL_INNER	60	79	-	-	795
10_PLANT_2	60	79	-	-	761

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
B1_KITCHEN	N/A	N/A
00_WELLNESS_3	NO (-8.1%)	NO
M_OFFICE_INNER	NO (-63.2%)	NO
M_coworking_SE	NO (-17.4%)	NO
M_coworking_INNER	NO (-38.1%)	NO
M_meeting_2	N/A	N/A
M_OFFICE_NW	NO (-34.5%)	NO
M_OFFICE_SW	NO (-24%)	NO
M_OFFICE_NE	NO (-17.5%)	NO
M_coworking_E1	NO (-9.7%)	NO
01_OFFICE_INNER_1	NO (-86.4%)	NO
01_OFFICE_SE	NO (-30.8%)	NO
01_OFFICE_NW	NO (-47.1%)	NO
01_OFFICE_SW	NO (-29.6%)	NO
01_OFFICE_NE	NO (-34.8%)	NO
01_OFFICE_INNER_2	NO (-86.8%)	NO
01_OFFICE_E1	NO (-36.4%)	NO
02_OFFICE_SW	NO (-30.8%)	NO
02_OFFICE_SE	NO (-33.4%)	NO
02_OFFICE_E	NO (-38.5%)	NO
02_OFFICE_NW	NO (-41.4%)	NO
02_OFFICE_N	NO (-39.5%)	NO
02_OFFICE_INNER	NO (-93.4%)	NO
03_OFFICE_SW	NO (-30.8%)	NO
03_OFFICE_SE	NO (-33.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
03_OFFICE_E	NO (-38.5%)	NO
03_OFFICE_NW	NO (-41.4%)	NO
03_OFFICE_N	NO (-39.5%)	NO
03_OFFICE_INNER	NO (-93.4%)	NO
04_OFFICE_SW (1)	NO (-30.8%)	NO
05_OFFICE_SW (2)	NO (-30.8%)	NO
06_OFFICE_SW (3)	NO (-30.8%)	NO
07_OFFICE_SW (4)	NO (-30.8%)	NO
08_OFFICE_SW (5)	NO (-30.8%)	NO
09_OFFICE_SW (6)	NO (-31%)	NO
04_OFFICE_SE (1)	NO (-33.4%)	NO
05_OFFICE_SE (2)	NO (-33.4%)	NO
06_OFFICE_SE (3)	NO (-33.4%)	NO
07_OFFICE_SE (4)	NO (-33.4%)	NO
08_OFFICE_SE (5)	NO (-33.4%)	NO
09_OFFICE_SE (6)	NO (-33.5%)	NO
04_OFFICE_E (1)	NO (-38.5%)	NO
05_OFFICE_E (2)	NO (-38.5%)	NO
06_OFFICE_E (3)	NO (-38.5%)	NO
07_OFFICE_E (4)	NO (-38.5%)	NO
08_OFFICE_E (5)	NO (-38.5%)	NO
09_OFFICE_E (6)	NO (-38.6%)	NO
04_OFFICE_NW (1)	NO (-41.4%)	NO
05_OFFICE_NW (2)	NO (-41.4%)	NO
06_OFFICE_NW (3)	NO (-41.4%)	NO
07_OFFICE_NW (4)	NO (-41.4%)	NO
08_OFFICE_NW (5)	NO (-41.4%)	NO
09_OFFICE_NW (6)	NO (-41.4%)	NO
04_OFFICE_N (1)	NO (-39.5%)	NO
05_OFFICE_N (2)	NO (-39.5%)	NO
06_OFFICE_N (3)	NO (-39.5%)	NO
07_OFFICE_N (4)	NO (-39.5%)	NO
08_OFFICE_N (5)	NO (-39.5%)	NO
09_OFFICE_N (6)	NO (-39.5%)	NO
04_OFFICE_INNER (1)	NO (-93.4%)	NO
05_OFFICE_INNER (2)	NO (-93.4%)	NO
06_OFFICE_INNER (3)	NO (-93.4%)	NO
07_OFFICE_INNER (4)	NO (-93.4%)	NO
08_OFFICE_INNER (5)	NO (-93.4%)	NO
09_OFFICE_INNER (6)	NO (-93.4%)	NO
10_OFFICE_INNER	NO (-92.1%)	NO
10_OFFICE_SE	NO (-31.3%)	NO
10_OFFICE_SW	NO (-28.2%)	NO
10_OFFICE_NW	NO (-38.3%)	NO
11_WINTER GARDEN	YES (+38%)	NO
11_KITCHEN	N/A	N/A
00_ATRIUM_S	YES (+144.3%)	NO
00_RETAIL_INNER	YES (+15.9%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	18846.5	18846.5	1	A1/A2 Retail/Financial and Professional services
External area [m ²]	12933.3	12933.3		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	MAN	MAN	99	B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	3	3		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	6256.8	6820.4		B8 Storage or Distribution
Average U-value [W/m ² K]	0.48	0.53		C1 Hotels
Alpha value* [%]	9.73	10		C2 Residential Institutions: Hospitals and Care Homes
* Percentage of the building's average heat transfer coefficient which is due to thermal bridging				C2 Residential Institutions: Residential schools
				C2 Residential Institutions: Universities and colleges
				C2A Secure Residential Institutions
				Residential spaces
				D1 Non-residential Institutions: Community/Day Centre
				D1 Non-residential Institutions: Libraries, Museums, and Galleries
				D1 Non-residential Institutions: Education
				D1 Non-residential Institutions: Primary Health Care Building
				D1 Non-residential Institutions: Crown and County Courts
				D2 General Assembly and Leisure, Night Clubs, and Theatres
				Others: Passenger terminals
				Others: Emergency services
				Others: Miscellaneous 24hr activities
				Others: Car Parks 24 hrs
				Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	2.99	2.05
Cooling	5.47	8.6
Auxiliary	8.8	10.02
Lighting	12.93	20.19
Hot water	6.25	5.93
Equipment*	52.28	52.28
TOTAL**	36.44	46.79

* 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
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	100.44	123.73
Primary energy* [kWh/m ²]	92.68	125.9
Total emissions [kg/m ²]	15.8	21.4

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

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] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	19.5	109.8	6.5	7	12.4	0.84	4.37	0.91	5.47
	Notional	12.9	132	4.2	9.7	15.1	0.86	3.79	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	4.8	0	1.6	0	5.3	0.85	0	0.91	0
	Notional	19.2	0	6.2	0	4.1	0.86	0	----	----
[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	23.1	438.6	7.6	27.9	17.9	0.84	4.37	0.91	5.47
	Notional	22.8	303.7	7.3	22.3	20.3	0.86	3.79	----	----
[ST] Central heating using air distribution, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	0	0	0	0	0	1.01	0	0.91	0
	Notional	0	0	0	0	0	0.86	0	----	----
[ST] Central heating using air distribution, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	0	0	0	0	0	1.02	0	0.91	0
	Notional	0	0	0	0	0	0.86	0	----	----
[ST] Central heating using air distribution, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	19.5	0	5.3	0	6.4	1.01	0	0.91	0
	Notional	0.2	0	0.1	0	2.1	0.86	0	----	----
[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	12	223.2	4	14.2	12.2	0.84	4.37	0.91	5.47
	Notional	1	168.3	0.3	12.3	11.4	0.86	3.79	----	----
[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	23.6	121.5	7.8	7.7	15.5	0.84	4.37	0.91	5.47
	Notional	12.3	157.6	4	11.5	14.9	0.86	3.79	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	4.1	0	1.3	0	1.1	0.85	0	0.91	0
	Notional	38.1	0	12.3	0	1.1	0.86	0	----	----
[ST] Chilled ceilings or passive chilled beams and displacement ventilation, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Elec										
	Actual	1.4	121.7	0.5	6.7	10	0.82	5.07	0.91	5.47
	Notional	0.4	185.3	0.1	13.6	11	0.86	3.79	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric			
Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.2	B1000000:Surf[1]
Floor	0.2	0.12	B1000000:Surf[0]
Roof	0.15	0.12	B100000B:Surf[1]
Windows, roof windows, and rooflights	1.5	1.4	00000008:Surf[1]
Personnel doors	1.5	-	No personnel doors in building
Vehicle access & similar large doors	1.5	-	No vehicle access doors in building
High usage entrance doors	1.5	-	No high usage entrance doors in building
U _{i-Typ} = Typical individual element U-values [W/(m²K)] U _{i-Min} = Minimum individual element U-values [W/(m²K)] * There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

