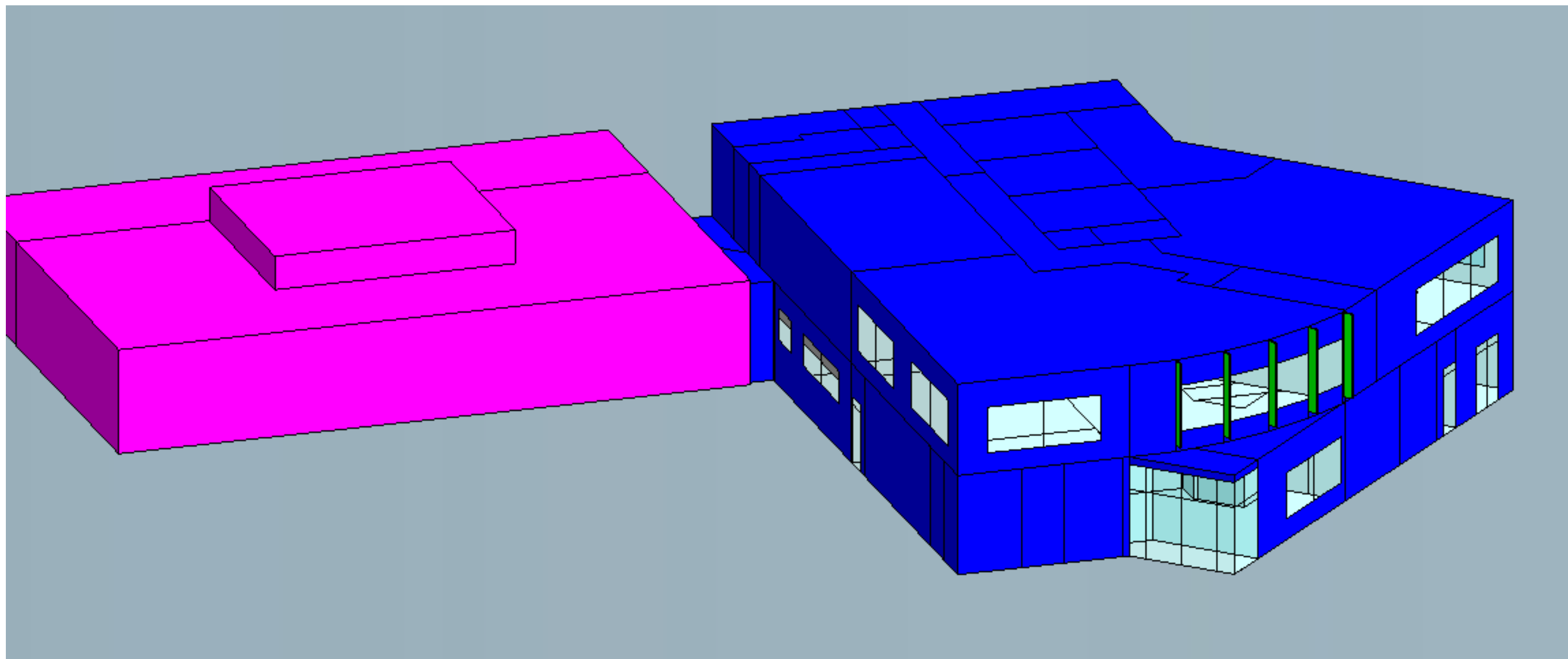




MCWFC Training Facility, 550 Ashton New Road, Manchester M11 4AA

ENERGY STATEMENT REPORT

230565-SVM-ZZ-ZZ-RP-Z-3100 (Revision P02)

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PROJECT INFORMATION

PREPARED BY Karen Connellan

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DOC TITLE Energy Statement Report

VERSION P02

FILE NAME 230565-SVM-ZZ-ZZ-RP-Z-3100 – Energy Statement Report

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DATED 05/12/2023

CHECKED BY

NAME Ben Tysoe

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DATED 05/12/2023

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COMPANY Bowker Sadler Architecture

ADDRESS



1. Executive Summary

This energy statement report has been prepared on behalf of Bowker Sadler Architecture for the proposed Training Facility (MCWFC) Development located at 550 Ashton New Road, Manchester.

The report accounts for planning and buidling control requirements at both national and local level. With the site situated in Manchester, this report takes into account local planning policy– Manchester’s Local Development Framework – ‘Core Strategy Development Plan Document’ Adopted July 2012.

- Policy EN 4 - follow the principle of the Energy Hierarchy.
- Policy EN6 – Energy Statement CO₂ target. Non-domestic CO₂ emissions reduction targets. (Target 2: Electricity intense buildings - % Minimum requirement - +10% increase on Part L 2010).
- Policy EN6 - Where the CO2 emissions reduction required under any future revision to Part L of the building regulations becomes greater than the '% Minimum requirement', the reduction required under building regulations would apply.

The development falls into the Non-domestic CO₂ emissions reduction Target 2 = minimum +10% increase on Part L 2010. There has been two additional Building Regulations editions since PartL2010, PartL2013 & the present PartL2021, with CO₂ emission improvements with each new edition – below shows that the planning policy reduction requirement is covered within the improvements made within each edition:-

PartL2010 → PartL2013 = 9% Improvement on 2010

PartL2013 → PartL2021 = 27% Improvement on 2013

Total improvement PartL2010 → PartL2021 = 36% Improvement.

Part L 2021 Volume 2 (ADL2) Regulation 24 – Methodology of calculation of the energy performance:

- Analysis of the building performance has been performed by creating a dynamic thermal model using an accredited simulation tool to guidance set out in CIBSE’s (AM11, 2015). An IES-VE dynamic thermal model has been developed using software Version 2023.2.0.0 BRUKL compliance check v6.1.e.1. The dynamic simulation uses national calculation methodology to compare the actual building to the Part L 2021 Volume 2 (ADL2) notional building performance.

Part L 2021 Volume 2 (ADL2) Regulation 25A - Consideration of high-efficiency alternative systems for new buildings:

- Refer to section 5 & 6 for the feasibility analysis of installing high-efficiency, low-carbon alternative systems for the proposed building.

This assessment aims to provide evidence that the proposed scheme will be a sustainably designed development and resilient to climate change through improving energy efficiency, reducing carbon dioxide emissions, generating energy services efficiently and implementing building integrated low and zero carbon technologies.

As set out within this report, the intention will be for the development to take a fabric first approach to energy demand reduction with high fabric standards, and introduce further energy demand reduction measures such as energy efficient lighting and control. The new building will be better for the

environment, affordable to heat and by using ASHP heating to provide a significant proportion of the building’s energy demand from renewable sources and reduce carbon emissions.

The “Be Lean, Be Clean, Be Green” energy hierachy principles have been utilised during the modelling and design in order to understand the improvements achieved at each stage.

Following the energy hierarchy passive design, energy efficient measures and renewable energy sources have been considered and the design will incorporate the following with a fabric first approach:

- Improved building envelope with low heat loss. Improved U values, lower air permeability and Improved glazing performance
- Design to maximise natural daylight, Solar gain control measures
- Highly efficient LED lighting
- Mech Ventilation strategy including heat recovery
- ASHP heating system
- ASHP domestic hot water.
- ASHP cooling system
- Electric Power Correction (>0.95)
- Photovoltaic Panels (roof mounted PV)

PV Allocation – 25 Panels (1.762x1.134=1.998m²) = 50m² - Panel 425W 21.3% Efficiency. South Facing. 9042kWh/annum – 11.1kWp

Part L 2021 Volume 2 (ADL2) Regulation 26 - CO₂ emission rates for new buildings

Energy Hierarchy - CO ₂ emission rates	CO ₂ Emissions (kgCO ₂ /m² per annum)	Regulated kgCO ₂ /m² Savings	% Reduction
Target CO ₂ Emission Rate (TER) - Part L 2021Notional building Emission Rate	18.21		
Building CO ₂ Emission Rate (BER) – Be Green - After renewable energy – ASHP + PV 50m² - 21.3% Eff – 9042kWh/annum – 11.1kWp	17.46	0.75	4.12%

Table 1: Proposed CO₂ Emissions summary & Savings based on PartL 2021 ADL2 emission factors

Part L 2021 Volume 2 (ADL2) Regulation 26C - Target primary energy rates for new buildings

Energy Hierarchy – Primary Energy	Primary Energy Rate (kWh/m² per annum)	Primary Energy Savings	% Reduction
Target Primary Energy Rate (TPER) - Part L 2021 Notional building Primary Energy Rate	198.16		
Building Primary Energy Rate (BPER) – Be Green - After renewable energy – ASHP + PV 50m² - 21.3% Eff – 9042kWh/annum – 11.1kWp	189.64	8.52	4.23%

Table 2: Proposed Prime Energy Summary & Savings based on PartL 2021 energy factors

2. Introduction

2.1 Purpose of Report

The purpose of this energy statement is to provide clarity on the design and proposed solutions that will address climate change mitigation opportunities and detail the measures necessary to comply with - Manchester’s Local Development Framework – ‘Core Strategy Development Plan Document’ Adopted July 2012.

The report has considered the Energy hierarchy design “Be Lean, Be Clean, Be Green” principles. The aim of this report is to develop an energy strategy for the building using a hierarchy approach of reducing energy demand, applying efficient building services, and finally utilising decentralised and/or renewable energy sources where appropriate. The proposed design aims to achieve a carbon emission reduction over Building Regulations 2021 Part L Volume 2 (ADL2).

