

An architectural rendering of modern buildings, featuring a mix of low-rise and high-rise structures with large windows and balconies. The entire image is overlaid with a semi-transparent blue filter. The sky is filled with soft, white clouds. In the foreground, there are some trees and a paved area with a few small figures of people.

June 2023
Energy and Sustainability Statement

Upper Brook Street Masterplan (McLaren / Kadans)

Upper Brook Street Masterplan- McLaren/ Kadans

Energy & Sustainability Statement

McLaren Property

Job No: 1036881
Doc Ref: UBS-CDL-ZZ-XX-RP-SY-70220
Revision: P05
Revision Date: 01 June 2023



Project title	Purpose-built Student accommodation (PBSA) on UBS, Manchester	Job Number
Report title	Energy & Sustainability Statement	1036881

Document Revision History

Revision Ref	Issue Date	Purpose of issue / description of revision
P01	14 April 2023	Draft Issue
P02	27 April 2023	Stage 2 Issue
P03	03 May 2023	Stage 2 Issue following comments
P04	24 May 2023	Stage 2 Issue – Project Name Update
P05	01 June 2023	Stage 2 Issue – Project Name Update

Document Validation (latest issue)

01/06/2023	01/06/2023	01/06/2023
X 	X 	X 
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Executive Summary

The McLaren purpose-built student accommodation (PBSA) development on Upper Brook Street (UBS), Manchester aims to be at the forefront of sustainability. Its strong carbon and sustainability goals will help create a development which supports Manchester's ambitious climate transition.

In accordance with the Manchester City Council (MCC) planning requirements, the following Energy Statement has been developed for the proposed Purpose-built Student accommodation (PBSA) on UBS, Manchester development. It aims to meet the energy and climate change requirements of the Manchester City Council's Core Strategy (July 2012) and the Greater Manchester Spatial Framework (GMSF) (Revised Draft January 2020). Whilst the GMSF is no longer being progressed, the replacement joint development plan, Places for Everyone, is currently being reviewed, we have taken note of the direction of travel of Greater Manchester policy to ensure the development meets the standard set out in the GMSF. Manchester's emerging Zero Carbon framework has also been referred to, to inform the strategy and align with Manchester's future aspirations.

An energy strategy has been developed by following the energy hierarchy; Be Lean, Be Clean and Be Green. The energy assessment is based on the current SAP 2012 emission factors.

The proposed PBSA consists of two towers student residential buildings with common ground floor areas, located on a plot of land between Kincardine Road and Upper Brook Street in Manchester. The towers are G+8 (Tower 1) and G+22 (Tower 2) respectively. The ground floor comprises of limited commercial floorspace, amenity space, cycle store, plant rooms and bin stores and community spaces at the rear. The first floor comprises of a mix of studio and cluster type student accommodation. External amenity and landscaping are also proposed at first floor level between the two towers, with additional landscaping around the site at ground level. The proposed UBS, Manchester development will deliver approximately 25,388 m² GIA including 379 m² of community/commercial spaces.

The core strategies applied in the project are outlined below:

- The envelope of the new build will be designed to perform significantly better than the Building Regulation standards with low U-values, g-values and low air leakage rates.
- Preliminary analysis has been carried out to optimise the facades so that heat losses are minimised whilst the size and position of openings has been optimised to maximise the use of natural light within each space.
- The development will be mechanically ventilated throughout the year, making use of heat recovery to reduce the heating demands and manually perforated opening through the façade used to purge the space and assist with summertime overheating
- Energy efficient services employed in the development include high efficiency LED lighting coupled with occupancy and daylight controls to significantly reduce the lighting energy use.

- Electrical and mechanical systems within the development will be tightly metered and controlled with a full Building Management System (BMS). This will enable energy use to be tracked and opportunities for efficiency improvements to be made.

A 28% carbon emissions reduction is achieved through energy efficiency measures.

An investigation into the feasibility of connecting to an existing or proposed district network as per the Manchester City Council's Policy EN 6 indicates that there are no viable district heating networks within the vicinity of the site. Also, the low heating demand of the development does not justify its use as an anchor load, to build out a new heat network, therefore, connecting to a district network has been discounted.

The inclusion of a Combined Heat and Power (CHP) unit to deliver a portion of the development's heat demand and electricity plant has been also assessed. The heat load of the development is insufficient to permit effective operation of an on-site combined heat and power unit. It is also widely recognised that CHP is now more CO₂ intensive than electricity because of the rapid decarbonisation of the electricity grid. Therefore, it is considered to be unviable for this scheme.

A study into low and zero carbon (LZC) technologies was undertaken as per the Manchester City Council's Policy EN 6. Radiators via heat pumps are proposed to provide the local heating to the bedrooms, ensuites. The ground floor amenity area will have its own VRF system A standalone Air Source Heat Pump will provide DHW.

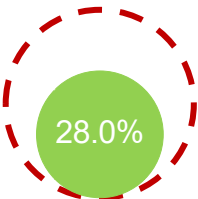
The proposed roof area is allocated as plant area and a roof terrace. The proposed location of PV arrays is at roof level. A total of 200 m² usable PV array is required over a few sections of roof, with a modular efficiency of at least 20.6%, orientated south at an inclination of 30° to the horizontal. This could enable a 41.2 kWp photovoltaic solar array to be installed.

The use of on-site renewables and low carbon technologies could reduce the site-wide CO₂ emissions of the development by 12.6% across the site.

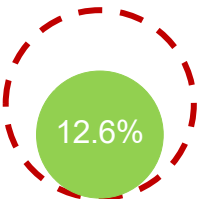
The proposed development is achieving a 40.6% improvement over the Building Regulations Part L 2013 Target Emission Rate (which supersedes the Building Regulations Part L 2010). Thus, the development complies with Policy EN6 of Manchester City Council's Core Strategy, which stipulates that non-domestic development should achieve a minimum 15% improvement over Building Regulations Part L 2010.

The proposed development is achieving a 22.1% improvement over the Building Regulations Part L 2021 Target Emission Rate.

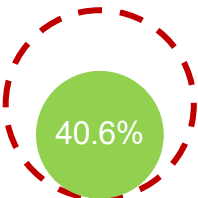
Carbon emissions reduction through energy efficiency measures:



Carbon emissions reduction through low & zero carbon technologies:



Total carbon emissions reduction over the Building Regulations Part L 2013 TER:



Health & Wellbeing

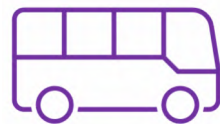


With people spending up to 90% of their lives indoors, the impact that buildings have on the health & wellbeing of occupants is of growing importance. The development aims to provide an environment that has a positive impact on its occupants.

- **Good daylight** will be achieved in occupied spaces through the balanced and considered use of glazing. High performance glazing will reduce energy loss and prevent excessive heat gain.
- As part of the façade adjacent to glazed areas, there are to be perforated panels with openable internal sections, that will provide free cooling during the day. The development will be mechanically cooled to maintain **thermal comfort** under normal operational hours.
- Mechanical Heat Recovery Units (MVHR) will maintain a consistent supply of filtered fresh air to maintain good **indoor air quality**. Low VOC materials and finishes will minimise internal sources of pollutants.

Transport

As the second largest emitter of CO₂ in the UK, the transport of people is a priority area in achieving the UK's net zero carbon ambition. Supporting alternatives to fossil fuel and private modes of transport is key.



- The promotion of **walking and cycling** with strong connection links from the site to the surrounding area. This is further supported with the provision of cycle storage facilities for occupant use.
- Good **public transport** links in the immediate vicinity with further national links in the nearby city centre.

Water



Climate change continues to place increasing pressure on the UK's water supply, with an increase in the frequency and severity of droughts. Furthermore, the energy and carbon emissions associated with the treatment of fresh water places water conservation at the forefront.

- **Water efficient** fixtures and fittings will be specified to reduce water consumption below the levels required for national building regulations.
- **Metering and sub-metering** of consumption will enable ongoing, targeted reductions in water use.
- **Leak detection and shut-off** will prevent both major and minor leaks within the buildings as well as in external areas.
- The need for **irrigation** will be minimised through appropriate landscaping which are adapted to the UK's conditions.

Materials



As well as carbon emissions, materials in both construction and operation can have much wider social and environmental impacts which need to be considered.

- All **timber** used in the project will be from a responsible or sustainable source, using certified FSC or PEFC sources.
- To ensure **responsible and sustainable procurement**, materials will be specified in line with a documented sustainable procurement plan.
- Materials that are **durable and resilient** will be specified to maximise their lifespan and avoid the need for disposal and replacement.

Waste



Buildings and building sites produce a significant amount of waste per year.

- The use of a **Resource Management Plan** will set targets for resource efficiency and procedures for waste management.
- Appropriate and accessible **waste facilities** will be provided to encourage occupants to recycle waste effectively.

Land Use & Ecology



As well as a climate crisis, the UK faces a biodiversity crisis with a rapid decline in biodiversity in recent years. The built environment can respond to this through sustainable land use, habitat protection and creation as well as improvement of long-term biodiversity for the site and surrounding land.

- Using the external landscape to integrate **biodiversity** and create a microclimate for planting.
- Diversity of planting to create valuable habitat throughout the seasons.