BRUKL Output Document

Compliance with England Building Regulations Part L 2013



Project name

New Victoria Manchester

As designed

Date: Fri May 19 17:03:56 2023

Administrative information

Building Details

Address: Corporate Street, Manchester, M3 1NX

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.20

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.20

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Kartik Amrania

Telephone number: 44(0)1628623423

Address: Sweco UK, 1 Bath Road, Maidenhead, SL6 4AQ

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

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	21.7
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	21.7
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	15.5
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.2	0.26	10000036:Surf[0]
Floor	0.25	0.12	0.12	B1000000:Surf[0]
Roof	0.25	0.12	0.18	10000036:Surf[7]
Windows***, roof windows, and rooflights	2.2	1.41	1.6	00000002:Surf[0]
Personnel doors	2.2	-	-	No personnel doors in building
Vehicle access & similar large doors	1.5	-	-	No vehicle access doors in building
High usage entrance doors	3.5	-	-	No high usage entrance doors in building

U_a-Limit = Limiting area-weighted average U-values [W/(m²K)]

U_a-Calc = Calculated area-weighted average U-values [W/(m²K)]

U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]

* There might be more than one surface where the maximum U-value occurs.

** 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.

N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- Basement Plant Heating

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.7	-	-	1.54	0.84
Standard value	2.5*	N/A	N/A	1.5^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types ≤12 kW output, refer to EN 14825 for limiting standards.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

2- WC_Electric Heater

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	-	0.8
Standard value	N/A	N/A	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

3- Showers

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.24	-	0.2	-	0.83
Standard value	2.5*	N/A	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types ≤12 kW output, refer to EN 14825 for limiting standards.					

4- Retail Heating/Cooling_VRF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	5.47	0	1.6	0.84
Standard value	2.5*	2.55	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types ≤12 kW output, refer to EN 14825 for limiting standards.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

5- Cycle store heating

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.7	-	0.2	1.54	0.84
Standard value	2.5*	N/A	N/A	1.5^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types ≤12 kW output, refer to EN 14825 for limiting standards.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

6- Wellness Suite Heating/Cooling

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	5.47	0	1.6	0.86
Standard value	2.5*	2.55	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

7- Office Heating/Cooling__internal displacement vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.43	4.43	0	1.54	0.76
Standard value	2.5*	2.55	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

8- Office Heating/Cooling__perimeter VRF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	5.47	0	1.6	0.84
Standard value	2.5*	2.55	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

9- On floor Office AHU Heating

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3	-	-	1.6	0.84
Standard value	2.5*	N/A	N/A	1.5^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

10- Reception Heating/Cooling

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.43	4.43	0	1.6	0.76
Standard value	2.5*	2.55	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

"No HWS in project, or hot water is provided by HVAC system"

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
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 supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

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	1.9	1.6	0.5	1.1	0.5	1		
B1__WC__3		-	-	-	0.7	-	-	-	-	-	-	N/A
B1__WC__1		-	-	-	0.7	-	-	-	-	-	-	N/A
B1__KITCHEN		-	-	-	-	-	-	-	0.2	-	-	N/A
00__WELLNESS__3		-	-	-	-	-	-	-	0.2	-	-	N/A
M__coworking__SE		-	-	-	-	-	-	-	0.3	-	-	N/A
M__coworking__INNER		-	-	-	-	-	-	-	0.3	-	-	N/A
M__WC__1		-	-	-	0.7	-	-	-	-	-	-	N/A
M__OFFICE__NW		-	-	-	-	-	-	-	0.2	-	-	N/A
M__OFFICE__SW		-	-	-	-	-	-	-	0.2	-	-	N/A
M__OFFICE__NE		-	-	-	-	-	-	-	0.2	-	-	N/A
M__coworking__E1		-	-	-	-	-	-	-	0.3	-	-	N/A
01__OFFICE__SE		-	-	-	-	-	-	-	0.2	-	-	N/A
01__WC__1		-	-	-	0.7	-	-	-	-	-	-	N/A
01__OFFICE__NW		-	-	-	-	-	-	-	0.2	-	-	N/A
01__OFFICE__SW		-	-	-	-	-	-	-	0.2	-	-	N/A
01__OFFICE__NE		-	-	-	-	-	-	-	0.2	-	-	N/A
01__OFFICE__E1		-	-	-	-	-	-	-	0.2	-	-	N/A
02__WC__1		-	-	-	0.7	-	-	-	-	-	-	N/A
02__OFFICE__SW		-	-	-	-	-	-	-	0.2	-	-	N/A
02__OFFICE__SE		-	-	-	-	-	-	-	0.2	-	-	N/A
02__OFFICE__E		-	-	-	-	-	-	-	0.2	-	-	N/A
02__OFFICE__NW		-	-	-	-	-	-	-	0.2	-	-	N/A
02__OFFICE__N		-	-	-	-	-	-	-	0.2	-	-	N/A
03__WC__1		-	-	-	0.7	-	-	-	-	-	-	N/A
03__OFFICE__SW		-	-	-	-	-	-	-	0.2	-	-	N/A
03__OFFICE__SE		-	-	-	-	-	-	-	0.2	-	-	N/A
03__OFFICE__E		-	-	-	-	-	-	-	0.2	-	-	N/A
03__OFFICE__NW		-	-	-	-	-	-	-	0.2	-	-	N/A
03__OFFICE__N		-	-	-	-	-	-	-	0.2	-	-	N/A
04__WC__1 (1)		-	-	-	0.7	-	-	-	-	-	-	N/A
05__WC__1 (2)		-	-	-	0.7	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		Zone	Standard
06_WC_1 (3)	-	-	-	0.7	-	-	-	-	-	-	-	N/A
07_WC_1 (4)	-	-	-	0.7	-	-	-	-	-	-	-	N/A
08_WC_1 (5)	-	-	-	0.7	-	-	-	-	-	-	-	N/A
09_WC_1 (6)	-	-	-	0.7	-	-	-	-	-	-	-	N/A
04_OFFICE_SW (1)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
05_OFFICE_SW (2)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
06_OFFICE_SW (3)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
07_OFFICE_SW (4)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
08_OFFICE_SW (5)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
09_OFFICE_SW (6)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
04_OFFICE_SE (1)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
05_OFFICE_SE (2)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
06_OFFICE_SE (3)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
07_OFFICE_SE (4)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
08_OFFICE_SE (5)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
09_OFFICE_SE (6)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
04_OFFICE_E (1)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
05_OFFICE_E (2)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
06_OFFICE_E (3)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
07_OFFICE_E (4)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
08_OFFICE_E (5)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
09_OFFICE_E (6)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
04_OFFICE_NW (1)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
05_OFFICE_NW (2)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
06_OFFICE_NW (3)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
07_OFFICE_NW (4)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
08_OFFICE_NW (5)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
09_OFFICE_NW (6)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
04_OFFICE_N (1)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
05_OFFICE_N (2)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
06_OFFICE_N (3)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
07_OFFICE_N (4)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
08_OFFICE_N (5)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
09_OFFICE_N (6)	-	-	-	-	-	-	-	0.2	-	-	-	N/A
10_WC	-	-	-	0.7	-	-	-	-	-	-	-	N/A
11_WINTER GARDEN	-	-	-	-	-	-	-	0.2	-	-	-	N/A
11_WC	-	-	-	0.7	-	-	-	-	-	-	-	N/A
11_KITCHEN	-	-	-	-	-	-	-	0.2	-	-	-	N/A
11_M_WC	-	-	-	0.7	-	-	-	-	-	-	-	N/A
00_RETAIL_INNER	-	-	-	-	-	-	-	0.2	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
B1_AHU		80	-	-	857