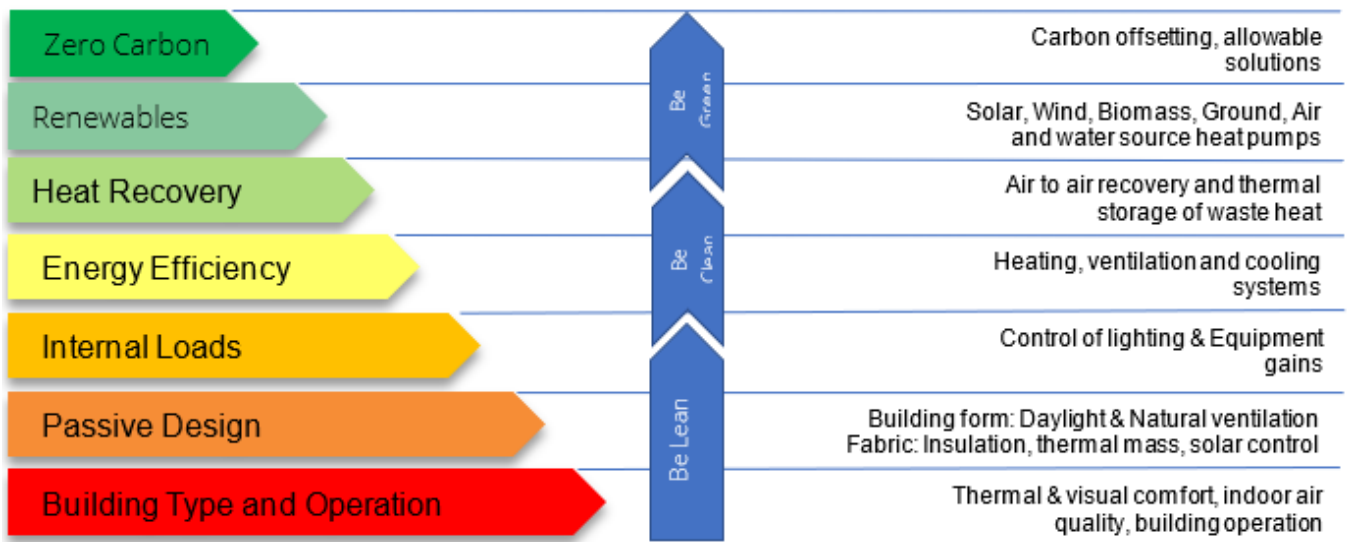


Figure 1: Energy Hierarchy and associated targets

The report details the options considered in the development of the design and explains the options chosen. Targets for the building fabric and services are set out in standard formats in this report.

As the co-author of this report, I am a fully certified CIBSE low carbon energy assessor and hold the following qualifications: Low carbon energy assessor (level 3, 4 & 5) for the production of EPC to meet the requirements of the Energy Performance of Buildings Regulations in England, Wales and Northern Ireland. Low Carbon building design to comply with the building regulations and the EPBD in the United Kingdom. Computer software for the simulated evaluation of environmental performance of buildings related to building regulations in the United Kingdom. Ben Tysoe Certificate No. LCEA12623.

2.2 Site Description

The proposed development is extension\refurbishment of a former bank to create a new training facility:

2 Storey training facility development consisting of (1185m² Extension to existing hall) -

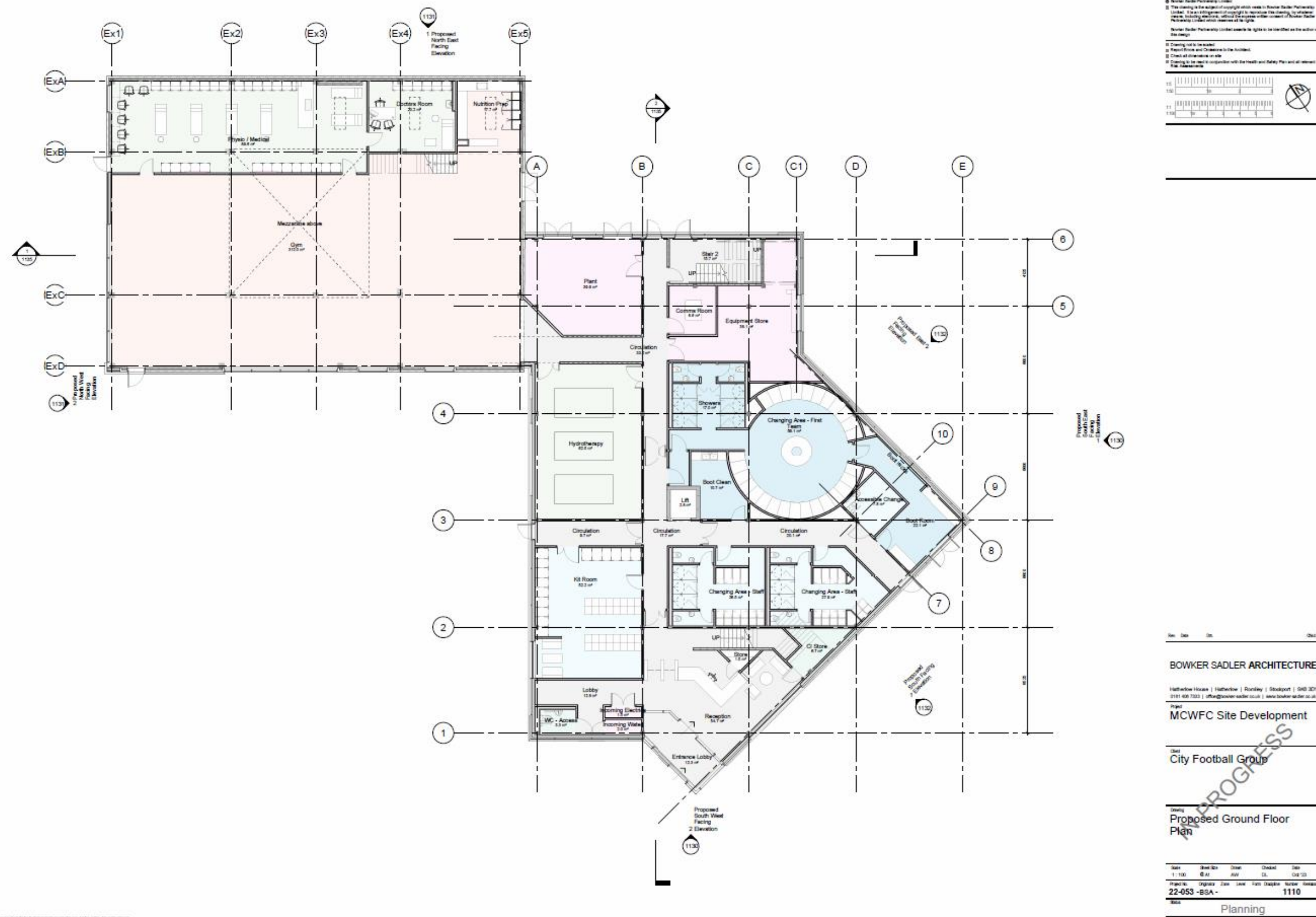
- Kitchen
- Lounge
- Refectory
-
- Office\Meeting Rooms
- Changing Rooms
- Equipment Stores
- Hydrotherapy
- WC's
- Circulation



2.3 Location Data

Building type: D2: General assembly and Leisure (Sports Centre)
Weather Location: Manchester TRY (CIBSE 2016 dataset) for Part L 2021 Volume 2 compliance

Proposed Ground Floor – Received 15.11.23



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0161 406 7333 | office@bowker-sadler.co.uk | www.bowker-sadler.co.uk

Project
MCWFC Site Development

Sited
City Football Group

Drawing
Proposed First Floor Plan

Scale 1 : 100 Plot Size 0.41 A/W Checked DL Date 08/10

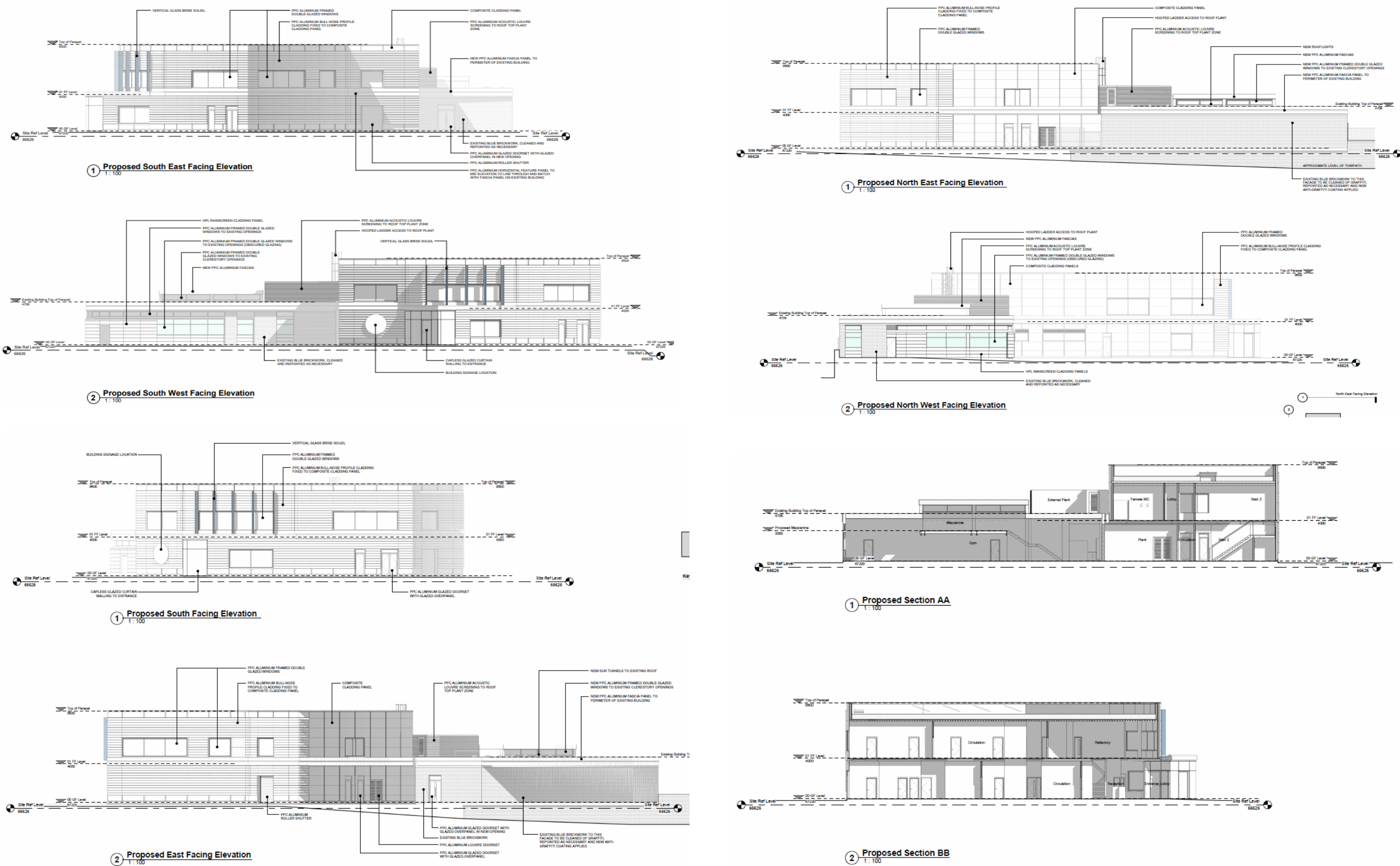
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22-053 - 1111