Pollution



- The site will feature no **on-site combustion** for heating and hot water which would be detrimental to local air quality.
- **External lighting** will be designed to minimise the impact of light pollution. Light fittings will be specified with a reduced light spill and controlled using photocells and timeclocks to limit unnecessary operation.
- Limits to noise emitting plant to prevent impacts on its surroundings.
- Responsible construction practices to minimise resource use and the impact of noise, dust and pollution.

Environmental Compliance



- Manchester's Policy DM 1 – Development Management requires that new residential development meet as a minimum the following Code for Sustainable Homes standards. This will apply until a higher national standard is required:
 - Year 2010 – Code Level 3;
 - Year 2013 – Code Level 4;
 - Year 2016 – Code Level 6;
- The preliminary BREEAM assessment indicates that the development is currently likely to achieve 'Excellent' under BREEAM UK New Construction Version 6 scheme.

Contents

1.0	Introduction	2	8.0	Waste	23
1.1	Purpose of Statement	2	8.1	Construction Waste Management	23
1.2	Methodology – The Energy Hierarchy	2	8.2	Operational Waste	23
1.3	The Site, Surrounding Context and Proposed Development	2	9.0	Land Use & Ecology	25
2.0	Policy	4	10.0	Pollution	27
3.0	Energy Strategy	6	10.1	Local Air Pollution	27
3.1	Demand Reduction – Be Lean	7	10.2	Sustainable Urban Drainage	27
3.2	Cooling and Overheating	8	10.3	Light Pollution	27
3.3	Heating Infrastructure – Be Clean	9	10.4	Noise Pollution	27
3.4	Low & Zero Carbon Technologies – Be Green	10	11.0	Environmental Certification	29
3.5	Proposed Energy Strategy	11	12.0	Conclusions	31
4.0	Health & Wellbeing	15	Appendix A – Policy		33
4.1	Daylight	15	Appendix B – Services Input		36
4.2	Thermal Comfort	15	Appendix C – Be Lean and Be Green BRUKL Document		37
4.3	Air Quality	15			
4.4	Acoustics	15			
5.0	Transport	17			
5.1	Walking & Cycling	17			
5.2	Public Transport	17			
6.0	Water	19			
6.1	Water Efficiency	19			
6.2	Water Monitoring	19			
6.3	Leak Prevention and Detection	19			
6.4	Irrigation	19			
6.5	Sustainable Urban Drainage	19			
7.0	Materials	21			
7.1	Responsible Sourcing & Procurement	21			
7.2	Durability and Resilience	21			
7.3	Material Efficiency	21			
7.4	Healthy Materials	21			



1.0 Introduction

1.1 Purpose of Statement

This Energy Statement has been prepared in support of the planning application for the Purpose-built student accommodation (PBSA) development on Upper Brook Street, located in central Manchester. It responds to the energy and climate change policy requirements of Manchester City Council and the Greater Manchester's Combined Authority.

The format of the statement is intended to reflect and respond to the issues raised in the Manchester City Council's Core Strategy (July 2012).

The principal objectives are to:

- Outline the development's approach to reducing the site's contribution to the causes of climate change by minimising the site's needs for energy and the emissions of CO₂, by providing some of the requirement by renewable/sustainable means, minimising waste generation and limiting consumption of finite resources.
- Demonstrate that the proposed development will meet the highest standards of sustainable design and construction throughout all of the stages of the project, including demolition, construction, and long-term management in line with the principles of BREEAM to achieve 'Excellent'.

1.2 Methodology – The Energy Hierarchy

The design of the proposed scheme has been developed to reduce its annual energy consumption, provide energy in an environmentally friendly way, and to minimise its annual CO₂ footprint. To achieve this, the Statement follows the 'Steps to low carbon methodology' as illustrated below.

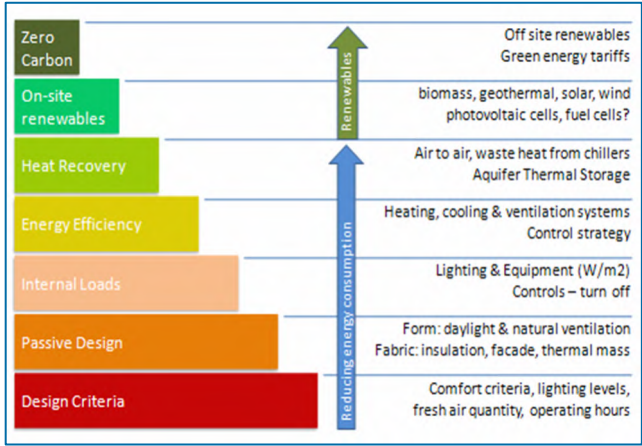


Figure 1-1. Steps to low carbon methodology

As part of the Energy Strategy an energy assessment has been carried out to benchmark the proposed energy strategy and evaluate its performance against the relevant policies. The calculations referenced within this planning statement have been based upon the National Calculation Methodology and Building Regulations Part L. These results highlight the development's potential energy efficiency. These are not a reflection on the likely energy consumption / CO₂ emissions of the building.

1.3 The Site, Surrounding Context and Proposed Development

The purpose-built student accommodation (PBSA) on Upper Brook Street (UBS), consists of two towers student residential buildings with common ground floor areas, located on a plot of land between Kincardine Road and Upper Brook Street in Manchester. The towers are G+8 (Tower 1) and G+22 (Tower 2) respectively. The ground floor comprises of a mixture of 'studio' and 'cluster' type student accommodation units, with plant and amenity located at roof level at each tower. External amenity and landscaping are also proposed at first floor level between the two towers, with additional landscaping around the site at ground level. The proposed Upper Brook Street, Manchester development will deliver approximately 25,388 m² GIA

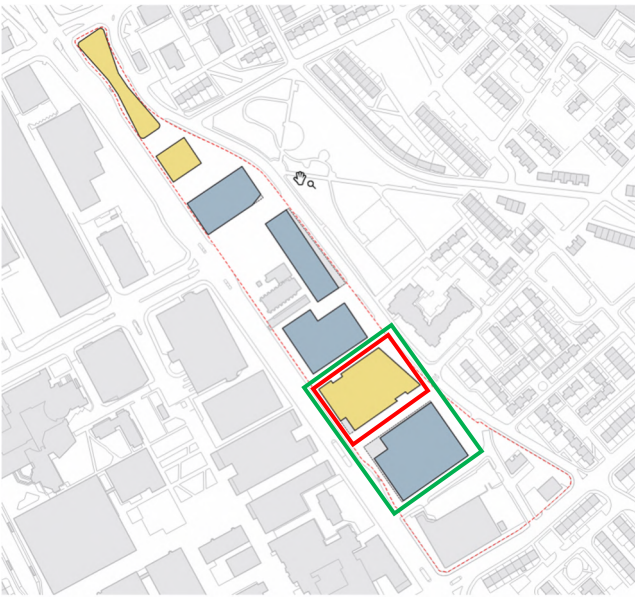


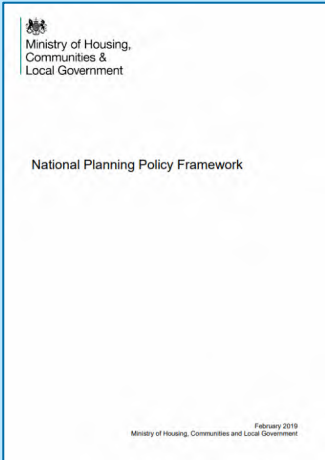
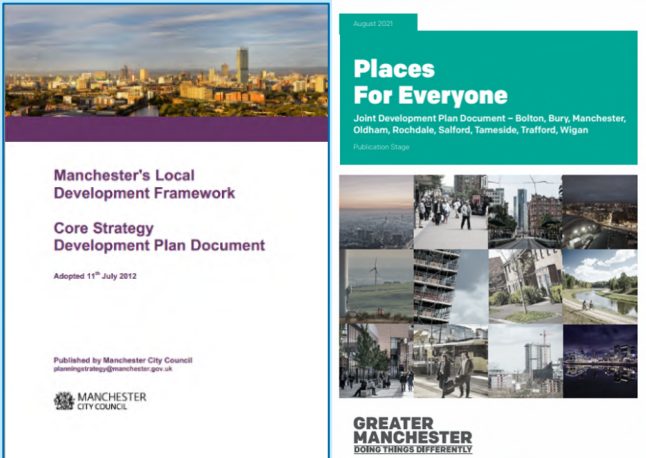
Figure 1-2. Upper Brook whole application boundary – PBSA scheme located in red zone



2.0 Policy

In support of the planning submission this energy and sustainability statement has been produced to demonstrate how the PBSA scheme on Upper Brook Street, Manchester development proposal addresses the policies and standards presented in the following table.

For more details about the planning policies see **Appendix A**.