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
B1_RAINWATER HARVEST_1		70	-	-	96
B1_CIRC_1		322	-	-	18
B1_STORE_1		150	-	-	23
B1_CIRC_2		236	-	-	106
B1_PLANT_2		95	-	-	203
00_FIRE STAIRS_1		-	187	-	60
00_FIRE STAIRS_2		-	203	-	48
B1_STORE_2		150	-	-	25
B1_REFUSE STORE		61	-	-	211
B1_PLANT_1		101	-	-	180
B1_DOMESTIC WATER TANK		58	-	-	268
B1_SPRINKLER WATER TANK_1		56	-	-	291
B1_SPRINKLER WATER TANK_2		58	-	-	219
B1_PLANT_3		95	-	-	407
B1_RAINWATER HARVEST_2		66	-	-	131
B1_CIRC_1		259	-	-	43
B1_CIRC_1		136	-	-	270
B1_CIRC_3		246	-	-	32
B1_WC_3		-	117	-	103
B1_SHOWER CIRC_2		-	100	-	252
B1_SHOWER CIRC_1		-	104	-	162
B1_SHOWERS_1		-	123	-	111
B1_SHOWERS_2		-	123	-	111
B1_WC_1		-	226	-	12
B1_KITCHEN		-	44	-	710
B1_CIRC_2		-	215	-	127
B1_CIRC_3		-	249	-	181
B1_PLANT_2		116	-	-	142
00_CYCLE STORE		50	-	-	591
00_FIRE CONTROL		100	-	-	118
00_FIRE LOBBY_1		-	125	-	64
00_FIRE CIRC_2		-	190	-	31
00_FIRE LOBBY_3		-	125	-	64
00_FIRE STAIRS_1		-	147	-	57
00_CIRC_2		-	148	-	78
00_STAIRS_1		-	154	-	47
00_CIRC_3		-	217	-	21
00_FIRE CIRC_4		-	170	-	39
00_FIRE STAIRS_2		-	148	-	55
00_STAIRS_2		-	170	-	45
00_CIRC_1		-	137	-	78
00_STORE_3		122	-	-	14
00_CIRC_3		-	156	-	45

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
00_WELLNESS_3		78	-	-	1324
M_OFFICE_INNER		125	-	-	1545
M_coworking_SE		127	-	-	366
M_coworking_INNER		130	-	-	203
M_CYCLE STORE		54	-	-	187
M_STAIRS_2		-	179	-	40
M_WC_1		-	85	-	185
M_FIRE LOBBY_1		-	130	-	52
M_FIRE LOBBY_3		-	133	-	54
M_FIRE STAIRS_1		-	146	-	58
M_LOBBY_2		-	122	-	41
M_FIRE STAIRS_2		-	148	-	55
M_STAIRS_1		-	151	-	50
M_CIRC_3		-	198	-	33
M_meeting_2		140	-	-	289
M_CIRC_2		-	251	-	15
M_OFFICE_NW		124	-	-	1161
M_OFFICE_SW		125	-	-	753
M_OFFICE_NE		130	-	-	263
M_coworking_E1		130	-	-	185
01_OFFICE_INNER_1		121	-	-	2243
01_OFFICE_SE		123	-	-	1103
01_OFFICE AHU		81	-	-	249
01_STAIRS_2		-	146	-	51
01_WC_1		-	84	-	186
01_FIRE LOBBY_1		-	125	-	52
01_FIRE LOBBY_3		-	128	-	54
01_FIRE STAIRS_1		-	142	-	58
01_LOBBY_2		-	117	-	41
01_FIRE STAIRS_2		-	144	-	55
01_CIRC_3		-	194	-	32
01_CIRC_2		-	238	-	15
01_OFFICE_NW		123	-	-	1116
01_OFFICE_SW		124	-	-	1357
01_OFFICE_NE		129	-	-	264
01_OFFICE_INNER_2		122	-	-	1086
01_OFFICE_E1		129	-	-	180
02_OFFICE AHU		81	-	-	249
02_WC_1		-	84	-	185
02_FIRE LOBBY_1		-	125	-	52
02_FIRE LOBBY_3		-	128	-	54
02_FIRE STAIRS_1		-	142	-	58
02_LOBBY_2		-	117	-	41

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
02_FIRE STAIRS_2		-	144	-	55
02_CIRC_3		-	189	-	33
02_CIRC_2		-	238	-	15
02_OFFICE_SW		123	-	-	1419
02_OFFICE_SE		123	-	-	1096
02_OFFICE_E		129	-	-	180
02_OFFICE_NW		123	-	-	1115
02_OFFICE_N		129	-	-	262
02_OFFICE_INNER		121	-	-	3540
03_OFFICE AHU		81	-	-	249
03_WC_1		-	84	-	185
03_FIRE LOBBY_1		-	125	-	52
03_FIRE LOBBY_3		-	128	-	54
03_FIRE STAIRS_1		-	142	-	58
03_LOBBY_2		-	117	-	41
03_FIRE STAIRS_2		-	144	-	55
03_CIRC_3		-	189	-	33
03_CIRC_2		-	238	-	15
03_OFFICE_SW		123	-	-	1419
03_OFFICE_SE		123	-	-	1096
03_OFFICE_E		129	-	-	180
03_OFFICE_NW		123	-	-	1115
03_OFFICE_N		129	-	-	262
03_OFFICE_INNER		121	-	-	3540
04_OFFICE AHU (1)		81	-	-	249
05_OFFICE AHU (2)		81	-	-	249
06_OFFICE AHU (3)		81	-	-	249
07_OFFICE AHU (4)		81	-	-	249
08_OFFICE AHU (5)		81	-	-	249
09_OFFICE AHU (6)		81	-	-	249
04_WC_1 (1)		-	84	-	185
05_WC_1 (2)		-	84	-	185
06_WC_1 (3)		-	84	-	185
07_WC_1 (4)		-	84	-	185
08_WC_1 (5)		-	84	-	185
09_WC_1 (6)		-	84	-	185
04_FIRE LOBBY_1 (1)		-	125	-	52
05_FIRE LOBBY_1 (2)		-	125	-	52
06_FIRE LOBBY_1 (3)		-	125	-	52
07_FIRE LOBBY_1 (4)		-	125	-	52
08_FIRE LOBBY_1 (5)		-	125	-	52
09_FIRE LOBBY_1 (6)		-	125	-	52
04_FIRE LOBBY_3 (1)		-	128	-	54