Notes

Planning

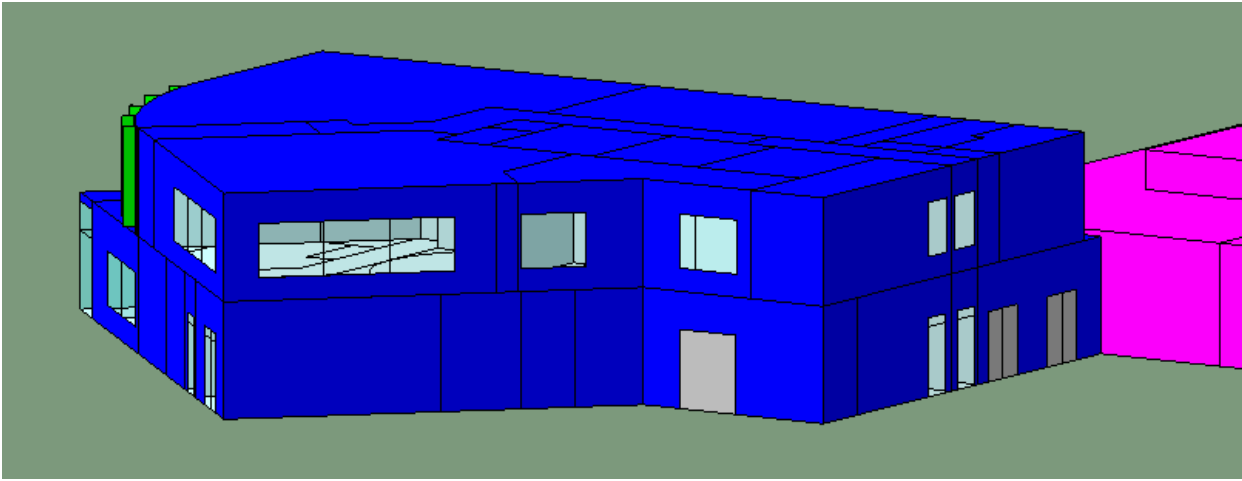
Proposed Elevations + Sections – Received 15.11.23