	Guidance	Policy Reference	Minimum Requirements									
Energy Strategy	<u>National</u> - National Planning Policy Framework – July 2021 - Building Regulations Part L2 2010 - Building Regulations Part L2 2021 <u>Regional</u> - Places for everyone - Following receipt of the 2020 Greater Manchester Strategic Framework (GMSF) Integrated Assessment (IA) and Addendum Report (2020), the Greater Manchester (GM) Authorities have amended the GMSF, primarily as a result of Stockport withdrawing from the Plan Local - Manchester City Council Core Strategy	<u>Places for everyone</u> - Objective 7 : Playing our part in ensuring that Greater Manchester is a more resilient and carbon neutral city region - Policy JP-S 2: Carbon and Energy - Policy JP-S-3: Heat and Energy Networks <u>Manchester City Council Core Strategy</u> - EN 4: Reducing CO2 Emissions by Enabling Low and Zero Carbon Development - EN 6: Target Framework for CO2 reductions from low or zero carbon energy supplies	Objective 7: Playing our part in ensuring that Greater Manchester is a more resilient and carbon neutral city region. - Promote carbon neutrality of new development by 2028; - Promote sustainable patterns of development that minimise the need to travel and contribute to cleaner air; - Locate and design development to reduce car dependency; - Facilitate provision of infrastructure for cleaner vehicles; - Improve energy efficiency and the generation of renewable and low carbon energy. EN6: Target Framework for CO2 reductions from low or zero carbon energy supplies <u>Domestic development</u> <table><tr><th>Target</th><th>% Minimum req.</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</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>	Target	% Minimum req.	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	+10% increase on Part L 2010	Target 3: Micro generation area	+15% increase on Part L 2010	  
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Target 3: Micro generation area	+15% increase on Part L 2010											
Overheating Assessment	Manchester City Council Core Strategy	<u>Manchester City Council Core Strategy</u> Policy EN 8 – Adaptation to Climate Change	The need to control overheating of buildings through passive design.									
Sustainability Strategy	- Manchester City Council Core Strategy - Climate Change - Air quality - Sustainable drainage - Sustainable water - Noise - Ecology/ landscaping (Urban Greening) - Sustainable transport	<u>Manchester City Council Core Strategy</u> - Policy EN 8 – Adaptation to Climate Change - Policy EN 14 – Flood Risk - Policy EN 15 – Biodiversity and Geological Conservation - Policy EN 16 – Air Quality - Policy EN 17 – Water Quality - Policy T 1 – Sustainable Transport										
Compliance Tools	Manchester City Council Core Strategy	<u>Manchester City Council Core Strategy</u> Policy DM 1 – Development Management	BREEAM UK New Construction Version 6									



3.0

Energy Strategy

3.0 Energy Strategy

This section outlines the development's approach to achieve the Manchester City Council's planning requirements.

To calculate carbon emissions and reductions, the design was assessed under 'Part L 2021: Conservation of Fuel and Power' of the UK Building Regulations, using the National Calculation Methodology (NCM). A detailed energy model was created using Government approved software Integrated Environmental Solutions: Virtual Environment (IES: VE) 2022, in line with CIBSE AM11. The model was revised for each of the steps of the Energy Hierarchy to establish expected performance and satisfaction of the policy requirements. The energy assessment is based on the current SAP 10 emission factors.

The energy strategy has been developed by following the energy hierarchy:

- **Energy Demand Reduction – Be Lean:** The energy demand of the development is minimised through prioritisation of passive design.
- **Heat Networks/ Combined Heat Power (CHP) – Be Clean:** The use of a decentralised heating network utilising a combined heat and power to reduce emissions.
- **Low & Zero Carbon Technologies – Be Green:** On site renewable energy generation should be prioritised and where this is not possible, off-site renewable energy should be procured.

As part of the Energy Strategy an energy assessment has been carried out to benchmark the proposed energy strategy and evaluate its performance against the relevant Policies. The energy strategy will cover passive design elements, energy efficiency measures and low and zero carbon energy delivery systems and how they have been incorporated into the project.

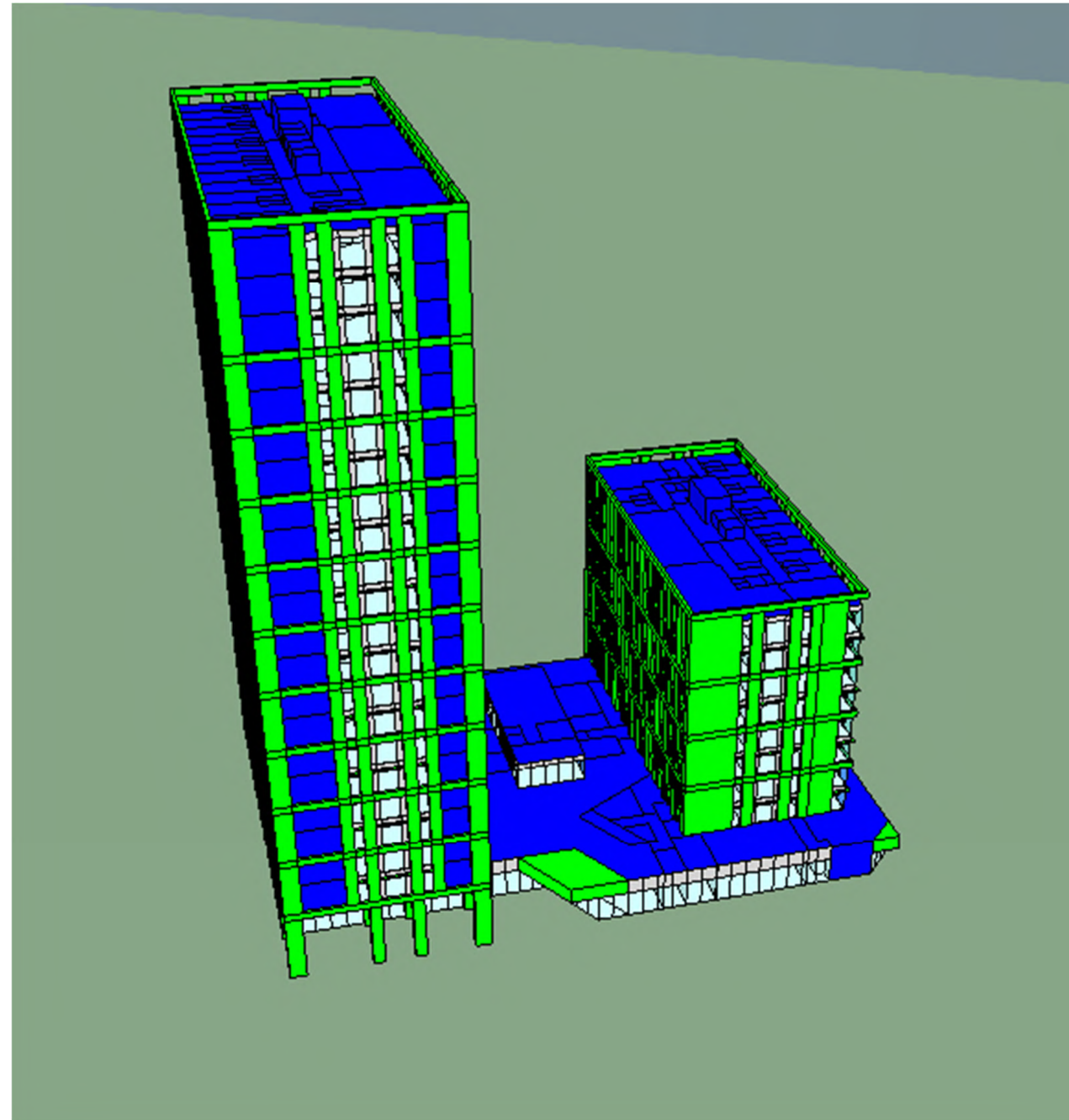
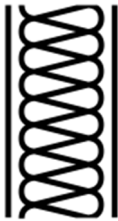


Figure 3-1: Upper Brook Street PBSA IES Geometry

3.1 Demand Reduction – Be Lean

Envelope



The development will first and foremost seek to reduce its energy demand in line with five basic principles:

1. Continuous thermal insulation
2. Airtightness
3. Thermal bridge free
4. High-performance windows
5. Mechanical ventilation with heat recovery

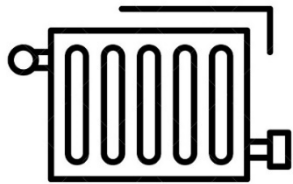
These principles focus on achieving a continuous, well insulated envelope which is both airtight and thermal-bridge free. High performance glazing provides a positive energy balance whilst improving thermal comfort. Mechanical ventilation with heat recovery ensures a continual supply of fresh air with minimal heat loss.

The thermal envelope will go significantly beyond the building regulation standards, with preliminary target values as shown in the table below:

Element U-Values (W/m²K)	Part L2 Minimum	Design Values
Floor	0.18	0.12
Roof	0.18	0.12
External Wall	0.26	0.15
Windows & Doors	1.60	1.20
Vehicle Doors	1.30	N/A

An improved air leakage rate of 3.0m³/(hr.m²) is being targeted for the proposed development, in comparison with the Building Regulation minimum standards of 10m³/(hr.m²) at 50Pa. Good air tightness could be achieved by prefabrication of several key building components under factory conditions, robust detailing of junctions and good building practices on site.