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
05_FIRE LOBBY_3 (2)	-		128	-	54
06_FIRE LOBBY_3 (3)	-		128	-	54
07_FIRE LOBBY_3 (4)	-		128	-	54
08_FIRE LOBBY_3 (5)	-		128	-	54
09_FIRE LOBBY_3 (6)	-		128	-	54
04_FIRE STAIRS_1 (1)	-		142	-	58
05_FIRE STAIRS_1 (2)	-		142	-	58
06_FIRE STAIRS_1 (3)	-		142	-	58
07_FIRE STAIRS_1 (4)	-		142	-	58
08_FIRE STAIRS_1 (5)	-		142	-	58
09_FIRE STAIRS_1 (6)	-		142	-	58
04_LOBBY_2 (1)	-		117	-	41
05_LOBBY_2 (2)	-		117	-	41
06_LOBBY_2 (3)	-		117	-	41
07_LOBBY_2 (4)	-		117	-	41
08_LOBBY_2 (5)	-		117	-	41
09_LOBBY_2 (6)	-		117	-	41
04_FIRE STAIRS_2 (1)	-		144	-	55
05_FIRE STAIRS_2 (2)	-		144	-	55
06_FIRE STAIRS_2 (3)	-		144	-	55
07_FIRE STAIRS_2 (4)	-		144	-	55
08_FIRE STAIRS_2 (5)	-		144	-	55
09_FIRE STAIRS_2 (6)	-		144	-	55
04_CIRC_3 (1)	-		189	-	33
05_CIRC_3 (2)	-		189	-	33
06_CIRC_3 (3)	-		189	-	33
07_CIRC_3 (4)	-		189	-	33
08_CIRC_3 (5)	-		189	-	33
09_CIRC_3 (6)	-		189	-	33
04_CIRC_2 (1)	-		238	-	15
05_CIRC_2 (2)	-		238	-	15
06_CIRC_2 (3)	-		238	-	15
07_CIRC_2 (4)	-		238	-	15
08_CIRC_2 (5)	-		238	-	15
09_CIRC_2 (6)	-		238	-	15
04_OFFICE_SW (1)	123	-	-	-	1419
05_OFFICE_SW (2)	123	-	-	-	1419
06_OFFICE_SW (3)	123	-	-	-	1419
07_OFFICE_SW (4)	123	-	-	-	1419
08_OFFICE_SW (5)	123	-	-	-	1419
09_OFFICE_SW (6)	123	-	-	-	1419
04_OFFICE_SE (1)	123	-	-	-	1096
05_OFFICE_SE (2)	123	-	-	-	1096

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
06_OFFICE_SE (3)	123	-	-	-	1096
07_OFFICE_SE (4)	123	-	-	-	1096
08_OFFICE_SE (5)	123	-	-	-	1096
09_OFFICE_SE (6)	123	-	-	-	1096
04_OFFICE_E (1)	129	-	-	-	180
05_OFFICE_E (2)	129	-	-	-	180
06_OFFICE_E (3)	129	-	-	-	180
07_OFFICE_E (4)	129	-	-	-	180
08_OFFICE_E (5)	129	-	-	-	180
09_OFFICE_E (6)	129	-	-	-	180
04_OFFICE_NW (1)	123	-	-	-	1115
05_OFFICE_NW (2)	123	-	-	-	1115
06_OFFICE_NW (3)	123	-	-	-	1115
07_OFFICE_NW (4)	123	-	-	-	1115
08_OFFICE_NW (5)	123	-	-	-	1115
09_OFFICE_NW (6)	123	-	-	-	1115
04_OFFICE_N (1)	129	-	-	-	262
05_OFFICE_N (2)	129	-	-	-	262
06_OFFICE_N (3)	129	-	-	-	262
07_OFFICE_N (4)	129	-	-	-	262
08_OFFICE_N (5)	129	-	-	-	262
09_OFFICE_N (6)	129	-	-	-	262
04_OFFICE_INNER (1)	121	-	-	-	3540
05_OFFICE_INNER (2)	121	-	-	-	3540
06_OFFICE_INNER (3)	121	-	-	-	3540
07_OFFICE_INNER (4)	121	-	-	-	3540
08_OFFICE_INNER (5)	121	-	-	-	3540
09_OFFICE_INNER (6)	121	-	-	-	3540
10_FIRE LOBBY_1	-	129	-	-	47
10_FIRE LOBBY_3	-	128	-	-	53
10_FIRE STAIRS_1	-	142	-	-	58
10_LOBBY_2	-	117	-	-	41
10_FIRE STAIRS_2	-	144	-	-	56
10_CIRC_3	-	195	-	-	29
10_CIRC_2	-	249	-	-	14
10_OFFICE_INNER	122	-	-	-	2103
10_OFFICE_SE	40	-	-	-	2926
10_STORE	68	-	-	-	54
10_WC	-	89	-	-	127
10_OFFICE_SW	39	-	-	-	3842
10_OFFICE_NW	40	-	-	-	1799
11_FIRE LOBBY_1	-	135	-	-	44
11_FIRE LOBBY_3	-	128	-	-	53

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
11_FIRE STAIRS_1	-	60	143	22	55
11_LOBBY_2	-	60	121	-	38
11_FIRE STAIRS_2	-	60	158	-	37
11_CIRC_3	-	60	195	-	29
11_CIRC_2	-	60	275	-	13
11_PLANT_1	75	-	-	-	1715
11_WINTER GARDEN	76	-	-	-	963
11_STORE	75	-	-	-	35
11_WC	-	89	-	-	122
11_PLANT_1	97	-	-	-	87
11_KITCHEN	-	39	-	-	435
11_LIFT LOBBY	-	88	-	-	234
11_M_FIRE LOBBY_1	-	133	-	-	59
11_M_FIRE STAIRS_1	-	195	-	-	42
11_M_CIRC_3	-	207	-	-	30
11_M_LIFT LOBBY	-	92	-	-	180
11_M_WC	-	185	-	-	19
11_M_STORE	115	-	-	-	18
00_ATRIUM_S	-	30	35	-	12118
00_RETAIL_INNER	79	-	-	-	795
10_PLANT_2	79	-	-	-	761