22-053- 1130 + 1131 + 1132 + 1135

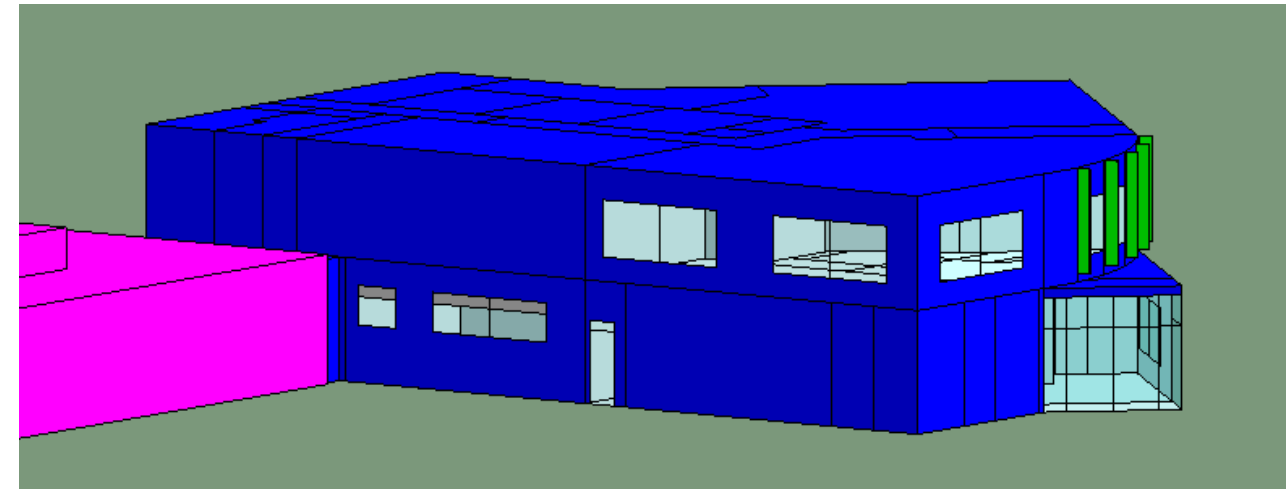


2.5 Model Images

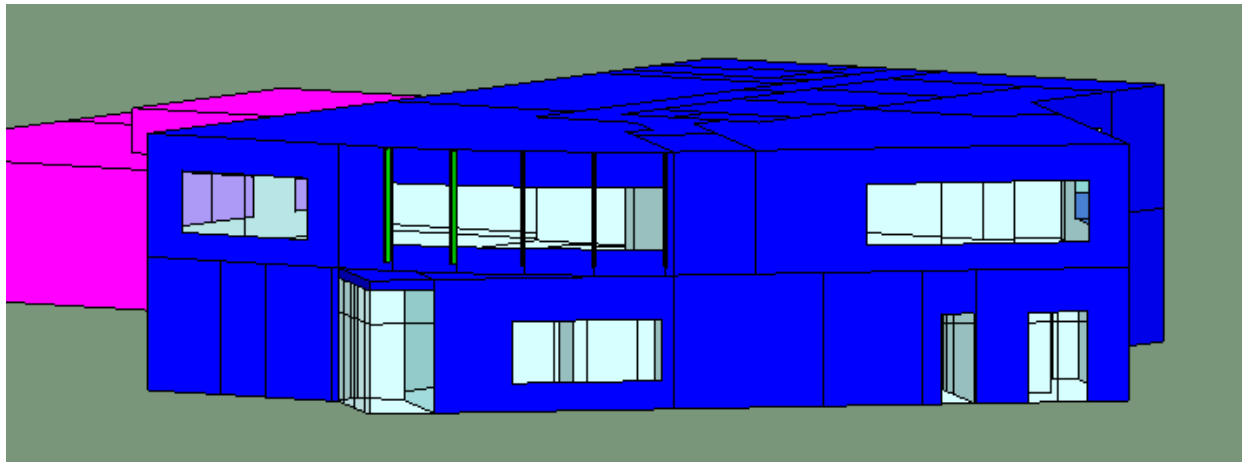
East View



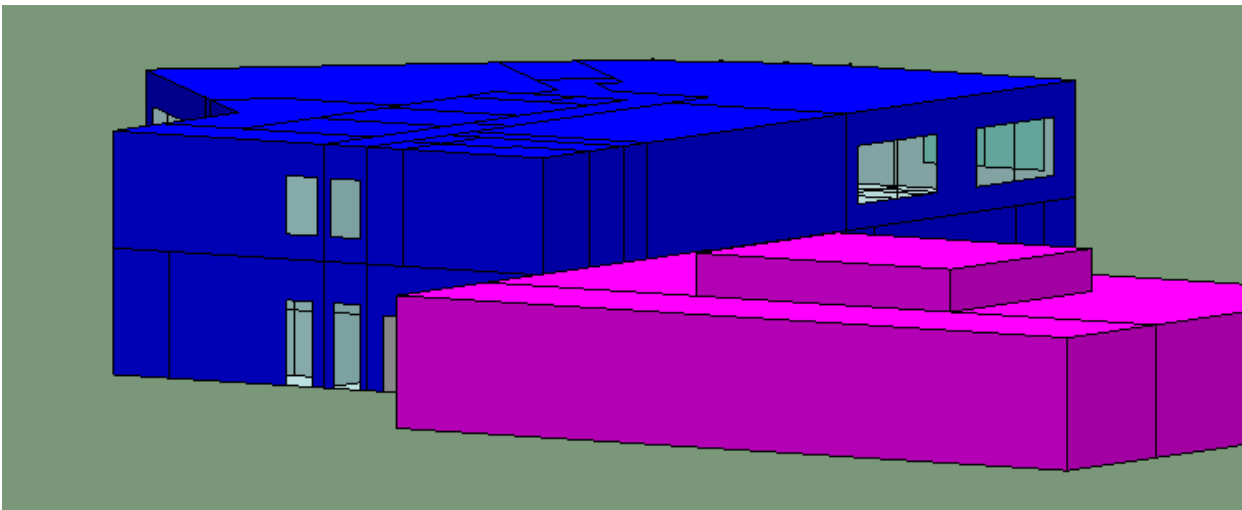
West View



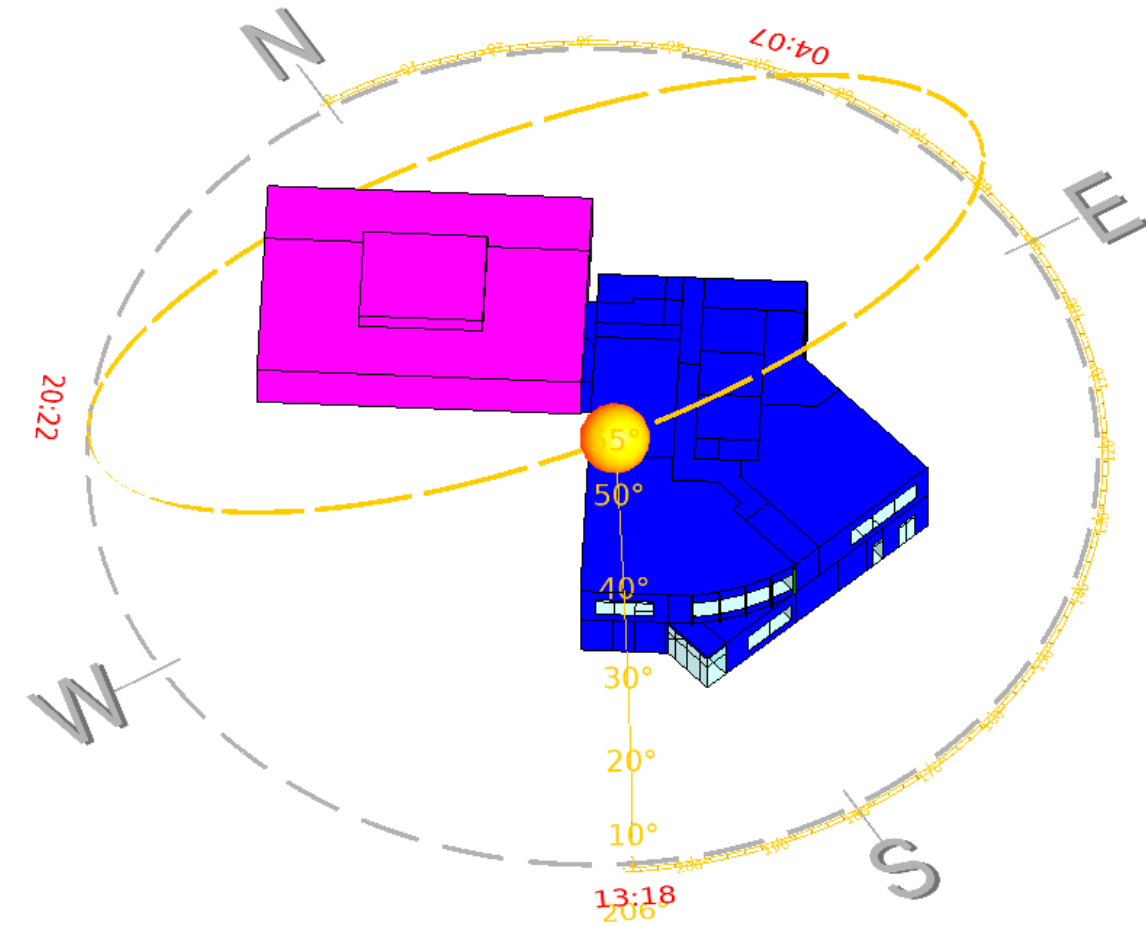
South View



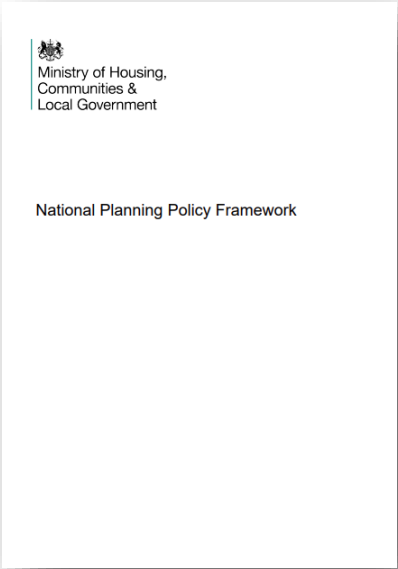
North View

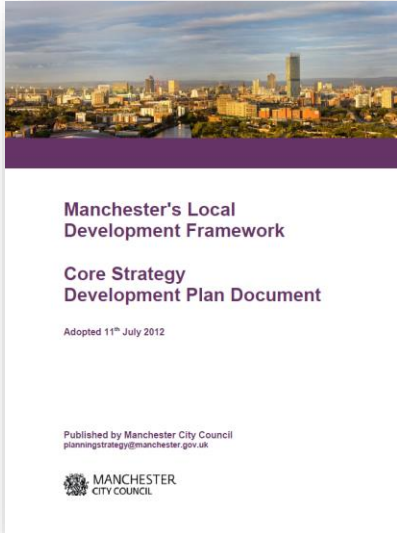


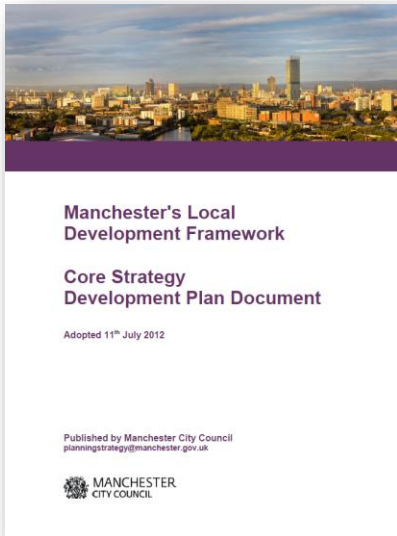
Solar Overview

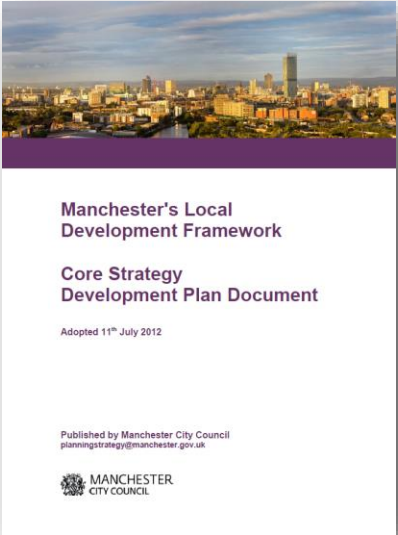


2.6 Planning Policy

Policy Document	Policy Reference	Requirements
National Planning Policy Framework 2023 	2.(11) Achieving sustainable development	(11) Plans to positively seek opportunities to meet the development needs of their area and be sufficiently flexible to adapt to rapid change.
	3.(20) Plan-making	(20) Strategic policies should make sufficient provision for: infrastructure for transport, telecommunications, security, waste management, water supply, wastewater, flood risk and coastal change management, and the provision of minerals and energy (including heat).
	14.(153-157) Meeting the challenge of climate change, flooding, and coastal change	(153) Plans should take a proactive approach to mitigating and adapting to climate change, considering the long-term implications for: • flood risk • coastal change • water supply • biodiversity and landscapes • risk of overheating from rising temperatures. (154) New development to be planned to ensure that: • Risks can be managed through suitable adaptation measures, including planning of green infrastructure. • They help to reduce greenhouse gas emissions through its location, orientation, and design. (155) To increase the use and supply of renewable and low carbon energy and heat, plans should: • Create a positive strategy for energy from these sources • Identify suitable areas for renewable and low carbon energy sources/supporting infrastructure • Identify opportunities for the development to draw its energy from decentralised, renewable, or low carbon energy supply systems and for co-locating potential heat customers and suppliers. (157) In determining planning applications, local planning authorities should expect new development to: • Comply with any development plan policies on local requirements for decentralised energy supply (unless this is demonstrated too not be feasible). • Take account of landform, layout, building orientation, massing, and landscaping to minimise energy consumption.
	15.(174-186) Conserving and enhancing the natural environment	(174) Planning policies and decisions should contribute to and enhance the natural and local environment by: • Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. • Development should, wherever possible, help to improve local environmental conditions such as air and water quality, considering relevant information such as river basin management plans. (186) • Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, considering the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. • Opportunities to improve air quality or mitigate impacts should be identified at the plan-making stage, such as through traffic and travel management, and green infrastructure provision and enhancement.
	17. (210) Facilitating the sustainable use of minerals	(210) Planning policies should: • Take account of the contribution that substitute, or secondary and recycled materials and minerals waste would make to the supply of materials, before considering extraction of primary materials, whilst aiming to source minerals supplies indigenously.