Systems



All equipment and plant will exceed the minimum requirements of the Building Services Compliance Guides. This document provides guidance on the means of complying with the requirements of Approved Document Part L2 of the Building Regulations for conventional space heating/ cooling systems, hot water systems and ventilation systems.

Local dedicated MVHR units with heat recovery providing continuous mechanical ventilation and purge panel which is used to purge the space and assist with summertime overheating.

All fans and pumps will be specified with variable-speed drives, which will reduce their energy consumption by more than two-thirds compared with equivalent constant speed alternatives, by only supplying the required flow rate to meet the demand.

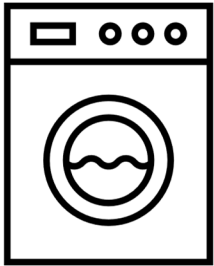
The heating and cooling systems are to be appropriately zoned, with local fast responding controls.

Natural light is maximised throughout, where practicable, with appropriate glazing design. This allows electric lighting energy consumption to be reduced during daylight hours, reducing running costs and CO₂ emissions.

Installing efficient low energy light fittings internally and externally can significantly reduce a building's overall lighting load hence lowering its annual CO₂ emissions. The development will reduce the energy consumption by the specification of low energy, high efficacy LEDs to all areas.

Appropriate lighting controls and occupancy controls will reduce the lighting energy use where appropriate.

Unregulated Energy



Unregulated energy is those uses that fall outside the typical scope of building regulations. This includes energy used through cooking, computers, external lighting and other 'plug loads' which are typically under the control of the occupant.

Addressing these loads, which often form a significant portion of a building's overall energy consumption, is key to reducing energy consumption to levels required for Net Zero Carbon.

This will be achieved through the specification of energy efficient white goods, lifts, and other appliances.

Be Lean Results

In accordance with the industry recognised Energy Hierarchy, an energy assessment has been carried out for the entire development with the aforementioned passive design and energy efficiency measures.

The table below presents the improvement over the notional building Part L2 2013 carbon emissions after the energy demand reduction.

An 28.0% carbon emissions reduction is achieved through energy efficiency measures.

Part L2 2013 End-uses Breakdown (kgCO ₂ /m²)		
End-use	TER	BER
Heating	1.1	0.7
DHW	4.0	4.0
Cooling	0.2	0.3
Auxiliary	0.4	1.1
Lighting	7.1	3.2
Renewables	0.0	0.0
Total	12.82	9.23
Improvement over TER		28.0%
Part L Status (BER<TER)		PASS

The BRUKL document's front page and technical data sheet can be found in **Appendix C**.

3.2 Cooling and Overheating

The proposed development has been designed to minimise its use of energy intensive cooling systems through passive and energy efficient measures.

Minimising internal heat generation

Plug-loads and occupant densities associated with the building’s activities cannot be altered beyond the client’s brief. Therefore, the only area that can be targeted is the lighting. Low energy, high efficacy, LED lighting will be used through-out the development to minimize internal heat gains.

Reducing the amount of heat entering the building

The development facades have undergone design review to control the amount of solar gain entering internal spaces. The façade elements have been specified with a low solar transmission (g-value) of 40% in all facades. Internal solar control blinds with a shading coefficient of 0.40 will operate when needed based on the solar gains to winter garden areas.

Glazing Specifications (%)	Design Values
Solar transmittance typical (G-value)	0.40
Glazing visible light transmission (VLT)	0.70
Solar control blinds shading coefficient	N/A
Glazing frame factor (%) - typical value	10%

Passive ventilation

As part of the façade adjacent to glazed areas, there are to be automatically openable vents, that will provide free cooling during the day, until demand requires mechanical cooling.

Mechanical ventilation and active cooling systems

Local dedicated MVHR units with heat recovery providing continuous mechanical ventilation and purge panel which is used to purge the space and assist with summertime overheating.

Cooling will be provided by air source heat pumps/VRF for amenity areas Efficiency values of these systems will not exceed the requirements of the Part L Vol 2 Buildings other than dwellings.

Active Cooling

The Part L assessment also provides a quantification of the energy demand likely to be expected of the cooling system. This is compared to the notional building benchmark demand to demonstrate compliance.

3.3 Heating Infrastructure – Be Clean

Combined Heat & Power

Combined Heat and Power (CHP), also known as cogeneration, is an energy system capable of producing both useful heat and electricity simultaneously in a single process. It allows for optimum use of the energy available from the fuel used.

In accordance with the Policy EN 6 of the Manchester City Council the feasibility of a site-wide CHP network has been investigated. The efficient use of CHP typically depends on finding a use for the heat generated by the process. Issues to consider include:

- If heat is not used, then the system is effectively just an electricity generator and electricity will be greener and cheaper if sourced from the national grid.
- If excess electricity is generated on site this can be exported (sold) back to the grid whereas excess heat needs to be rejected (wasted). Exported electricity can count towards reducing the site's CO₂ emissions.
- Exported electricity will typically not be financially attractive as exports tend to coincide with low demand periods on the national grid so the cost of producing the electricity on site can be less than the prices received for the exported electricity.

The heat load of the development is insufficient to permit effective operation of an on-site combined heat and power unit. Furthermore, CHP emits local air pollution in the form of NO_x and SO_x. CHP is not viable without expensive catalytic converters which would not be feasible for a unit of this size.

It is also widely recognised that CHP is now more CO₂ intensive than electricity because of the rapid decarbonisation of the electricity grid.

As such it is not proposed to include CHP within the development.

District Heating

A district heating or cooling scheme comprises of a network of insulated pipes used to deliver heat or cooling, normally in the form of hot or chilled water from the point of production to an end user.

The feasibility of connecting to an existing district network has been investigated for the site in accordance with Policy EN 6 of the Manchester City Council. There are no existing or proposed district heating networks within 500m of the site suitable for connection to, therefore connection to an existing network is not feasible.

3.4 Low & Zero Carbon Technologies – Be Green

3.4.1 Air Source Heat Pumps

Air source heat pumps (ASHP) exchange heat between the outside air and a building to provide space heating in winter and cooling in the summer months. The efficiency of these systems is inherently linked to the ambient air temperatures.

Heat pumps supply more energy than they consume, by extracting heat from their surroundings. Heat pump systems can supply as much as 4kW of heat output for just 1kW of electrical energy input.

ASHPs are therefore being incorporated into the design proposals and will be implemented as follows:

LTHW flow & return pipework is routed down central core or apartment risers with branches to each apartment. Heat Interface Units (HIU) may be considered (Client to confirm) to meter and monitor usage to each apartment, however not specifically required for billing purposes (all in rent)

Domestic hot water will be provided via ASHP and will utilise high temperature refrigerant, such as CO₂, which operate efficiently at the high temperatures that DHW generation demands.

These heat pump systems will enable significant emissions savings over a conventional gas boiler heating system, particularly when factoring in the decarbonisation of the electrical grid.

A summary of the fixed building services inputs used for the 'Be Green' scenario can be found in **Appendix B**.

3.4.2 Photovoltaics (PV)

Photovoltaic solar cells convert solar energy directly into electricity. The advantage of photovoltaic cells is once they are installed, they require minimal maintenance over their operational life and have no primary fuel requirements.

The proposed roof area is allocated as plant area and a roof terrace. The proposed location of PV arrays is at roof level. A total of 200 m² usable PV array is required over a few sections of roof, with a modular efficiency of at least 22%, orientated south at an inclination of 30° to the horizontal. This could enable a 41.2 kWp photovoltaic solar array to be installed.

3.4.3 Other Technologies

Other technologies were considered, however are not considered appropriate for the development. These include:

- **Wind Turbines:** The output from wind turbines is highly sensitive to wind speed. Hence it is essential that turbines should be sited away from obstructions, with a clear exposure, or fetch, for the prevailing wind. The urban nature of the site means these are not considered appropriate for this development.
- **Biomass:** Biomass in the form of logs, wood chips and wood pellets are classified as a renewable source of energy since the carbon dioxide emitted when the biomass is burned has been taken out of the atmosphere by the growing plants. Even allowing for emissions of carbon dioxide in planting, harvesting, processing, and transporting the fuel they will typically reduce net CO₂ emissions by over 90%. However, biomass boilers and their associated NO_x emissions would impact local air quality and therefore are not considered feasible for this development.
- **Solar Thermal:** Solar thermal collectors utilise solar radiation to heat water for use in buildings. Solar collectors are typically designed to meet a development's base heat load, associated with its domestic hot water requirements. However, the complexities involving the integration of pipework as well as the limited available roof space means that solar thermal collectors are not considered feasible for the development.

3.4.4 Be Green 2013 Results

The analysis indicates that the proposed development is performing significantly better than the minimum requirements of Part L of the Building Regulations and achieves an improvement of 40.6 % over the Building Regulations Part L 2010 Target Emission Rate as highlighted below and it is therefore in compliance with Core Strategy Policy EN6.

Part L2A 2013 End-uses Breakdown (kgCO ₂ /m ²)		
End-use	TER	BER
Heating	1.1	0.5
DHW	4.0	3.6
Cooling	0.2	0.4
Auxiliary	0.4	0.7
Lighting	7.1	3.2
Renewables	0.0	-0.8
Total	12.8	7.6
Improvement over TER		40.6%
Part L 2013 Status (BER<TER)		PASS

The BRUKL document's front page and technical data sheet can be found in **Appendix C**.