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
B1_KITCHEN	N/A	N/A
00_WELLNESS_3	NO (-56.9%)	NO
M_OFFICE_INNER	NO (-78.4%)	NO
M_coworking_SE	NO (-75.4%)	NO
M_coworking_INNER	NO (-81.7%)	NO
M_meeting_2	N/A	N/A
M_OFFICE_NW	NO (-58.1%)	NO
M_OFFICE_SW	NO (-49%)	NO
M_OFFICE_NE	NO (-44.1%)	NO
M_coworking_E1	NO (-68.9%)	NO
01_OFFICE_INNER_1	NO (-94.6%)	NO
01_OFFICE_SE	NO (-76.3%)	NO
01_OFFICE_NW	NO (-57.4%)	NO
01_OFFICE_SW	NO (-50.1%)	NO
01_OFFICE_NE	NO (-50.5%)	NO
01_OFFICE_INNER_2	NO (-90.9%)	NO
01_OFFICE_E1	NO (-74.4%)	NO
02_OFFICE_SW	NO (-49.5%)	NO
02_OFFICE_SE	NO (-72.5%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
02_OFFICE_E	NO (-72.2%)	NO
02_OFFICE_NW	NO (-52.8%)	NO
02_OFFICE_N	NO (-53.8%)	NO
02_OFFICE_INNER	NO (-95.9%)	NO
03_OFFICE_SW	NO (-48.7%)	NO
03_OFFICE_SE	NO (-64.8%)	NO
03_OFFICE_E	NO (-66.3%)	NO
03_OFFICE_NW	NO (-52.6%)	NO
03_OFFICE_N	NO (-53.1%)	NO
03_OFFICE_INNER	NO (-95.7%)	NO
04_OFFICE_SW (1)	NO (-47.7%)	NO
05_OFFICE_SW (2)	NO (-46.6%)	NO
06_OFFICE_SW (3)	NO (-46%)	NO
07_OFFICE_SW (4)	NO (-45.6%)	NO
08_OFFICE_SW (5)	NO (-45.1%)	NO
09_OFFICE_SW (6)	NO (-44.8%)	NO
04_OFFICE_SE (1)	NO (-54.4%)	NO
05_OFFICE_SE (2)	NO (-46.1%)	NO
06_OFFICE_SE (3)	NO (-45.7%)	NO
07_OFFICE_SE (4)	NO (-45.6%)	NO
08_OFFICE_SE (5)	NO (-45.6%)	NO
09_OFFICE_SE (6)	NO (-45.6%)	NO
04_OFFICE_E (1)	NO (-57.3%)	NO
05_OFFICE_E (2)	NO (-50.4%)	NO
06_OFFICE_E (3)	NO (-50.2%)	NO
07_OFFICE_E (4)	NO (-50.2%)	NO
08_OFFICE_E (5)	NO (-50.2%)	NO
09_OFFICE_E (6)	NO (-50.2%)	NO
04_OFFICE_NW (1)	NO (-52.5%)	NO
05_OFFICE_NW (2)	NO (-52.4%)	NO
06_OFFICE_NW (3)	NO (-52.4%)	NO
07_OFFICE_NW (4)	NO (-52.4%)	NO
08_OFFICE_NW (5)	NO (-52.4%)	NO
09_OFFICE_NW (6)	NO (-52.4%)	NO
04_OFFICE_N (1)	NO (-52.3%)	NO
05_OFFICE_N (2)	NO (-51.8%)	NO
06_OFFICE_N (3)	NO (-51.8%)	NO
07_OFFICE_N (4)	NO (-51.8%)	NO
08_OFFICE_N (5)	NO (-51.8%)	NO
09_OFFICE_N (6)	NO (-51.8%)	NO
04_OFFICE_INNER (1)	NO (-95.3%)	NO
05_OFFICE_INNER (2)	NO (-94.9%)	NO
06_OFFICE_INNER (3)	NO (-94.9%)	NO
07_OFFICE_INNER (4)	NO (-94.9%)	NO
08_OFFICE_INNER (5)	NO (-94.9%)	NO
09_OFFICE_INNER (6)	NO (-94.8%)	NO
10_OFFICE_INNER	NO (-96.4%)	NO
10_OFFICE_SE	NO (-75.9%)	NO
10_OFFICE_SW	NO (-75.8%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
10_OFFICE_NW	NO (-49.2%)	NO
11_WINTER GARDEN	YES (+12.8%)	NO
11_KITCHEN	N/A	N/A
00_ATRIUM_S	NO (-17.3%)	NO
00_RETAIL_INNER	NO (-63.2%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

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

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m²]	18846.5	18846.5	1	A1/A2 Retail/Financial and Professional services
External area [m²]	12933.3	12933.3		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	MAN	MAN	99	B1 Offices and Workshop businesses
Infiltration [m³/hm²@ 50Pa]	3	3		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	6256.8	6820.4		B8 Storage or Distribution
Average U-value [W/m²K]	0.48	0.53		C1 Hotels
Alpha value* [%]	9.73	10		C2 Residential Institutions: Hospitals and Care Homes
* Percentage of the building's average heat transfer coefficient which is due to thermal bridging				C2 Residential Institutions: Residential schools
				C2 Residential Institutions: Universities and colleges
				C2A Secure Residential Institutions
				Residential spaces
				D1 Non-residential Institutions: Community/Day Centre
				D1 Non-residential Institutions: Libraries, Museums, and Galleries
				D1 Non-residential Institutions: Education
				D1 Non-residential Institutions: Primary Health Care Building
				D1 Non-residential Institutions: Crown and County Courts
				D2 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	0.87	0.91
Cooling	4.16	8.03
Auxiliary	7.19	10.11
Lighting	12.93	20.19
Hot water	5.68	5.93
Equipment*	52.28	52.28
TOTAL**	30.82	45.17

* 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	0.16	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	83.19	116.5
Primary energy* [kWh/m²]	92.26	123.54
Total emissions [kg/m²]	15.5	21.7

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

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] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	21.6	82.6	1.7	4.2	11.4	3.5	5.47	3.5	5.47
	Notional	14	123.3	1.5	9	15.1	2.56	3.79	----	----
[ST] Central heating using water: radiators, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	5	0	1.4	0	5.3	1	0	1	0
	Notional	20.3	0	6.5	0	4.1	0.86	0	----	----
[ST] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	30.8	342.8	2.7	17.4	14.8	3.23	5.47	3.5	5.47
	Notional	29.6	239.9	3.2	17.6	17.4	2.56	3.79	----	----
[ST] Central heating using air distribution, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	0	0	0	0	0	2.7	0	2.7	0
	Notional	0	0	0	0	0	2.56	0	----	----
[ST] Central heating using air distribution, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	0	0	0	0	0	3	0	3	0
	Notional	0	0	0	0	0	2.56	0	----	----
[ST] Central heating using air distribution, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	24.2	0	2.5	0	6.4	2.7	0	2.7	0
	Notional	0.3	0	0	0	2.1	2.56	0	----	----
[ST] Chilled ceilings or passive chilled beams and displacement ventilation, [HS] Heat pump (electric): air source, [HFT] Elec										
	Actual	15.8	118.5	1.3	7.4	6.6	3.43	4.43	3.43	4.43
	Notional	1.6	130.3	0.2	9.5	11.1	2.56	3.79	----	----
[ST] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	28.5	67.3	2.5	3.4	13.7	3.23	5.47	3.5	5.47
	Notional	13.9	123.4	1.5	9	13.3	2.56	3.79	----	----
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	4.5	0	0.4	0	1.1	3.24	0	3.24	0
	Notional	42.2	0	4.6	0	1.1	2.56	0	----	----
[ST] Chilled ceilings or passive chilled beams and displacement ventilation, [HS] Heat pump (electric): air source, [HFT] Elec										
	Actual	1.9	109.9	0.2	6.9	6.8	3.43	4.43	3.43	4.43
	Notional	0.6	177.1	0.1	13	11.4	2.56	3.79	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.2	B1000000:Surf[1]
Floor	0.2	0.12	B1000000:Surf[0]
Roof	0.15	0.12	B1000000B:Surf[1]
Windows, roof windows, and rooflights	1.5	1.4	00000008:Surf[1]
Personnel doors	1.5	-	No personnel doors in building
Vehicle access & similar large doors	1.5	-	No vehicle access doors in building
High usage entrance doors	1.5	-	No high usage entrance doors in building
U _{i-Typ} = Typical individual element U-values [W/(m²K)]			
U _{i-Min} = Minimum individual element U-values [W/(m²K)]			
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

Appendix B – PV Arrangement

Reg. Office Address:
Sweco UK Limited
Grove House
Mansion Gate Drive
Leeds, LS7 4DN
+44 113 262 0000