Policy Document	Policy Reference	Requirements
A Local Plan for Manchester's Local Development Framework – 'Core Strategy Development Plan Document' Adopted July 2012. 	Policy EN 4: Reducing CO2 Emissions by Enabling Low and Zero Carbon Development Policy EN 6: Target Framework for CO₂ reductions from low or zero carbon energy supplies	The Council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO₂ emissions, and rising fossil fuel prices, through the following actions: - All development must follow the principle of the Energy Hierarchy, being designed - to reduce the need for energy through design features that provide passive heating, natural lighting and cooling. - to reduce the need for energy through energy efficient features such as improved insulation and glazing. - to meet residual energy requirements through the use of low or zero carbon energy generating technologies. - Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies. - Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings. - Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing/potential decentralised energy schemes. - The use of building materials with low embodied carbon in new development and refurbishment schemes. Applications for residential development of 10 or more units and all other development over 1,000 sq m will be expected as a minimum to meet the target shown in Tables 12.1 or 12.2, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated CO₂ emissions for all phases of the development. Developments smaller than the above threshold but involving the erection of a building or substantial improvement to an existing building will also be expected to meet the minimum target, where viable, but will not be expected to submit an energy statement. The target framework relates to three broad development locations and their potential for low and zero carbon, decentralised energy. The areas are defined as follows - Target 1 Network development areas: Locations where the proximity of new and existing buildings, the mix of uses and density of development provide the right conditions to support district heating (and cooling). - Target 2 Electricity intense areas: Locations where the predominant building type has an all electric fit-out such as retail units and leisure complexes. - Target 3 Micro-generation areas: Locations where lower densities and a fragmented mix of uses tend to mean that only building scale solutions are practical. Where the CO₂ emissions reduction required under any future revision to Part L of the building regulations becomes greater than the '% Minimum requirement', the reduction required under building regulations would apply. Where the Council identifies an 'allowable solution', for example within an energy proposals plan, that would produce higher carbon reductions at no extra cost than that of achieving the '% Minimum requirement' (or required under building regulations if greater) the higher percentage reduction will be required. The cost comparison is based on the cost of incorporating the 'allowable solution' at design stage. The energy statement will be required to be submitted at the outset of any proposed development (outline application or before). Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO₂ mitigation, subject to the energy statement incorporating evidence such as modelling to demonstrate compliance. Guidance on what the energy statement should contain and how to decide which target applies to a development proposal is given in Appendix A.

Policy Document	Policy Reference	Requirements								
	Appendix A Energy Target Explanation - Policy Approach EN6 Explanatory Notes	Non-domestic CO₂ emissions reduction targets Table 12.2 <table><tr><th>Target</th><th>% Minimum requirement</th></tr><tr><td>Target 1: Network development area</td><td>CHP/district heating anchor or connection or where not feasible, a 15% increase on Part L 2010</td></tr><tr><td>Target 2: Electricity intense buildings (Applies to commercial uses with a high proportion of emissions from electricity use (>45 kg CO2/m2))</td><td>+10%increase on Part L 2010</td></tr><tr><td>Target 3: Micro generation area</td><td>+15% increase on Part L 2010</td></tr></table> Energy Statement Methodology A. Set out the baseline information The baseline information should include the following: - Proposed mix of uses - Schedule of floorspace for each use - Proposed phasing and anticipated timescale for the completed development - The proposed servicing strategy for the development, by block, site or phase B. Calculate the total energy demand of the completed development Using the above baseline information, set out the projected future energy demand of the development, assuming the development is compliant with Part L of the Building Regulations 2010, and including the following: - Regulated emissions under Part L i.e. those associated with 'fixed' M&E plant such as space heating, ventilation, hot water and fixed lighting, and C. Calculate the equivalent annual carbon emissions from the completed development The carbon emissions should be calculated based on regulated energy use weighted to reflect the emissions factors for different fuels and energy sources. D. Apply the appropriate carbon emissions reduction target Use the guidance below, headed 'Which Target applies to my Development?' to identify the appropriate carbon emissions reduction target for your development. Using this calculate the extent of carbon savings that need to be made. E. Apply the energy hierarchy The energy hierarchy should be applied in order to identify opportunities for carbon emissions reductions through design and specification of the development. Set out the carbon savings achieved by each measure. This should include consideration of how to minimise or even design-out electricity use associated with heating, ventilation and cooling, and how to influence energy used by future occupiers e.g. through the installation of Building Energy Management systems or smart metering.	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
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									

Policy Document	Policy Reference	Requirements
		F. Consider all appropriate low carbon, renewable and/or decentralised energy technologies In order to achieve the overall carbon savings required, consider the range and/or mix of low carbon renewable and/or decentralised technologies that are available and appropriate for the type and location of the development. Set out the carbon savings achieved by each technology or mix of technologies and the associated cost of installing that technology. Technologies that may be considered appropriate are listed below. This list is not exhaustive and other technologies may be identified by the developer and given consideration. Any proposed technology will need to be appropriate to the site location and surrounding uses. • CHP/district heating - If the development falls into the category of Target 1 a CHP/district heating feasibility study, encompassing buildings that could be connected in the surrounding area will be expected as part of the consideration of potential low carbon technologies • Solar Hot Water (SHW) • Photovoltaics (PV) • Wind • Ground Source Heat Pumps (GSHP) • Air Source Heat Pumps (ASHP) • Biomass heating • Gas Combined Heat and Power (Gas CHP) • Biomass Combined Heat and Power (Biomass CHP) • Energy from Waste (EfW) • Deep Bore Geothermal • Fuel Cell technologies G. Assessment of least cost technology option Following on from the above assessment, the identified target should be met using the technology mix which demonstrates the required carbon reductions at the least cost. Where there are no suitable local resources or opportunities, and a district heating network is not deemed viable, solutions to a shortfall in carbon reductions over and above that required to achieve 'carbon compliance' under Government proposals may be met through the use of off-site allowable solutions. Which Target applies to My Development? • Target Area 1 will apply if a development has at least three of the following - commercial offices, hotel, residential, apartments, public building, supermarket, or it is adjacent to an existing district heat network. If connection to an existing heat network, or installation of a new heat network is not considered feasible or viable then a development would be expected to follow Target Area3. • Target Area 2 will apply where the predominant building type within a development will have an all-electric fit-out and will typically consist of retail or leisure units. • Target Area 3 will apply where the lower density or fragmented mix of uses means that building scale solutions tend to be the only viable options.

2.7 Part L 2021 Volume 2 Building Regulations - Buildings other than Dwellings

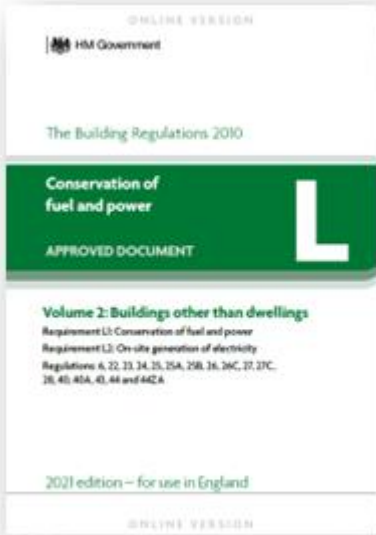
The proposed building is required to meet the requirements of Part L 2021 Volume 2 of the building regulations. The building regulation document sets out minimum building fabric and services standards, limitations on the amount of acceptable solar gain, a Target CO₂ Emission Rate (TER) & Target Primary Energy Rate (TPER) that must not be exceeded by the actual Building CO₂ Emission Rate (BER). & Building Primary Energy Rate (BPER) respectively.

Building Control bodies in the UK will require evidence that the building complies with regulations 24, 25, 25A, 25B, 26, 26C, 27 & 27C at design stage and once built.

The requirements of ADL Vol 2 2021 are summarised below . Please see the latest full version of the approved document online [Approved Documents - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/conservation-of-fuel-and-power-approved-document-volume-2-buildings-other-than-dwellings)

The Part L carbon emission and primary energy targets set out in sections one to four are applicable to the new building only. For the new build element of the development compliance is demonstrated through the production of BRUKL Output document from dynamic simulation.

Part L carbon emission & primary energy targets are not applicable to the existing building. For the existing building compliance is demonstrated by meeting the minimum standards for; new and replacement thermal elements, windows, roof windows, rooflights and doors(controlled fittings) and building services .

	Section 1: Calculating the target primary energy rate and target emission rate A new building must be built to a minimum standard of total energy performance. This is evaluated by comparing calculations of the performance of the ‘actual building’ against calculations of the performance of a theoretical building, called the ‘notional building’. This must be carried out both at the design stage and when work is complete. The notional building is the same size and shape as the actual building and has standardised properties for fabric and services. The energy performance of the notional building is described using the following metrics. a. The target primary energy rate (TPER), in kWhPE/m2 per year. b. The target emission rate (TER), in kgCO2/m2 per year.
	Section 2: Calculating the building primary energy rate and building emission rate The building primary energy rate (BPER) and the building emission rate (BER) must be calculated at both of the following points using the same calculation tool. a. Before work starts, using design values (Design Stage). b. When work is complete (As built Stage), using figures for the building as constructed, and incorporating both of the following. i. Any changes that have been made during construction to the list of specifications. ii. The measured air permeability. At both of these points, the building primary energy rate and building emission rate must not exceed the target primary energy rate and the target emission rate, respectively. The specification of the actual building may vary from that of the notional building if the building meets the target primary energy rate, target emission rate and the guidance in the approved document.