3.4.5 Be Green 2021 Results

The analysis indicates that the proposed development is performing significantly better than the minimum requirements of Part L of the Building Regulations and achieves an improvement of 22.1 % over the Building Regulations Part L 2021 Target Emission Rate as highlighted below and it is therefore in compliance with Part L 2021.

Part L2A 2021 End-uses Breakdown (kgCO ₂ /m ²)		
End-use	TER	BER
Heating	0.4	0.3
DHW	1.2	1.0
Cooling	0.0	0.1
Auxiliary	0.1	0.2
Lighting	0.8	0.6
Renewables	0.0	-0.2
Total	2.48	1.93
Improvement over TER		22.1%
Part L 2021 Status (BER<TER)		PASS

The BRUKL document's front page and technical data sheet can be found in **Appendix C**.

3.5 Proposed Energy Strategy

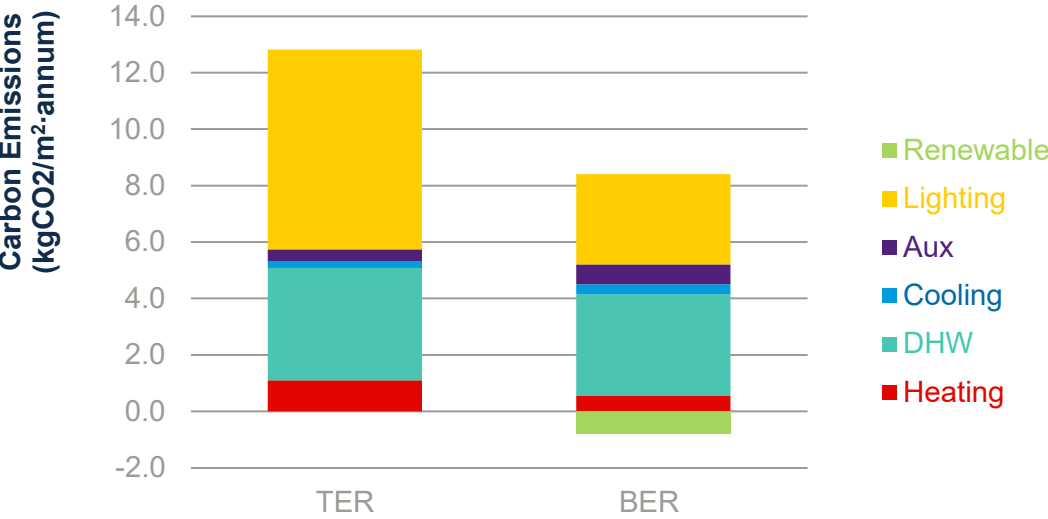
The analysis indicates that the proposed development is performing significantly better than the minimum requirements of Part L of the Building Regulations and achieves an improvement of 40.6% over the Building Regulations Part L 2013 Target Emission Rate as highlighted below.

The proposed development also achieves an improvement of 22.1% over the current Building Regulations Part L 2021.

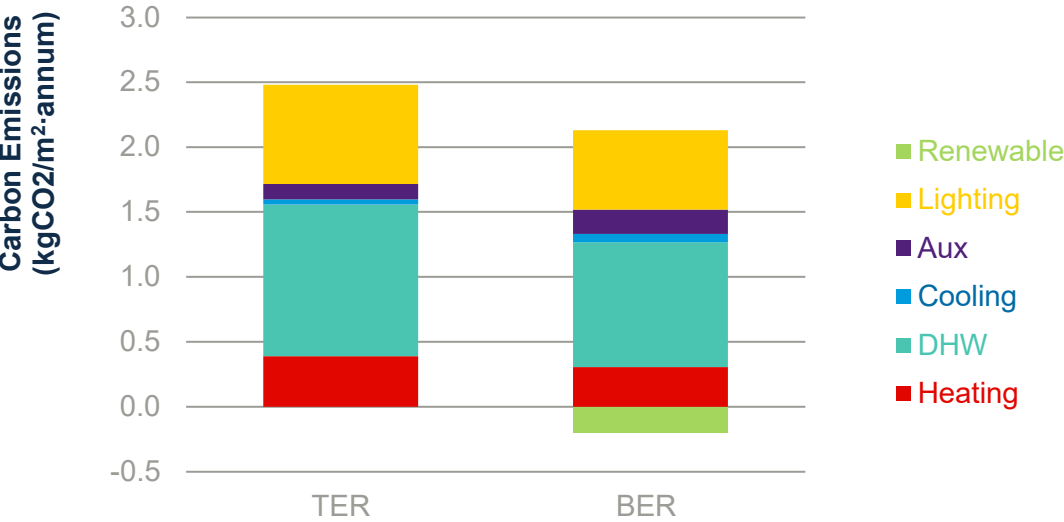
A summary of the energy and sustainability policies and the developments performance against the targets is shown in the next page.

A summary of the fixed building services inputs used for the scenarios can be found in **Appendix B**.

Part L2A 2013 Results



Part L2A 2021 Results



	Guidance	Minimum Requirements	Summary of Performance								
Energy Strategy	<u>National</u> - National Planning Policy Framework – July 2021 - Building Regulations Part L2 2013 - Building Regulations Part L2 2021 <u>Regional</u> - Places for everyone - Following receipt of the 2020 Greater Manchester Strategic Framework (GMSF) Integrated Assessment (IA) and Addendum Report (2020), the Greater Manchester (GM) Authorities have amended the GMSF, primarily as a result of Stockport withdrawing from the Plan Local <u>Local</u> Manchester City Council Core Strategy	Objective 7: Playing our part in ensuring that Greater Manchester is a more resilient and carbon neutral city region. - Promote carbon neutrality of new development by 2028. - Promote sustainable patterns of development that minimise the need to travel and contribute to cleaner air. - Locate and design development to reduce car dependency. - Facilitate provision of infrastructure for cleaner vehicles. - Improve energy efficiency and the generation of renewable and low carbon energy. <u>Domestic and non-domestic development</u> <table><tr><th>Target</th><th>% Minimum req.</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</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>	Target	% Minimum req.	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	+10% increase on Part L 2010	Target 3: Micro generation area	+15% increase on Part L 2010	The results indicate that the proposed development is achieving a 40.6% improvement over the Building Regulations Part L 2013 Target Emission Rate, using the SAP 2012 emissions factors. This exceeds the Manchester City Council Core Strategy target. A 28.0% carbon emissions reduction is achieved through energy efficiency measures ('Be Lean'), using the SAP 2012 emissions factors. The 'Be Lean' scenario utilises a centralised heat pump system to deliver the space heating and domestic hot water requirements. Based on NCM modelling guide, the notional building uses the same system type and fuel for hot water generation as the actual building. The analysis found that the use of renewables (air source heat pumps for heating and cooling and photovoltaic panels) could reduce CO₂ emissions by 12.6% for the development over a conventional HVAC configuration, using the SAP 2012 emissions factors. The BRUKL output is provided in Appendix C.
Target	% Minimum req.										
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	+10% increase on Part L 2010										
Target 3: Micro generation area	+15% increase on Part L 2010										
Overheating Assessment	Manchester City Council Core Strategy	The need to control overheating of buildings through passive design.	The development will use a mixed mode strategy, using natural ventilation where possible, and switching to mechanical during periods of higher demand. As part of the façade adjacent to glazed areas, there are to be perforated panels with openable internal sections, that will provide free cooling during the day. There is a reduction in load due to lower energy lighting, solar control and improved fabric performance. There is no requirement for an overheating assessment.								
Sustainability Strategy	- Manchester City Council Core Strategy - Climate Change - Air quality - Sustainable drainage - Sustainable water - Noise - Ecology/ landscaping (Urban Greening) - Sustainable transport	- Policy EN 8 – Adaptation to Climate Change All new development will be expected to be adaptable to climate change in terms of the design, layout, siting and function of both buildings and associated external spaces. - Policy EN 14 – Flood Risk In line with the risk-based sequential approach contained within PPS25, development should be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding; this should take account of all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA) - Policy EN 15 – Biodiversity and Geological Conservation The Council will seek to maintain or enhance sites of biodiversity and geological value throughout the City	The development will ensure that measures are included that contribute to the goals of the respective policies.								

	Guidance	Minimum Requirements	Summary of Performance
		▪ Policy EN 16 – Air Quality The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester’s principal traffic routes and at Manchester Airport ▪ Policy EN 17 – Water Quality Development should avoid any adverse impact on water quality, including during the construction phase, and wherever possible should seek to enhance water quality, both chemical and ecological. ▪ Policy T 1 – Sustainable Transport To deliver a sustainable, high quality, integrated transport system to encourage modal shift away from car travel to public transport, cycling and walking, to support the needs of residents and businesses and to prepare for carbon free modes of transport	
Compliance Tools	▪ Manchester City Council Core Strategy	BREEAM UK New Construction Version 6	BREEAM ‘Excellent rating is being targeted. Please refer to BREEAM Assessor “Crouch Perry & Wilkes LLP”.