Reg. No.: 2888385
Reg. Office: Leeds

www.sweco.co.uk

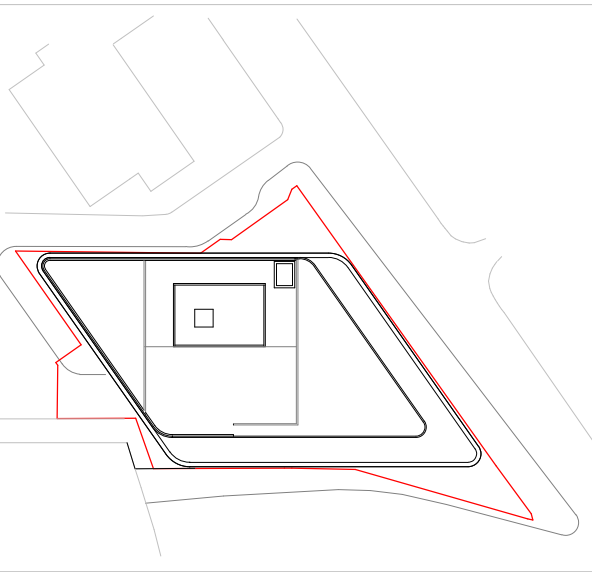
Sweco UK Limited
1 Bath Road

Maidenhead, SL6 4AQ
+44 1628 623 423

Roaa Babiker
Senior Sustainability Engineer
+44 1628 598 335

Roaa.babiker@sweco.co.uk

Key Plan



Do not scale from this drawing.

Check drawing on receipt and immediately report any discrepancies to the Architect.

Verify all dimensions and levels on site prior to construction.

The contents of this drawing are Piercy&Company copyright and shall not be re-used without their written permission.

Notes

Building Use Key

- Circulation
- Landlord
- Office
- Plant
- Retail
- Cycle Store
- WC / STORAGE
- Refuse Store
- Site Boundary
- Extent of Works

A	26/05/23	Stage 4 Issue	GM	NH
Rev	Date	Description	Drawn	Checked

Piercy&Company

Piercy&Company
39 Plender Street
London NW1 0DT

T +44(0)20 74249611
info@piercyandco.com
www.piercyandco.com

Client

Toriview Ltd

Project

Land At Corporation Street "New
Victoria Phase 2" Manchester M3 1NX

Drawing Title

Proposed Plan - Roof Level

Drawing Status	Drawing:	GM	Revision
S3	Checked:	NH	A

Date:

26/05/23

Scale @ A1

1 : 100

Drawing No.

NV-PCO-ZZZ-L13-DR-A-03114

Appendix C – BREEAM Credit Tracker

Reg. Office Address:
Sweco UK Limited
Grove House
Mansion Gate Drive
Leeds, LS7 4DN
+44 113 262 0000

Reg. No.: 2888385
Reg. Office: Leeds

www.sweco.co.uk

Sweco UK Limited
1 Bath Road

Maidenhead, SL6 4AQ
+44 1628 623 423

Roaa Babiker
Senior Sustainability Engineer
+44 1628 598 335

Roaa.babiker@sweco.co.uk

BREEAM NC 2018 Credit Review

14/03/2023 Rev.8

Project Name		New Victoria Office		Targeted BREEAM rating %		83.72	Excellent		Credit awarded		Credit awarded		
Building Type		Office		Potential BREEAM rating %		93.45	Outstanding		Credit not applicable to the stage		Credit not targeted		
Project Type		Shell and Core		Achieved scoring %		22.09	Unclassified		Potential additional credit		Potential additional credit		
									Urgent information needed		Further information required		
Credit Ref.	Credit Title	Credit Name	Credits Available	Credits Targeted	Potential Additional	Credits Achieved	Responsibilities	Design Stage Assessment				Final Assessment	
								Status	Requirement			Status	Requirement
MANAGEMENT													
		0.61%											
Man 01	Project brief and design	Project Delivery Planning	1	1		1	Client	PM			No further action required at the design stage		No further action required at the construction stage
		Stakeholder Consultation (Interested Parties)	1	1		1	Client	PM			No further action required at the design stage		No further action required at the construction stage
		BREEAM AP (Concept Design)	1	1		1	BREEAM AP				No further action required at the design stage		No further action required at the construction stage
		BREEAM AP (Developed Design)	1	1		0	BREEAM AP				Letter of commitment from the client regarding the involvement of BREEAM AP		BREEAM AP site visit reports, meeting minutes
Man 02	Life cycle cost and service life planning	Elemental Life Cycle Cost (LCC)	2	2		2	LCC Specialist				No further action required at the design stage		A letter explaining how steps have been taken to comply with the requirements and recommendations of the LCC report
		Component Level LCC options appraisal	1	1		0	LCC Specialist				No action required at the design stage		A Component LCC analysis at RIBA Stage 4 including Envelope, e.g. cladding, window, roof. Services, Finishes, e.g. floors or ceilings. External spaces, e.g. landscaping.
		Capital Cost Reporting	1	1		0	QS	Client				Capital cost in £/m2	
Man 03	Responsible construction practices	Legally harvested and traded timber	Prerequisite				Contractor				Commitment letter from the contractor		Invoices, letters and reports about the timber used on site
		Environmental Management	1	1		0	Contractor				Commitment letter from the contractor about EMS: certificate of ISO 14001 /EMAS		EMS certificates (Should be updated when expired)
		BREEAM AP (Site)	1	1		0	Contractor				Site BREEAM AP appointment letter or commitment letter		Site BREEAM AP reports, meeting minutes
		Responsible Construction Management	2	2		0	Contractor				Report/letter showing considerate construction scheme participation		CCS certificates (Should be updated when expired)
		Monitoring of Construction Site Impacts - Utility Consumption	1	1		0	Contractor				Commitment letter		Site-based energy and water usage to be monitored. Display figures on site.
		Monitoring of Construction Site Impacts - Transport of Construction Materials & Waste	1	1		0	Contractor				Commitment letter		Vehicle monitoring of materials deliveries from point of supply and vehicle monitoring of waste to establish carbon figures. Display figures on site.
Man 04	Commissioning & Handover	Commissioning - Testing Schedule & Responsibilities	1	1		0	Contractor	Specialist			Commitment letter		Third party commissioning manager to be appointed. Testing schedule and responsibilities to be provided.
		Commissioning - design and preparation	1	1		0	Contractor	Specialist			Commitment letter		Appointment of an appropriate project team member, provided they are not involved in the general installation works provide commissioning management.
		Testing & Inspecting Building Fabric	1	1		0	Contractor				Commitment letter		Thermographic survey as well as an airtightness test and inspection required.
		Building User Guide (BUG)	Prerequisite				Contractor				Commitment letter		Commissioning manager required to return to site at summers/winter months after occupation at least for 1 year. Carry out recommissioning if required.
		Handover	1	1		0	Contractor				Commitment letter		Third party appointment to undertake evaluation, provide feedback and report with lessons learned to the client and building occupiers.
Man		TOTAL:	18	18	0	5							
		% of total score:	11.00%	11.00%	0.00%	3.06%							
HEALTH & WELLBEING		0.73%											
Hea 01	Visual comfort	View Out	1	1		0	Architect				Hatched GA plans for the mezzanine floor, first floor, and 10th floor. Hatched M2 information for the typical floor, the mezzanine floor, the first floor, and the tenth floor.		A letter explaining how steps have been taken to comply with the requirements and recommendations of the daylighting study report As built drawings
		External Lighting Levels	1	1		0	M&E	Lighting Specialist			No further action required at the design stage		A letter explaining how steps have been taken to comply with the BREEAM requirements. As built drawings
Hea 02	Indoor air quality	Indoor Air Quality Plan (IAQP)	Prerequisite				Specialist	Contractor			Commitment letter from the contractor		A letter explaining how steps have been taken to comply with the requirements and recommendations of the IAQP As built drawings
		Ventilation	1	1		0	M&E	Contractor			No further action required at the design stage		A written confirmation that no changes have been made since the design stage. As built drawings
Hea 04	Thermal comfort	Thermal modelling	1	1		1	Energy Consultant				No further action required at the design stage		A written confirmation that no changes have been made since the design stage. The as-built thermal comfort modelling report must be provided if there have been any changes.
		Design for future thermal comfort	1	1		1	Energy Consultant				No further action required at the design stage		A written confirmation that no changes have been made since the design stage. The as-built thermal comfort modelling report must be provided if there have been any changes.
Hea 05	Acoustic performance	Acoustic performance standards	1	1		0	Contractor	Acoustician			Commitment letter from the contractor		A letter explaining how steps have been taken to comply with the requirements and recommendations of the acoustician. As built drawings
Hea 06	Safety & Security	Security of Site & Building	1	1		0	Architect	M&E	Contractor		Completed HEA06 matrix Commitment letter from the contractor		A letter explaining how steps have been taken to comply with the requirements and recommendations of the security needs assessment report. As built drawings
Hea 07	Safe and healthy surroundings	Safe Access	1	1		1	Architect	Contractor			A letter explaining how steps have been taken to comply with the BREEAM requirements. Site plan		A letter explaining how steps have been taken to comply with the BREEAM requirements. As built drawings
		Outside Space	1	1		1	Architect	Contractor			A letter explaining how steps have been taken to comply with the BREEAM requirements.		As built drawings
Hea		TOTAL:	11	9	0	4							
		% of total score:	8.00%	6.55%	0.00%	2.91%							