	Building control notification – The building control body must be notified at both design stage and As built stage with calculations to demonstrate $BPER \leq TPER$ & $BER \leq TER$ together with a list of specifications used in the calculations. The Building Regulations UK Part L compliance report (BRUKL report) listing these metrics and specifications is produced as a standardised output from the approved software.
	Section 3: Consideration of high-efficiency alternative systems
	Before building work starts on a new non-domestic building, the person undertaking the building work must analyse the technical, environmental and economic feasibility of using high-efficiency alternative systems in the building design. This analysis should be considered when designing the building.
	Section 4: Limiting heat gains and losses
	• U-values - New fabric elements should meet the limiting standards • Limiting the effects of solar gains in summer - For each space in the building that is occupied or mechanically cooled, the solar gains through the glazing – aggregated from April to September inclusive – should be no greater than would occur through the relevant reference glazing systems with a defined total solar energy transmittance (g-value) calculated according to BS EN 410. • Limiting heat losses and gains from building services – Hot Water, heating & cooling pipework, ductwork & hot water storage vessels shall be insulated to standards set out in approved document L.
	Section 5: Minimum building services efficiencies and controls – general guidance
	Section 5 of sets out general guidance relating to sizing of space heating systems, thermal zoning, controls and energy submeters • Newly installed or fully replaced heating systems must be installed to operate at a maximum flow temperature of $\leq 55^{\circ}\text{C}$ where technically feasible. • Heating systems should be zoned to account for solar exposure, patterns of use and type of use with each zone independently controlled by time and temperature. • Heating and cooling should not operate simultaneously and should include weather compensation where technically feasible. • Energy submeters should be installed to allow for 90% of annual energy consumption of each fuel to be assigned to an end use. Buildings $\geq 1,000\text{m}^2$ must include AMR and data collection facilities.
	Section 6: System specific guidance
	Section 6 of the ADL Volume 2 provides specific guidance relating to the minimum efficiency of fixed building services and calculation methodology. Comparison of proposed plant performance against minimum specific standards is made later in this report.
	Section 7: Air Permeability and pressure testing
	All non-domestic buildings (unless exempt) are required to undergo pressure testing carried out by a competent person to testing methodology CIBSE TM23. The overall building performance depends upon the air permeability value and the value assumed in this report should be targeted to achieve the BPER and BER. A pressure test certificate must be provided upon building completion and results used to calculate BPER & BER at the As built stage.
	Section 8: Commissioning
	All fixed building services and onsite electricity generation systems must be commissioned to ensure performance is with reasonable tolerances appropriate to the circumstances. Commissioning results should be documented, provided to the building owner, BCB and where applicable used to inform ‘As built’ calculations of BPER and BER. In particular ductwork systems with design flow rates above $1\text{m}^3/\text{s}$, are required to be tested for air leakage. Commissioning to be carried out by others.

	Section 9: Providing information																										
	For all buildings operating and maintenance instructions must be provided to allow efficient use and operation of the building and should include information regarding the building, fixed building services, commissioning records and for buildings≥1,000m² a forecast of energy consumption by fuel type for both regulated and unregulated loads.																										
	Section 10: New Elements in existing building, including extensions & Section 11: Work to fabric elements in existing buildings																										
	Section 10 & 11 relate to work in the existing building setting standards for new and replacement thermal elements, renovating existing thermal elements In existing buildings retain thermal elements should be upgraded where the u-value exceeds values in column (a) to achieve u-values in column (b) unless it is not technically or functionally feasible or would not achieve a payback of 15 years or less. All renovated thermal elements should achieve u-values in column (b). <table><tr><td colspan="3">Part L Vol 2 Table 4.2- Limiting U-values for existing elements in existing buildings</td></tr><tr><td rowspan="2">Element</td><td colspan="2">U-value</td></tr><tr><td>(a) Threshold</td><td>(b) Improved</td></tr><tr><td>Pitched roof – insulation at ceiling level</td><td>0.35</td><td>0.16</td></tr><tr><td>Pitched roof – insulation at rafter level</td><td>0.35</td><td>0.18</td></tr><tr><td>Flat roof or roof with integral insulation</td><td>0.35</td><td>0.18</td></tr><tr><td>Wall – cavity insulation</td><td>0.70</td><td>0.55</td></tr><tr><td>Wall – external or internal insulation</td><td>0.70</td><td>0.30</td></tr><tr><td>Floors</td><td>0.70</td><td>0.25</td></tr></table>	Part L Vol 2 Table 4.2- Limiting U-values for existing elements in existing buildings			Element	U-value		(a) Threshold	(b) Improved	Pitched roof – insulation at ceiling level	0.35	0.16	Pitched roof – insulation at rafter level	0.35	0.18	Flat roof or roof with integral insulation	0.35	0.18	Wall – cavity insulation	0.70	0.55	Wall – external or internal insulation	0.70	0.30	Floors	0.70	0.25
Part L Vol 2 Table 4.2- Limiting U-values for existing elements in existing buildings																											
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Wall – cavity insulation	0.70	0.55																									
Wall – external or internal insulation	0.70	0.30																									
Floors	0.70	0.25																									

3. Energy assessment methodology and proposals

All development proposals should take the most appropriate action to minimise Carbon emissions in accordance with the Energy Hierarchy: Be Lean- Be Clean- Be Green as well as consider the need to reduce cooling demand and assess impact of overheating.

The energy assessment is structured around the Energy Hierarchy which is generally accepted as the most effective way of reducing building Carbon emissions. The four stage strategy targets energy use by consideration of the following actions:

- Be Lean [Passive]

Energy demand reduction building fabric
- Be Lean [Active]

Energy demand reduction building services
- Be Clean

Consideration of heating infrastructure including CHP
- Be Green

Supply energy from renewable sources

The approach that will be undertaken (for this report) during the stages of detailed design are proposed in this document and are based on and around the CIBSE methodology for energy reports and follows 4 primary steps:

- Step 1

Identifying the targets

• Step 2

Assessing the Baseline

• Step 3

Applying energy efficiency – Lean passive & active

• Step 4

Applicability of renewable and LZC's
- Baseline 2021 notional building specification – data obtained from Green Building TER.

• Lean building incorporating passive and active energy demand reduction measures. (Improved u-values, high efficiency LED lighting with occupancy and daylight control).

• Green building – Renewable energy applied – Low Carbon heat source – Heat Pump (space heating & domestic hot water) and Photovoltaic panels.

4. Energy Demand (Be Lean)

4.1 Energy Demand Reduction (Be Lean) – Building Fabric (Passive)

4.1.1 Opaque thermal elements

The building will adopt a fabric first approach to minimise heat loss and energy consumption.

Part L 2021 Volume 2 (ADL2) Regulation 25 (b) - The performance of the building fabric and the building services systems should be no worse than the design limits.

	PartL 2021 Vol 2 Max Limits U-value	Part L 2021 Vol 2 Notional building	Proposed Actual Building U-Value (W/m2K)	Improvement against PartL Max Limits (%)
		Side lit & unlit		
Roof (Flat)	0.18	0.15	0.15	16.7%
External Wall	0.26	0.18	0.18	30.8%
Ground Floor	0.18	0.15	0.15	16.7%
Pedestrian Doors	1.6	1.9	1.6	0%

4.1.2 Glazed thermal elements

The glazing is appropriately sized to reduce heat loss whilst allowing light and useful heat from the sun to enter the building.

Construction Element	Thermal Transmittance (U-Value), W/m2K	Solar Transmittance (G-Value)	Light Transmittance (LT)	Improvement Against PartL Max % (U- Value)
Part L 2021 Vol 2 Max Limits Windows	1.6	-	-	
Part L 2021 Vol 2 Notional Building	1.4	0.29	0.60	
General Glazing - (Whole element – frame & glass)	1.4	0.40	0.71	12.5%

4.1.3 Air permeability

Air Permeability	ADL 2021 Vol 2 Maximum Limiting Value	ADL 2021 Vol 2 Notional Building Value	Proposed Actual Building Air Permeability
Air Permeability (m³/m².h@50Pa)	8	3	3

4.2 Energy Demand Reduction (Be Lean) – Building Services (Active)

4.2.1 Ventilation

The proposed ventilation systems -

- High efficiency Mechanical Ventilation with Heat Recovery (AHU) providing supply\extract for changing rooms, WC's, office, meeting rooms, refectory, hydrotherapy & reception.
- Zonal Supply & Zonal Extract to Kitchen (with demand control).
- Natural ventilation to general circulation

System	Serving	ADL 2021		SFP Actual W/I/s	HR
		Limit SFP	Notional SFP		
AHU (VRF - SFP System Input)	Office, meeting rooms, refectory, first team changing & reception	2.0	1.8	≤1.8W/I/s	76%
AHU (SFP Room Input)	Hydrotherapy	2.3	18	≤1.8W/I/s	76%
AHU (SFP Room Input)	Changing, WC's, Boot Room & Equip Store	2.3	1.8	≤1.8W/I/s	76%
Zonal Supply	Kitchen	2.3	0.9	≤0.9W/I/s	-
Zonal Extract	Kitchen	1.0	0.6	≤0.9W/I/s	-
Natural Ventilation	General Circulation	-	-	-	-

Table 3: Proposed buildings zonal ventilations systems

4.2.2 Lighting Systems

High efficiency LED lighting throughout the building with intelligent control system. Occupancy sensing appropriate to the space activity i.e., Absence or Presence detection.

Area	Efficacy (lm\W)	Daylight control (Dimming)	Occupancy control
Office	110	Yes	Absence
Meeting Rooms	110	n\	Absence
Reception	110	Yes	Absence
Refectory	110	Yes	Presence
Kitchen	95	No	None - Manual
Hydrotherapy	95	No	None - Manual
Changing Rooms	95	n\	Presence
Equipment\Kit Rooms	95	No	Presence
WC's	95	n\	Presence
Circulation	95	No	Presence
Plant Rooms	95	No	None - Manual
Cupboard	95	No	None - Manual

4.2.3 Control and Energy Metering Systems

Energy efficient control systems will be utilised to ensure systems are only used as required during the building operation, with a dedicated onsite metering system to monitor energy usage and provide valuable feedback to maximise efficiency.

This will include variable speed drives on pumps and fans for commissioning and operation. Zoning of controls for M&E systems will allow separate control zones.

4.2.4 Water Consumption

Efficient use of water should be encouraged in all buildings. Efficient internal water conservation measures to be incorporated within the proposed development, with fittings with low capacity, restricted flow rates & WC dual flushing.