4.0

Health & Wellbeing



4.0 Health & Wellbeing

4.1 Daylight



Good daylight is an important factor in moderating people's circadian rhythm, which enhances productivity and regulates the sleep cycle. It is also a key factor in reducing energy consumption from artificial lighting.

Achieving a perfect balance between thermal comfort, internal daylight and energy consumption is a main driver when establishing the location and size of windows and the glazing properties.

The elevations have been established using a balanced approach to glazing to ensure that all windows within elevations are providing maximum daylighting resulting in bright and airy space, but at the same time, no excessive heat enters the building during hot summer days.

Room depths enable occupants to have access to a view out, which is important in allowing the eyes to refocus after periods of deep focus.

Glare control measures such as blinds will allow occupants to regulate their own internal daylight conditions in line with their preferences.

4.2 Thermal Comfort



As climate change leads to rising summer temperatures, maintaining acceptable temperatures in occupied spaces is fundamental to creating productive, healthy & safe places for people to live and work. Maintaining good thermal comfort has been central to the project's shading, ventilation & cooling strategy.

Heat has been limited from entering the building through careful consideration of glazing. This must be balanced with a need for good daylight and solar heat in winter, so the use of shading and solar control glass has been considered.

The specification of LED lighting and energy efficient equipment has been considered for reducing the internal heat generation.

The development will be mechanically ventilated with manually openable sections behind perforated panels on the façade adjacent to glazed areas that will enable free cooling during the day and purge vent

4.3 Air Quality



Poor external air quality originates from the high number of vehicles, as well as plant and machinery such as boilers used to heat buildings, and the density of roads and building, which prevents effective dispersal of pollutants.

To protect occupants from the high levels of air pollution experienced at certain areas of the site, a background ventilation strategy that does not rely on openable windows will be adopted. Local dedicated MVHR units with heat recovery providing continuous mechanical ventilation and purge panel which is used to purge the space and assist with summertime overheating.

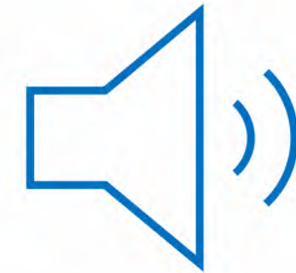
Where necessary, appropriate filtration will be installed to clean the incoming air into the building and ensure good standards of air quality.

The development proposal will not include the installation of any combustion plant for the purposes of generating heat or hot water. This will be entirely electric, therefore will not create any adverse effect on the local air quality for residents and neighbouring properties.

To maintain good internal air quality, internal finishes will be specified which have low or no emissions of VOCs and other harmful pollutants complying with European best practice levels as a minimum.

An air quality assessment has been carried out to support the development's planning application. Further details of the development's response to air quality can be found in the Air Quality Assessment report issued by BWB consulting.

4.4 Acoustics



Acoustic comfort is important for occupant productivity, relaxation and rest. High noise levels which hinder this can have a range of adverse effects on people's mental and physical health.

For more details refer to the Noise Impact Assessment report issued by Cundall in April 2023



5.0

Transport

5.0 Transport

5.1 Walking & Cycling



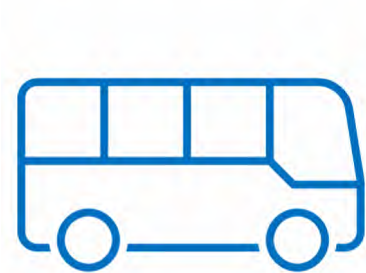
The transport of people between buildings is the second largest source of CO₂ emissions in the UK after energy use in buildings and remains the main source of many local pollutants. Energy use and emissions from transport are growing at 4% per year, while the effects of climate change are becoming more severe.

As part of the development, secure cycle spaces will be provided for occupants use to reduce reliance on car-based travel. The development is car free (apart from the provision of 5 disabled car parking spaces)

The site benefits from good walking and cycling links from the site to the surrounding areas, including:

- The area provides multiple options for safe cycling such as trails, dedicated lanes and bicycle-friendly roads.

5.2 Public Transport



The proposed development on Upper Brook Street Manchester, benefits from access to a comprehensive range of public transport services.

The Transport for Greater Manchester (TfGM) Piccadilly rail and Deansgate rail/tram stations are located within a ten-minute walk of the site (700m away), providing services to other destinations in Greater Manchester and beyond, as shown in the next figure.

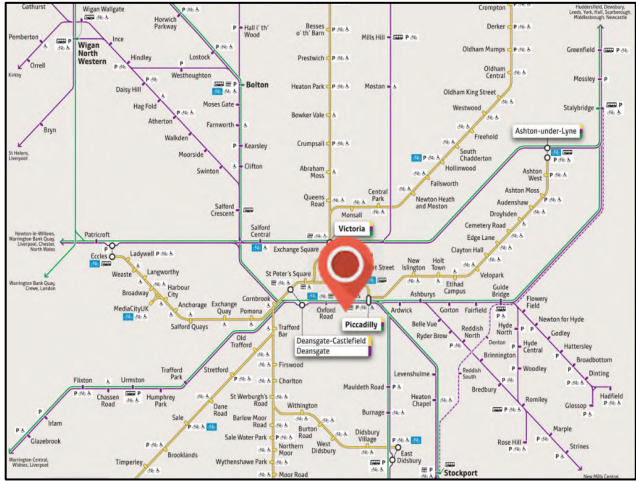


Figure 5-1. Greater Manchester Train and Tram Lines, Transport for Greater Manchester

There are bus stops on Upper Brook Street and Oxford Road offering a high frequency service across the city centre.

Further details on the development's approach to sustainable transport can be found in the Transport Statement and Framework Travel Plan that will be issued by Civic Engineers.



6.0

Water

6.0 Water

6.1 Water Efficiency



Water consumption in the UK has risen by 70% over the last 30 years. Trying to meet the increasing demand by locating new sources of water supply is both expensive and damaging to the environment. Therefore, the design team have focused on reducing the demand for water and managing the existing resources.

The aim is to minimise internal and external potable water use within the development. Good water management can contribute to reducing the overall level of water consumption maintaining a vital resource and having environmental as well as cost benefits in the lifecycle of the building.

Anticipated water demand is 100 litres per person per day. However, the following water saving measures are being considered throughout:

- **Dual Flush Cisterns on WC's** - It is proposed that these are used throughout the development in order to minimise water consumption.
- **Flow Restrictors to Taps** - Flow restrictors reduce the volume of water discharging from the tap. Spray taps have a similar effect and are recommended to reduce both hot and cold-water consumption.
- **Low Flow Showers** - The average shower uses 15 litres of water a minute, however by restricting the output of any showers in the development to lower rate, a significant water saving can be achieved. Flow rates can be reduced to 6 litres/minute without compromising on water pressure and hence will be considered as the design develops.

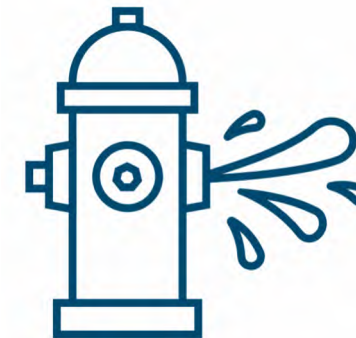
6.2 Water Monitoring



In 2017, approximately 5.3 billion cubic meters of water were abstracted for public water supply, making up over half of all water abstracted in the UK. To reduce this figure, accurate information on usage is required for management of a building's consumption.

Water meters will be specified on the main supply and sub-metering in line with the BREEAM requirements.

6.3 Leak Prevention and Detection



To minimise the risks of major water leaks occurring, a water leak detection will be installed. The flowrate of the incoming water meter will be monitored by a leak detection system, which will highlight when there is a significant rise in water consumption, indicating a major leak within the building.

The leak detection system can be standalone or can be integrated within the Building Management System (BMS). It will feature programmable thresholds to suit the specific consumption of the building and an audible alarm if those thresholds are exceeded. It will also be designed to avoid false alarms by normal operation of large water consuming plant.

As well as a major leak detection system, minor leaks will be prevented through automatic flow control devices within each Landlord WC/facility. These will feature solenoid valves within the cold-water supply to each area, linked to the occupancy sensors within the space. This will minimise water leaks and wastage from sanitary fittings.

6.4 Irrigation



External irrigation can also contribute towards significant water consumption if not appropriately managed. External planting on the roof area, will utilise plants which are adapted to the local climate and can rely on precipitation alone for the majority of the year.

The incorporation of a **blue roof** can offer temporary storage of rainfall to mitigate runoff impacts and storage for reuse such as irrigation.

6.5 Sustainable Urban Drainage

A surface water drainage assessment has been carried out for the development to examine opportunities to reduce the overall level of flood risk through the appropriate application of sustainable drainage systems. The assessment demonstrates that there is scope for various SuDS features that can restrain runoff to mitigate the risk of future surface water flooding, taking into account potential climate changes.

Further details on the development's approach can be found in the Proposed Drainage Strategy and Flood Risk Assessment that will be issued by Civic.