Credit Ref.	Credit Title	Credit Name	Credits Available	Credits Targeted	Potential Additional	Credits Achieved	Responsibilities			Design Stage Assessment		Final Assessment	
										Status	Requirement	Status	Requirement
ENERGY		0.64%											
Ene 01	Reduction of Emissions	Energy Performance Commissioning - Implementation	9	6		0	Energy Consultant				BRUKL document		As built BRUKL document
		Energy Modelling and Reporting	4	4		0	Energy Consultant				Energy modeling report		Energy modeling report
Ene 02	Energy Monitoring	Sub-Metering of End-use Categories	1	1		0	M&E				No further action required at the design stage		As built schematics
		Sub-Metering of High Energy Load & Tenancy Areas	1	1		0	M&E				No further action required at the design stage		As built schematics
Ene 03	External Lighting	External Lighting	1	1		0	M&E				No further action required at the design stage		As built schematics
Ene 04	Low Carbon Design	Passive Design Analysis	1	1		1	Energy Consultant				No further action required at the design stage		A written confirmation that no changes have been made since the design stage. As built drawings
		Low Zero Carbon Feasibility Study	1	1		1	Energy Consultant				No further action required at the design stage		A written confirmation that no changes have been made since the design stage. As built drawings
Ene 06	Energy Efficient Transportation Systems	Energy Consumption	1	1		0	Lift Consultant				No further action required at the design stage		A written confirmation that no changes have been made since the design stage. As built drawings
		Energy Efficient Features - Lifts	1	1		0	Lift Consultant				No further action required at the design stage		A written confirmation that no changes have been made since the design stage. As built drawings
		Energy Efficient Features - Escalators or moving walks	1	1		0	Lift Consultant				No further action required at the design stage		A written confirmation that no changes have been made since the design stage. As built drawings
Ene		TOTAL:	22	18	0	2							
		% of total score:	14.00%	11.45%	0.00%	1.27%							
TRANSPORT		0.82%											
Tra 01	Transport assessment and travel plan	Travel plan	2	2		2	Contractor				Commitment letter from the contractor		A letter explaining how steps have been taken to comply with the requirements and recommendations of the travel plan
Tra 02	Sustainable transport measures	1. The existing AI calculated in Tra 01	6	6		0	Transport Consultant				No further action required at the design stage		No further action required at the construction stage
		3. Provide a public transport information system in a publicly accessible area, to allow building users access to up-to-date information on the available public transport and transport infrastructure.	1	1		0	Client	Contractor	Architect		A letter explaining the public transport information system		A letter explaining the public transport information system As built drawings
		6. During preparation of the brief, the design team consults with the local authority (LA) on the state of the local cycling network and public accessible pedestrian routes, to focus on whichever the LA deems most relevant to the project, and how to improve it.	2	0	2	0	Client	PM	Transport Consultant		Potential Credit - Confirmation needed		No further action required at the construction stage
		7. Install compliant cycle storage spaces to meet the minimum levels set out in Table 7.5	1	1		0	Architect	Contractor			GA drawings of cycle storage area		As built drawings
		8. Provide at least two compliant cyclists' facilities for the building users	1	1		0	Architect	Contractor			GA drawings of cyclist facilities		As built drawings
		9. At least three existing accessible amenities are present, see Table 7.6.	1	1		1	BREEAM Assessor				No further action required at the design stage		No further action required at the construction stage
		Tra		TOTAL:	14	12	2	3					
% of total score:	11.50%			9.86%	1.64%	2.46%							
WATER		0.78%											
Wat 01	Water Consumption	Water Consumption	5	3	1	0	Architect	M&E			Bathroom schedule		A written confirmation that no changes have been made since the design stage.
Wat 02	Water Monitoring	Water Monitoring	1	1		0	M&E				No further action required at the design stage		As built schematics
Wat 03	Water Leak Detection	Leak Detection System	1	1		0	M&E				No further action required at the design stage		As built schematics
		Flow Control Devices	1	1		0	M&E				No further action required at the design stage		As built schematics
Wat 04	Water efficient equipment	Water efficient equipment	1	1		0	Landscape Architect	M&E			A letter explaining how steps have been taken to comply with the BREEAM requirements.		As built schematics
Wat		TOTAL:	9	7	1	0							
		% of total score:	7.00%	5.44%	0.78%	0.00%							