- Dual Flush Toilets
The Climate Change and The Demand for Water Report 1996 state that the use of water for flushing toilets uses on average 30% of the domestic water demand. Dual flush cisterns allow users to decide whether to flush only a portion of, or all the water from the cistern. It is proposed that dual flush cisterns (4 litres/2 litres) are installed to help contribute to improved water savings.
- Low Flow Taps / Fittings
Low flow taps must be provided to minimise water usage.

5. Heating Infrastructure (Be Clean)

5.1 District Heating

There is no district heating option at present for the location of the proposed development.

5.2 Combined Heat and Power (CHP)

A Combined Heat and power (CHP) is an electricity generator where the waste heat is captured and then re-used within a building. Gas fired CHP is a well proven technology for buildings with continuous simultaneous demand for both heat and power throughout the year. Typically buildings with high domestic hot water demand are well suited to this technology allowing a correctly sized unit to be utilised to its full potential. For CHP to be effective in terms of carbon reduction and cost effectiveness it is very important that the engine operates for long periods of the day, throughout the year e.g. heat dominant buildings such as swimming pools, hotels and hospitals.

The training\sports facility has a consistent high demand for heat and power throughout the year which would suit a CHP unit, however due to decarbonisation of the national grid reflected in the carbon emissions factors of the recent 2021 update to part L building regulations, the carbon reduction achieved using CHP are minimal. The CHP would also require additional plant space on a restricted site and potentially cause noise issues. A 100% electric solution incorporating renewable sources should be prioritised over fossil fuelled CHP to achieve a greater carbon reduction.

6. Applicability of renewable and Low carbon technology (Be Green) – Ene04

Part L 2021 Volume 2 (ADL2) Regulation 25A

6.1 Renewable Technology overview

Energy resources accepted as Renewable or Low Carbon Technologies are defined by the Department of Energy & Climate change Low Carbon Buildings Program. Those which are suitable for consideration in this case are:

- [Solar photovoltaics](#)
- Wind turbines
- Solar thermal hot water
- [Air Source Heat Pumps](#)
- Ground Source Heat Pumps
- Biomass Heating

6.2 Solar Photovoltaics

Photovoltaics (PVs) generate electricity from daylight using semiconductors. PV's are also a simple technology requiring little in the way of maintenance and offer a proven way of generating zero Carbon, renewable electricity. Photovoltaics generate electricity which displaces that which would otherwise be provided by the national grid.

The development is located at 550 Ashton New Road, Manchester, the flat roof of the building gives sufficient unshaded space for a large number of solar panels. Roof mounted solar panels have no known planning permission issues. The energy generated can be used within the development to achieve a substantial reduction in carbon emissions. Photovoltaic Panels (PV) is a suitable renewable energy for this development.

6.3 Wind Turbines

Wind turbines generate electricity via a conventional generator connected to turbine blades which are in turn powered by the prevailing wind. Wind turbines can potentially have location & planning issues ie physical constraints (footpaths\bridleway, water course, private roads, grid lines) & planning constraints (aviation, landscape\ecology). Wind turbines can cause noise issues, shadow flicker, low wind speeds reduces' the output from a wind turbine and wind turbine technology has greater maintenance costs compared to other renewable sources, making payback periods less attractive. Therefore, it is not proposed to use this technology.

6.4 Solar Thermal Hot Water

Solar Thermal collectors' harness solar energy from either flat panels or evacuated tubes, to heat water for use within the building. Solar thermal could be considered to serve the domestic hot water system, but this system would take up considerably more plant space than other more suitable technologies and has not been considered in the analysis.

The demand for hot water in a training\sports facility is relatively high and therefore solar thermal collectors can be effective in reducing CO₂ emissions however the proposal already includes a renewable heating source for hot water production in the form of a heat pump. Due to the hot water already being generated by a renewable heat pump the effect of the solar panels is reduced, because of this photovoltaic panels are favoured instead.

6.5 Air Source Heat Pumps

Air source heat pumps extract thermal energy from the ambient external air and can be used to provide heating and/or cooling. Air source heat pumps have zero NOx emissions and are considered a clean technology. Air source heat pumps require electricity to operate but have a high coefficient of performance which is why they are classed as a renewable source of energy. Seasonal coefficient of performance (SCoP) minimum standard is 250% but can exceed 320%.

Air to water heat pumps can replace a conventional gas fired system. An air source heat pump produces low grade heat and are best suited to well insulated buildings where heat losses are lower. As a non-fossil fuel source of heat ASHP provide an 'all electric' solution that will continue to decarbonise as the national grid decarbonises towards zero carbon. This technology is suitable for the development and would provide a fossil fuel free alternative low carbon heat source.

6.6 Ground Source Heat Pumps

A Ground Source Heat Pump (GSHP) captures natural energy through buried pipework in the form of boreholes or horizontal pipework. The natural heat is transferred via circulating fluid within pipes in the ground to the building. This can provide the building with space heating, hot water and cooling from renewable sources if required.

The capital costs of a ground source heat pump can be high due to the extensive ground works required. Because the proposed building location is situated in a built-up area, boreholes would be the only viable option. Due to the high capital costs of installing the boreholes and the disruption to the existing site and structure, this option is not viable.

6.7 Biomass Heating

Biomass is the burning of any plant-derived organic material (such as wood) that renews itself over a short period to generate energy. This fuel type is usually used for heating. Since the CO₂ released during the burning process is offset by the CO₂ absorbed during the life of the biomass source, biomass is close to carbon neutral.

The spatial requirement for biomass plant, equipment and associated fuel storage is significant. Given the buildings built up location and on-going fuel delivery requirement the inclusion of biomass has not been deemed appropriate. Biomass also emits NOx gas which would be detrimental to the natural environment.

6.8 LZC Summary

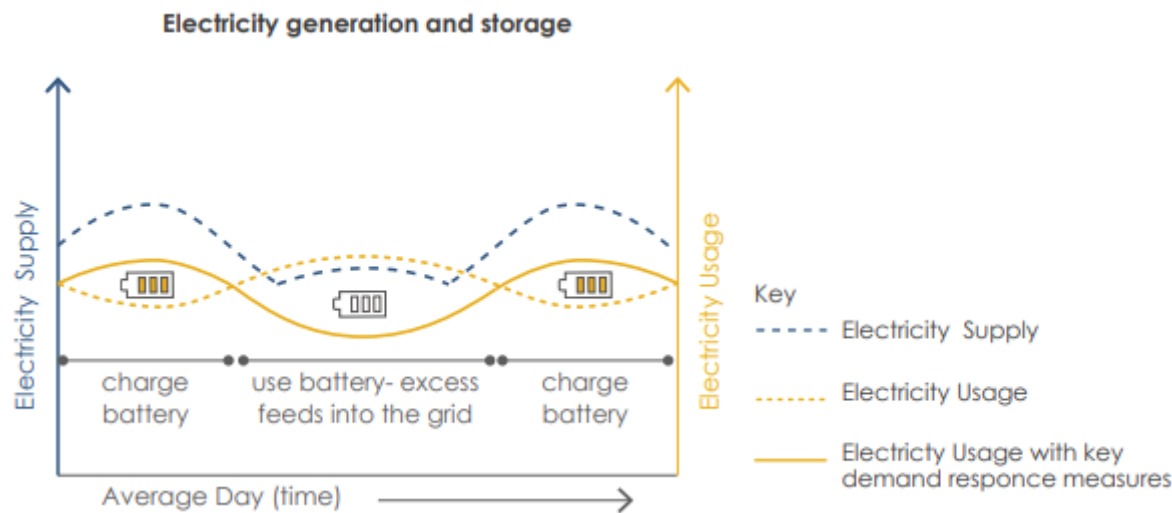
Description	Comments applicable to the scheme
District Heating	There is no local area network within economical distance of the proposed development and has not been considered viable.
Air Sourced Heat Pumps	Air source heat pumps offer a low carbon source of heating that will continue to decarbonise as further renewable technology is incorporated into the national grid. This technology has been selected.
Ground Sourced Heat Pumps	Possible to serve the building heating demands but is not considered viable for the scheme due to cost and site constraints.
Biomass Boiler Plant	Possible to serve the building heating demands but based on storage area and practicality of installation/maintenance has not been considered viable for the scheme.
Solar Thermal (solar water heating)	Possible to serve the domestic hot water systems but due to the hot water already being generated by a renewable heat pump the effect of the solar panels is reduced, because of this photovoltaic panels are favoured instead.
Active Solar (Photovoltaic)	Possible to provide onsite electricity. The energy generated can be used within the development to achieve a substantial reduction in carbon emissions, therefore chosen for this development.
Combined Heat and Power (CHP)	CHP is not suggested for this development due carbon reduction achieved using CHP are minimal. The CHP would also require additional plant space on a restricted site and potentially cause noise issues.

6.9 Feasibility of exporting heat or electricity from LZC system

The proposed ASHP system has been sized to generate heat for the units only, to maximise efficiency.

6.10 Energy Storage

Energy storage refers to the ability of a physical system to consume, retain and release energy as required. This allows system flexibility in response to specific energy demands. At building level energy storage maximises utilisation of on-site renewables. This can be in the form of solar to hot water storage or electrical battery storage from onsite renewable electricity generation.



Solar hot water generation is not proposed for the scheme and therefore thermal storage is not applicable.

7. Building Services Applied (Green)

7.1 Heating and cooling

The ‘Be Green’ Heating strategy proposed as follows.

- ASHP Heat\cooling source - to VRF system within first team changing room, office, meeting rooms, refectory & reception.
- ASHP Heat source - to radiators\UFH system within staff changing rooms, hydrotherapy, WC’s, kit room, boot room & circulation areas.
- Plant area un-heated.