7.0 Materials

7.1 Responsible Sourcing & Procurement

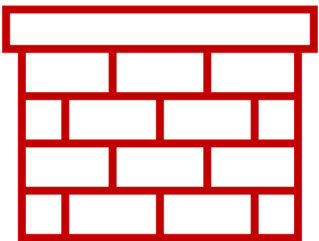


All timber used for basic or finishing building elements in the scheme will be sourced from responsibly managed and sustainable forests or plantations. Such timber products are the only truly renewable construction material in common use and the responsible management of forests for timber helps to lock in CO₂. By maximising the use of timber for structural or finishing purposes the embodied carbon impact of the development can be reduced.

The development recognises the importance of using locally sourced materials, which it will aim to consider throughout the design. Preference will be given to locally sourced materials wherever practical. Materials will be sourced from reasonable sources where possible, including ISO 14001 and BES 6001.

Much of the responsibility for materials procurement falls to the contractor, therefore they will aim to procure all materials in accordance with a documented sustainable procurement plan. This sets out a clear framework for the responsible sourcing of materials to guide those involved in the specification and procurement of materials throughout a project. It is intended to identify risks & opportunities against a broad range of social, economic & environmental issues, and provide a strategic assessment of sustainably sourced materials available locally or nationally. This will also contain a policy to procure materials locally where possible. This is to reduce the environment impacts and CO₂ emissions associated with transportation to the site.

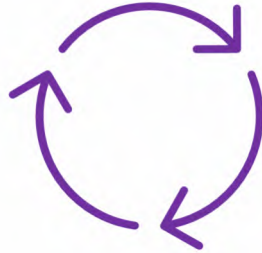
7.2 Durability and Resilience



In order to ensure the longevity of the materials used in the building construction and avoid the need for replacement, durability & protection measures will be specified where appropriate. This will prevent damage to vulnerable parts of the building, such as high pedestrian traffic areas, external vehicular collision and areas with internal vehicle/storey movement.

The building elements will also be designed to incorporate appropriate measures to limit material degradation due to environmental factors. This includes degradation due to factors such as temperature variation, water/moisture damage, pollutants etc.

7.3 Material Efficiency



Material use will be reduced or optimised through design, specification and construction techniques. Targets will be set and monitored throughout the construction process to achieve the objective. This is to reduce the environmental impact through optimising the use of materials during all stages of the project.

7.4 Healthy Materials



Volatile organic compounds (VOCs) are emitted as gases (commonly referred to as off-gassing) from certain solids or liquids. VOCs include a variety of chemicals, some of which are known to have short-term and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors.

VOCs are emitted by a wide array of products numbering in the thousands. Examples include paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials, furnishings, adhesives, Urea-formaldehyde foam insulation (UFFI), pressed wood products (hardwood plywood wall panelling, particleboard, fibreboard) and furniture made with these pressed wood products.

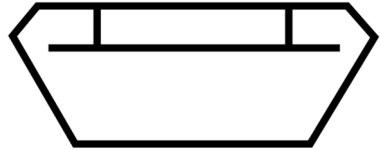
'No' or 'low' VOC paints are available from most standard mainstream paint manufacturers. The 'eco-friendly' paints are made from organic plant sources and powdered milk-based products.

The design team will select internal finishes and fittings with low or no emissions of VOCs and comply with European best practice levels as a minimum.



8.0 Waste

8.1 Construction Waste Management



During the construction phase, a large amount of waste material will be generated through construction, demolition, and land clearing procedures. In building construction, the primary waste products in descending percentages are wood, asphalt/concrete/masonry, drywall, roofing, metals, and paper products.

Prior to commencement on site a Resource Management Plan (RMP) that complies with the requirements of current legislation and BREEAM will be prepared. This plan will identify the local waste haulers and recyclers, determine the local salvage material market, identify and clearly label site spaces for various waste material storage and require a reporting system that will quantify the results and set targets. As a minimum, the RMP will contain:

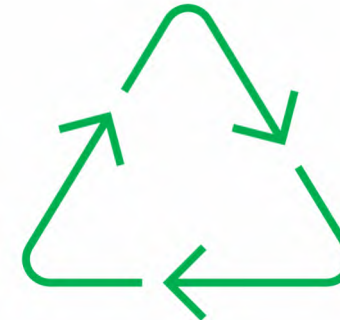
1. The target benchmark for resource efficiency i.e., m³ of waste per 100m² or tonnes of waste per 100m².
2. Procedures and commitments to minimise non-hazardous waste in line with the target benchmark.
3. Procedures to minimise hazardous waste.
4. A waste-minimisation target and details of waste minimisation actions to be undertaken.
5. Procedures to estimate, monitor, measures and report on hazardous and non-hazardous site waste and demolition waste, where relevant, arising from work carried out by the principal contractor and all subcontractors. Waste data obtained from licensed external waste contractors needs to be reliable and verifiable, i.e., using data from EA/SEPA/EA Wales/NIEA waste return forms or from a PAS402 compliant company.
6. Monthly reporting of all construction waste data throughout the project checked against what would be expected based on the stage of the project,

invoices, etc., to validate completeness of waste reporting data.

7. Procedures to sort, reuse and recycle construction waste into defined waste groups, either on site or through a licensed external contractor.
8. Procedures to review and update the plan.
9. The name or job title of the individual responsible for implementing the above.

The development's target is to achieve more than 80% of construction waste be diverted away from landfill.

8.2 Operational Waste



The detailed design phases will identify the potential waste streams that the development will produce. As a minimum, plans will be formulated to handle the separation, collection, and storage of common recyclable materials such as paper, glass, plastics, and metal. The collection points will be easily accessible to all users.

The main aim will be to recycle as much waste as possible, this will be achieved by making sure that waste recycling facilities are strategically placed in convenient locations.

Dedicated storage space for recyclable materials generated by the site during occupation, will include the following:

- Be clearly labelled to assist with segregation, storage and collection of the recyclable waste streams.
- Be placed within accessible reach to building occupants or facilities operators for the deposit of materials and collections by waste management contractors
- Of a capacity appropriate to the building type, size, number of units (if relevant) and predicted volumes of waste that will arise from daily or weekly operational activities and occupancy rates.

Cundall will be preparing a waste proforma as required by Manchester City Council.



9.0 Land Use & Ecology

Biodiversity of wildlife, plants and their habitats is a vital component of healthy, well-functioning ecosystems, which in turn sustain all life on the planet.

In response to the ecological emergency developments should aim to increase local ecology and diversity.

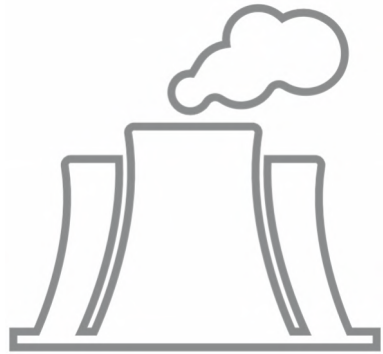
The development's roof terrace area will be used as amenity area offering the occupants vital outdoor space. The development will provide a high-quality public realm treatment including proposed tree planting along the highway edge that will create a microclimate and enhance biodiversity of the site.

For more details refer to the Design & Access Statement issued by Sheppard Robson and preliminary ecologic appraisal carried out by Brooks Ecology.



10.0 Pollution

10.1 Local Air Pollution



Global concern for environmental pollution has risen in recent years, as concentrations of harmful pollutants in the atmosphere are increasing. Buildings have the potential to create major pollution both from their construction and operation, largely through pollution to the air (dust emissions, NO_x emissions, ozone depletion and global warming) but also through pollution to watercourses and ground water. The proposed development will aim to minimise the above impacts, both at the design state and onsite.

The development will feature no on-site combustion for the provision of heating and hot water. All services will be electrically driven. As well as supporting the development's low emission aspirations, this has the added benefit of negating its impact on local air quality.

There will be a fire and life safety generator for the residential building located at ground floor. The generator will only be in use during emergency situations, testing to be carried out in accordance with the manufacturer recommendations.

Further details of the development's response to air quality can be found in the Air Quality Assessment report that will be issued by BWB Consulting.

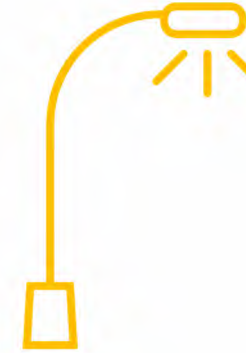
10.2 Sustainable Urban Drainage



A flood risk assessment (FRA) and Drainage Strategy has been prepared for this development in support of the planning application. The FRA is used to establish the risk of flooding to the development and from the proposed development to the vicinity.

Further details on the site's flood risk and sustainable drainage strategy can be found in the Proposed Drainage Assessment Strategy that will be issued by Civic.

10.3 Light Pollution

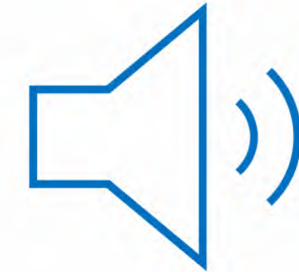


External lighting encompasses vehicle and pedestrian access lighting, security lighting, facility illumination and general feature lighting. The lighting will be designed on a site wide basis to meet the mandatory requirements and aesthetic considerations. The strategy is to provide a balance between adequate external lighting for safe and secure operation of the site without unnecessary illumination or power consumption.