Credit Ref.	Credit Title	Credit Name	Credits Available	Credits Targeted	Potential Additional	Credits Achieved	Responsibilities	Design Stage Assessment				Final Assessment	
								Status	Requirement			Status	Requirement
MATERIALS		1.25%											
Mat 01	Environmental impacts from construction products - Building life cycle assessment (LCA)	Superstructure - Concept Design	6	4	1	2	LCA Specialist				Updated LCA report (Stage 3 report)		Updated LCA report
		LCA Specialist								Updated LCA report (Stage 3 report)		Updated LCA report	
		Substructure and hard landscaping options appraisal during Concept Design	1	1		1	LCA Specialist				Updated LCA report (Stage 3 report)		Updated LCA report
Mat 03	Responsible Sourcing of construction products	Timber procurement details	Prerequisite				ALL TEAM				Commitment letter from the contractor		All timber to be FSC/PEFC certified etc.
		Enabling Sustainable Procurement	1	1		1	Client				No further action required at the design stage		Written confirmation that all procurement activities were done in line with the measures set in the sustainable procurement plan is required.
		Measuring Responsible Sourcing	3	1	1	0	Architect	Contractor			Commitment letter from the contractor		Material specified from manufacturers who can provide EMS Certification (ISO 14001 etc.)
Mat 05	Designing for Durability & Resilience	Designing for Durability & Resilience	1	1		0	Architect	Structural Engineer	M&E		Completed Mat05 tool		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at Mat05 tool. As built drawings
Mat 06	Material Efficiency	Preparation and Brief	1	1		0	Architect	Structural Engineer	M&E		Completed Mat06 tool		No further action required at the construction stage
		Concept Design									Completed Mat06 tool		No further action required at the construction stage
		Developed Design									Completed Mat06 tool		No further action required at the construction stage
		Technical Design									No action required at the design stage		Completed Mat06 tool
		Construction									No action required at the design stage		Completed Mat06 tool
Mat		TOTAL:	14	9	2	4							
		% of total score:	17.50%	11.25%	2.50%	5.00%							
WASTE		0.64%											
Wst 01	Construction Waste Management	Pre-demolition audit	1	1		0	Demolition Contractor	Contractor			Information regarding local reproprocessors or recyclers and overall landfill diversion rate for all key materials need to be added to the report.		Post demolition report comparing actual waste arisings and waste management routes with the report
		Construction Resource Efficiency	3	2		0	Contractor				Commitment letter		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at the RMP
		Diversion of Resources from Landfill	1	1		0	Contractor				Commitment letter		Letter/report explaining the amount of waste generated and processed/recycled.
Wst 03	Operational Waste	Operational Waste	1	1		1	Contractor				No further action required at the design stage		Credit has been completed for the design stage. Additional information will be needed at the construction stage.
Wst 04	Speculative Finishes (Offices only)	Speculative Floor and Ceiling Finishes	1	1		1	Contractor				No further action required at the design stage		Client's commitment letter has been received and compliant.
Wst 05	Adaptation to Climate Change	Resilience of structure, fabric, building services and renewables installation	1	1		0	Architect	M&E	Structural Engineer		No further action required at the design stage		Updated WST05 document
Wst 06	Design for disassembly and adaptability	Design for disassembly and functional adaptability - recommendations	1	1		0	Architect	M&E	Structural Engineer		Updated Wst 06 document with drawing and report references		Wst 06 document has been received and compliant. Drawing and report references will be added - credit will be awarded once this information added.
		Disassembly and functional adaptability – implementation	1	1		0	Architect	M&E	Structural Engineer		No further action required at the design stage		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment
Wst		TOTAL:	11	9	0	2							
		% of total score:	7.00%	5.73%	0.00%	1.27%							
LAND USE & ECOLOGY		1.15%											
LE 01	Site Selection	Previously Occupied Land	1	1		0	Architect				Updated site plan with m2 information		No further action required at the construction stage
		Contaminated Land	1	0	1	0		Specialist*			Potential Credit - Confirmation needed		No further action required at the construction stage
LE 02	Identifying and understanding the risks and opportunities for the project	Statutory obligations	Prerequisite				Client	Contractor			Commitment letter from the contractor		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment
		Survey and evaluation	1	1		1	Ecologist				Evidence of how preliminary ecological appraisal was shared with the team (email)		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment
		Determining the ecological outcomes of the site	1	1		1	Ecologist				Evidence of discussion with stakeholders about the ecological outcomes (Emails, meeting minutes) Evidence of confirmation from the ecologist about the outcomes of stakeholder discussions		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment
LE 03	Managing negative impacts on ecology	Ecological risks and opportunities	Prerequisite				Ecologist	Client	Contractor		Evidence of discussion with stakeholders about the ecological outcomes (Emails, meeting minutes) Evidence of confirmation from the ecologist about the outcomes of stakeholder discussions		No further action required at the construction stage
		Planning and measures on-site	1	1		0	Ecologist	Contractor			Ecologist to confirm if seasonal survey is required before construction begins Contractor letter about assigned roles and responsibilities, planning and implementation of site preparation		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment
		Managing negative impacts on ecology	2	2		2	Ecologist	Contractor			Commitment letter from the contractor		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment
LE 04	Ecological change and enhancement	Managing negative impacts on ecology	Prerequisite								Commitment letter from the contractor		No further action required at the construction stage
		Ecological enhancement	1	1		0	Contractor	Ecologist			No action required at the design stage		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment
		Change and enhancement of ecology	3	2	1	0	Contractor	Ecologist			No action required at the design stage		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment
LE 05	Long Term ecology management and maintenance	Roles & Responsibilities, implementation, statutory obligations	Prerequisite				Client	Contractor			Commitment letter from the contractor		No further action required at the construction stage
		Management and maintenance throughout the project	1	1		0	Contractor	Design Team			No action required at the design stage		Letter/report explaining implementation effectiveness and maintenance solutions.
		Landscape and ecology management plan (or similar) development	1	1		0	Client	Contractor			No action required at the design stage		Landscape and ecology management plan, or similar (In accordance with BS 42020:2013) covering as a minimum the first five years after project completion.
LE		TOTAL:	13	11	2	4							
		% of total score:	15.00%	12.69%	2.31%	4.62%							



Credit Ref.	Credit Title	Credit Name	Credits Available	Credits Targeted	Potential Additional	Credits Achieved	Responsibilities	Design Stage Assessment				Final Assessment	
								Status	Requirement			Status	Requirement
POLLUTION		0.75%											
Pol 01	Impact of Refrigerants	Systems with electric compressors	Prerequisite				M&E	Contractor			No further action required at the design stage		Confirmation letter from the contractor
		Impact of Refrigerants	2	1	1	0	M&E	Contractor			No further action required at the design stage		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment
		Leak Detection	1	1		0	M&E	Contractor			No further action required at the design stage		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment As built drawings and schematics
Pol 02	Local air quality	Local air quality	2	2		0	M&E	Contractor			No further action required at the design stage		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment As built drawings and schematics
Pol 03	Flood and surface water management	Flood Resilience	2	2		2	Floor Risk Consultant	Contractor			No further action required at the design stage		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment As built drawings and schematics
		Surface Water Run Off	2	1	1	0	Floor Risk Consultant	Contractor			No action required at the design stage		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment As built drawings and schematics
Pol 04	Reduction of Night Time Light Pollution	Reduction of Night Time Light Pollution	1	1		0	M&E	Contractor			No further action required at the design stage		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment As built drawings and schematics
Pol 05	Reduction of Noise Pollution	Reduction of Noise Pollution	1	1		0	Acoustician	Contractor			No further action required at the design stage		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment As built drawings and schematics
Pol		TOTAL:	12	9	2	2							
		% of total score:	9.00%	6.75%	1.50%	1.50%							
INNOVATION		1.00%											
Inn 01	Man 03	Responsible construction practices	1	1		0	Contractor				Commitment letter		CCS certificates (Should be updated when expired)
Inn 05	Ene 01	Reduction of Energy Use & Carbon Emissions	5	2		0	Energy Consultant				4 credits achieved at Ene01 Prediction of Operational Energy		Energy assessor to report on actual as-built energy consumption vs. targets set via Ene01 criteria 4
Inn 11	Wst 05	Responding to Climate Change	1	0	1	0	BREEAM Assessor				Potential Credit - will be awarded depending on the performance at HEA04, ENE01, ENE04, WAT01, MAT05 and POL03 credits		A letter explaining how steps have been taken to comply with the requirements and recommendations stated at design stage assessment for HEA04, ENE01, ENE04, WAT01, MAT05 and POL03 credits
Inn		TOTAL:	10	3	1	0							
		% of total score:	10.00%	3.00%	1.00%	0.00%							
Final BREEAM Score		Overall Credits	134	105	10	26							
		Final BREEAM score:	110.00%	83.72%	9.73%	22.09%							