Heat Source	PartL Vol 2 SCoP Limit	Part L 2021 Vol 2 Notional building	Proposed SCoP
ASHP - VRF	250%	264%	350%
ASHP – RAD\UFH	100%	134%	350%

Cooling System	PartL Vol 2 SCoP Limit	Part L 2021 Vol 2 Notional building	Proposed SEER
ASHP - VRF	250%	579%	500%

7.2 Domestic Hot Water

- ASHP – providing hot water via heat exchangers – 2000ltr Storage centralised hot water system with secondary circulation system (200m loop) – No Time Switch.

Heat Source	PartL Vol 2 SCoP Limit	Part L 2021 Vol 2 Notional building	Proposed SCoP
ASHP	250%	286%	320%

8. PartL2A Assessment Results

This ‘Part L 2021 Volume 2 (ADL2)’ analysis was conducted using the Integrated Environmental Solutions IESVE 2023.2.0.0, VE Compliance 7.0.23.0 with BRUKL compliance check version v6.1.e.1, to illustrate the greenhouse gas emissions reduction for each step taken through the energy hierarchy design process.

The model calculations and results are based on the information stated in this report – electric power factor applied >0.95 & adding lighting controls/metering (out of range).

8.1 Regulation 26 – Carbon dioxide emission rates for new buildings

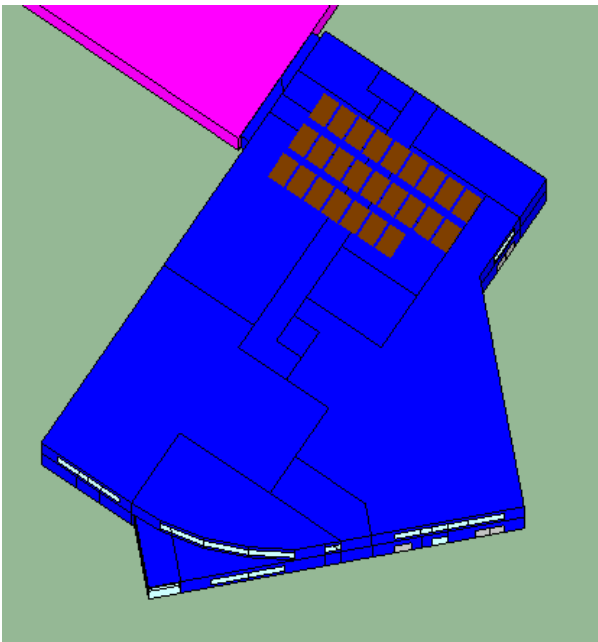
(Also includes Regulations 25 & 27)

Carbon dioxide emissions are assessed by comparing the building emissions rate against the proposed building target emissions rate. The target emission rate is based upon the notional building which is the same size and shape as the actual building but built to concurrent specification defined in PartL 2021 ADL2 of the building regulations.

The following tables show the results of the model and carbon reduction against the 2021 notional building specification (Green building TER).

- Baseline 2021 notional building specification – data obtained from Green Building TER.
- Green building – Renewable energy applied – Low Carbon heat source – Air Source Heat Pump (Space heating & Domestic hot water) and Photovoltaic panels.

PV Allocation –



(PV Location indicative only)

PV Allocation – 25 Panels (1.762x1.134=1.998m²) = 50m² - Panel 425W 21.3% Efficiency. South Facing.
9042kWh/annum – 11.1kWp

Energy Hierarchy - CO ₂ emission rates	CO ₂ Emissions (kgCO ₂ /m ² per annum)	Regulated kgCO ₂ /m ² Savings	% Reduction
Target CO ₂ Emission Rate (TER) - Part L 2021Notional building Emission Rate	18.21		
Building CO ₂ Emission Rate (BER) – Be Green - After renewable energy – ASHP + PV 50m² - 21.3% Eff – 9042kWh/annum – 11.1kWp	17.46	0.75	4.12%

Table 1: Proposed CO₂ Emissions summary & Savings based on PartL 2021 ADL2 emission factors

8.2 Regulation 26C – Primary energy rates for new buildings

(Also includes Regulations 25 & 27C)

Primary energy rates are assessed by comparing the building primary energy rate against the proposed building primary energy rate. The target primary energy rate is based upon the notional building which is the same size and shape as the actual building but built to concurrent specification defined in Part L 2021 ADL2 of the building regulations.

Energy Hierarchy – Primary Energy	Primary Energy Rate (kWh/m ² per annum)	Primary Energy Savings	% Reduction
Target Primary Energy Rate (TPER) - Part L 2021 Notional building Primary Energy Rate	198.16		
Building Primary Energy Rate (BPER) – Be Green - After renewable energy – ASHP + PV 50m² - 21.3% Eff – 9042kWh/annum – 11.1kWp	189.64	8.52	4.23%

Table 2: Proposed Prime Energy Summary & Savings based on PartL 2021 energy factors

8.3 Life cycle cost for Renewable systems

8.3.1 Life cycle cost for proposed ASHP system

The ASHP system is not expected to provide a payback to the high capital cost of ASHPs in comparison to conventional gas fired boilers but will provide reduce annual running costs and a significant carbon reduction.

8.3.2 Life cycle cost for proposed PV system

	50m ²
Peak Output kWp - South	11.1
Module efficiency	21.3%
Life expectancy	25 years

Estimated Energy Generation, Emission Savings and Simple Payback

Capital Cost (Estimated)	£18,793
Energy Generated KWh/annum	9042
Electrical consumption savings (Estimated)	£1808
Export	0
Available Grants	None
Other Financial Incentives	Feed in Tariff
Feed In Tariff	n/a
Feed in Tariff Income per annum	0
Electricity Tariff	20.0p/KWh
Electricity Price Inflation	5%
Simple pay back	13 years
Carbon Savings per annum	1164KgCO2

8.4 Limiting solar gain

PartL 2021 Vol2 - Requirement L1(a) – Limiting the effects of solar gains in summer - is to assess the passive control measures to limit excessive solar gains reducing the risk of overheating or reduce the installed capacity of air conditioning equipment.

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
FF - Meeting Room 1	N/A	N/A
FF - Meeting Room 2	N/A	N/A
FF - Meeting Room 3	N/A	N/A
FF - Open Plan Office	NO (-23.8%)	NO
FF - Private Office	NO (-35.7%)	NO
FF - Refectory	NO (-19%)	NO
GF - Comms Room	N/A	N/A
GF - First Team Changing Area	NO (-100%)	NO
GF - Hydrotherapy	NO (-67.8%)	NO
GF - Reception	NO (-1.3%)	NO

Appendix A – BRUKL Report – Green

BRUKL Output Document



Compliance with England Building Regulations Part L 2021

Project name

230565-SVM-ZZ-ZZ-RP-Z-3101 GREEN

As designed

Date: Fri Nov 24 09:15:10 2023

Administrative information

Building Details

Address: MCWFC, Manchester, M11 4AA

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.23

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.23

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

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Foundation area [m²]: 521.2

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

Target CO ₂ emission rate (TER), kgCO ₂ /m ² :annum	18.21
Building CO ₂ emission rate (BER), kgCO ₂ /m ² :annum	17.46
Target primary energy rate (TPER), kWh _{eq} /m ² :annum	198.16
Building primary energy rate (BPER), kWh _{eq} /m ² :annum	189.64
Do the building's emission and primary energy rates exceed the targets?	BER <= TER BPER <= TPER

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

Fabric element	U _{s-Limit}	U _{s-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.18	0.18	FF000004:Surf[1]
Floors	0.18	0.15	0.15	SH000010:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.15	0.15	FF000004:Surf[0]
Windows** and roof windows	1.6	1.4	1.4	FF000026:Surf[0]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	1.6	1.6	GF00000E:Surf[2]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building
U _{s-Limit} = Limiting area-weighted average U-values [W/(m ² K)] U _{s-Calc} = Calculated area-weighted average U-values [W/(m ² K)] U _{i-Calc} = Calculated maximum individual element U-values [W/(m ² K)] * Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows. ** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position. ^ For fire doors, limiting U-value is 1.8 W/m ² K NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

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

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	1177.3	1177.3
External area [m ²]	1984.2	1984.2
Weather	MAN	MAN
Infiltration [m ³ /h.m ² @ 50Pa]	3	3
Average conductance [W/K]	504.32	662.6
Average U-value [W/m ² K]	0.25	0.33
Alpha value* [%]	25.27	10

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
100	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	5.39	7.23
Cooling	1.65	1.6
Auxiliary	12.68	8.34
Lighting	16.08	14.51
Hot water	100.36	102.5
Equipment*	56.67	56.67
TOTAL**	136.16	134.18

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

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

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	7.68	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	7.68	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	84.28	98.91
Primary energy [kWh _{eq} /m ²]	189.64	198.16
Total emissions [kg/m ²]	17.46	18.21

Appendix B – DRAFT EPC – Be Green

Energy Performance Certificate

Non-Domestic Building

230565-SVM-ZZ-ZZ-RP-Z-3102 GREEN
MCWFC
Ashton New Road
Manchester
M11 4AA

Certificate Reference Number:
9700-4942-3788-5276-0301

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government's website at www.gov.uk/government/collections/energy-performance-certificates.

Energy Performance Asset Rating

More energy efficient

A+

Net zero CO₂ emissions

A0-25

7

This is how energy efficient the building is.

B26-50

C51-75

D76-100

E101-125

F126-150

Gover 150

Less energy efficient

Technical information

Main heating fuel:

Grid Supplied Electricity

Building environment:

Air Conditioning

Total useful floor area (m²):

1177.273

Building complexity:

Level 5

Building emission rate (kgCO₂/m²per year):

17.46

Primary energy use (kWh_m/m²per year):

189.64

Benchmarks

Buildings similar to this one could have ratings as follows:

7

If newly built

29

If typical of the existing stock

BUILDING SERVICES DESIGN

svm.co.uk