The intention is to be a good neighbour and not to introduce nuisance glare or light pollution of the night sky from misdirected or unnecessary lighting. Feature lighting, where required, will be focussed to the task/subject. Where necessary, luminaires will be further screened in cases where there may be an issue of proximity and light spill to adjacent neighbouring residential areas, although the intention is to avoid this situation wherever possible from the outset. The external lighting design will take into consideration the relevant guidance from the British Standards and other recommended documents including the following Standards and Design Guides:

- CIBSE Lighting Design Guides
- BS5489 Code of Practice for the Design of Road Lighting
- BS EN 13201-1&2 Road Lighting
- Institute of Lighting Engineers Guidance for Reduction of Obtrusive Light

10.4 Noise Pollution



New developments can have an adverse impact on their local surroundings by creating nuisance noise that did not exist before. It is therefore important to understand and limit this noise to avoid disturbances.

Any new items of building services plant will need to be selected, installed, and attenuated such that the local authority noise criteria are achieved. It is proposed that noise from any new items of building services plant associated with the development be designed to meet the BS4142:2014 requirements.

For more details refer to the Noise Impact Assessment report issued by Cundall in April 2023

A large-scale construction site at dusk or dawn. The sky is a mix of deep purple, orange, and yellow. Several tower cranes are silhouetted against the bright horizon. In the foreground, the dark silhouettes of buildings under construction are visible. The overall scene conveys a sense of active development and progress.

11.0

Environmental Certification

11.0 Environmental Certification

A pre-assessment has been carried out using the BREEAM UK New Construction Version 6 methodology, residential building. The results of the assessment indicate that the current design is likely to achieve a BREEAM 'Excellent' rating, with a score of 70 %.

The threshold for an 'Excellent' rating is 70% and for 'Outstanding' rating is 85%. Cundall recommends a 4-5% additional buffer to mitigate against any unforeseen credit loss throughout the design stages.

BREEAM groups its sustainability rating under the following nine headings:

- Management - Commissioning and construction site management
- Health & Wellbeing - Indoor and external issues
- Energy Use - Operational energy and CO₂ issues
- Transport - Transport related CO₂ and location related factors
- Water - Consumption and water efficiency
- Materials - Environmental implication of building materials
- Waste – Operational and construction waste resource efficiency
- Land Use & Ecology - Ecological value of the site
- Pollution - Air & Water pollution

The overall rating of the building is constructed by achieving 'credits', which represent particular management, design or performance aspects of the building, as stipulated by BREEAM. The building must achieve the relevant mandatory credits, as well as other credits which contribute towards an overall target score. This score is used to determine what BREEAM rating the building achieves.

The following table summarise the initial strategy to achieve BREEAM 'Excellent' rating.

Environmental Section	Available	Weighting	Targeted (Excellent)	Potential (Excellent)
Management	21	11	19	0
Health & Wellbeing	19	14	11	0
Energy	23	16	11	0
Transport	12	10	6	0
Water	9	7	7	0
Materials	14	15	10	0
Waste	10	6	8	0
Land Use & Ecology	13	13	11	0
Pollution	12	8	9	0
Exemplary/Innovation	10	10	1	0
Total	143		101	
Excellent				

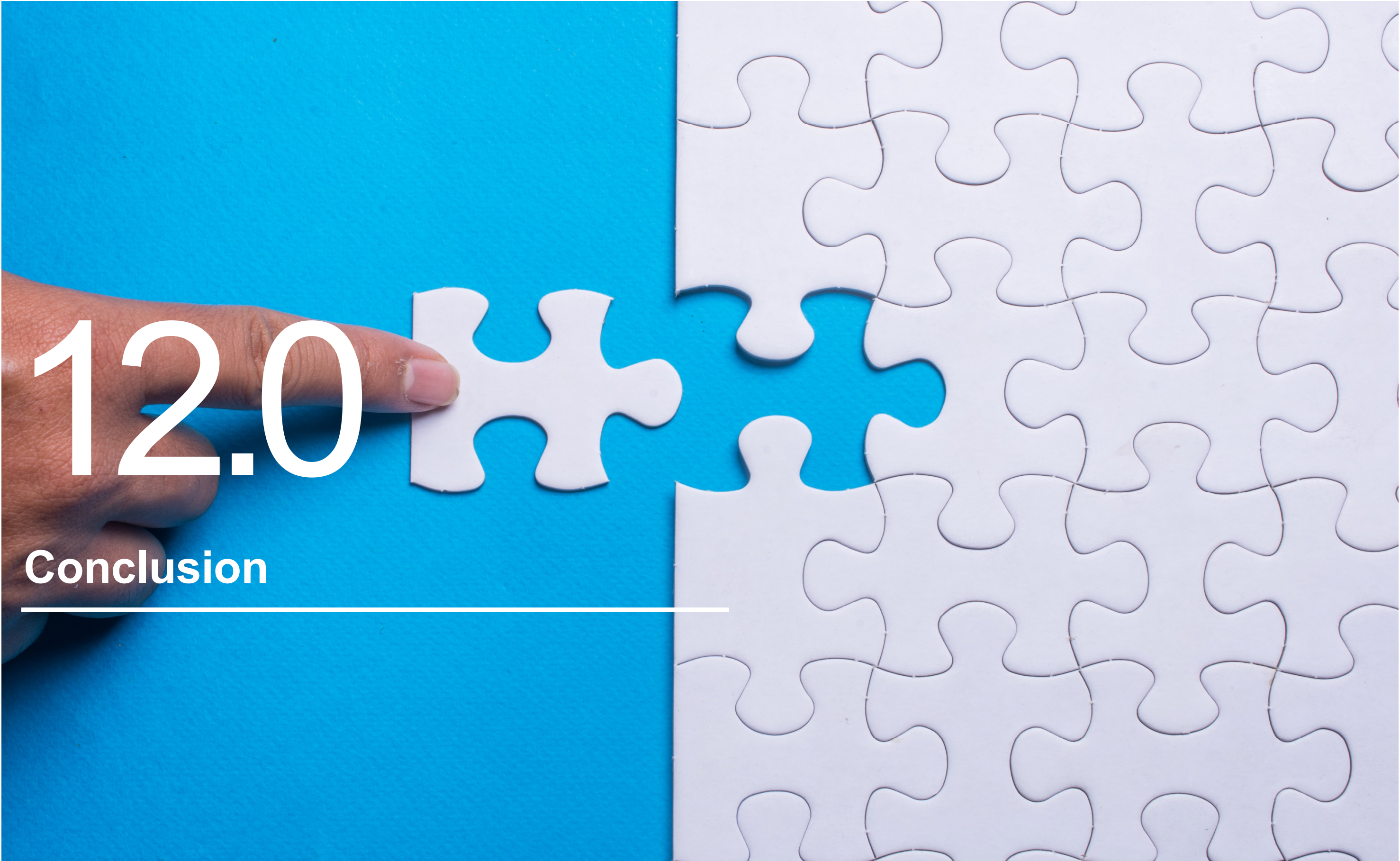
The minimum standards for 'Excellent' and 'Outstanding' for BREEAM UK New Construction Version 6, non-domestic buildings are shown below:

BREEAM issue	Minimum standards by BREEAM rating level				
	Pass	Good	Very Good	Excellent	Outstanding
Man 03 Responsible construction practices	None	None	None	One credit (responsible construction management)	Two credits (responsible construction management)
Man 04 Commissioning and handover	None	None	One credit (commissioning-test schedule and responsibilities)	One credit (commissioning-test schedule and responsibilities)	One credit (commissioning-test schedule and responsibilities)
Man 04 Commissioning and handover	None	None	Criterion 11 (Building User Guide)	Criterion 11 (Building User Guide)	Criterion 11 (Building User Guide)
Man 05 Aftercare	None	None	None	One credit (commissioning-implementation)	One credit (commissioning-implementation)
Hea 01: Visual comfort	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1 only
Ene 01 Reduction of energy use and carbon emissions	None	None	None	Four credits (Energy performance or Prediction of operational energy consumption*)	Six credits (Energy performance) and Four credits (Prediction of operational energy consumption*)
Ene 02 Energy monitoring	None	None	One credit (First sub-metering credit)	One credit (First sub-metering credit)	One credit (First sub-metering credit)
Wat 01 Water consumption	None	One credit	One credit	One credit	Two credits
Wat 02 Water monitoring	None	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1 only
Mat 03 Responsible sourcing of construction products	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1 only
Wst 01 Construction waste management	None	None	None	None	One credit
Wst 03 Operational waste	None	None	None	One credit	One credit

**For the 'Prediction of operational energy consumption', it must be demonstrated that the operational energy performance has been substantially improved.*

Please note that for speculative developments where the tenant is not known, the criteria set on Man 05 Aftercare are not applicable, and therefore the Commissioning implementation minimum requirement for 'Excellent' / 'Outstanding' rating is not applicable.

Please refer to BREEAM planning pre-assessment issued by CPW for further details regarding the credit requirements and evidence needed to complete the Design Stage Assessment.



12.0 Conclusions

The McLaren purpose-built student accommodation (PBSA) development on Upper Brook Street (UBS), Manchester. Manchester development's energy and sustainability approach is aligned with the Manchester City Council planning requirements.

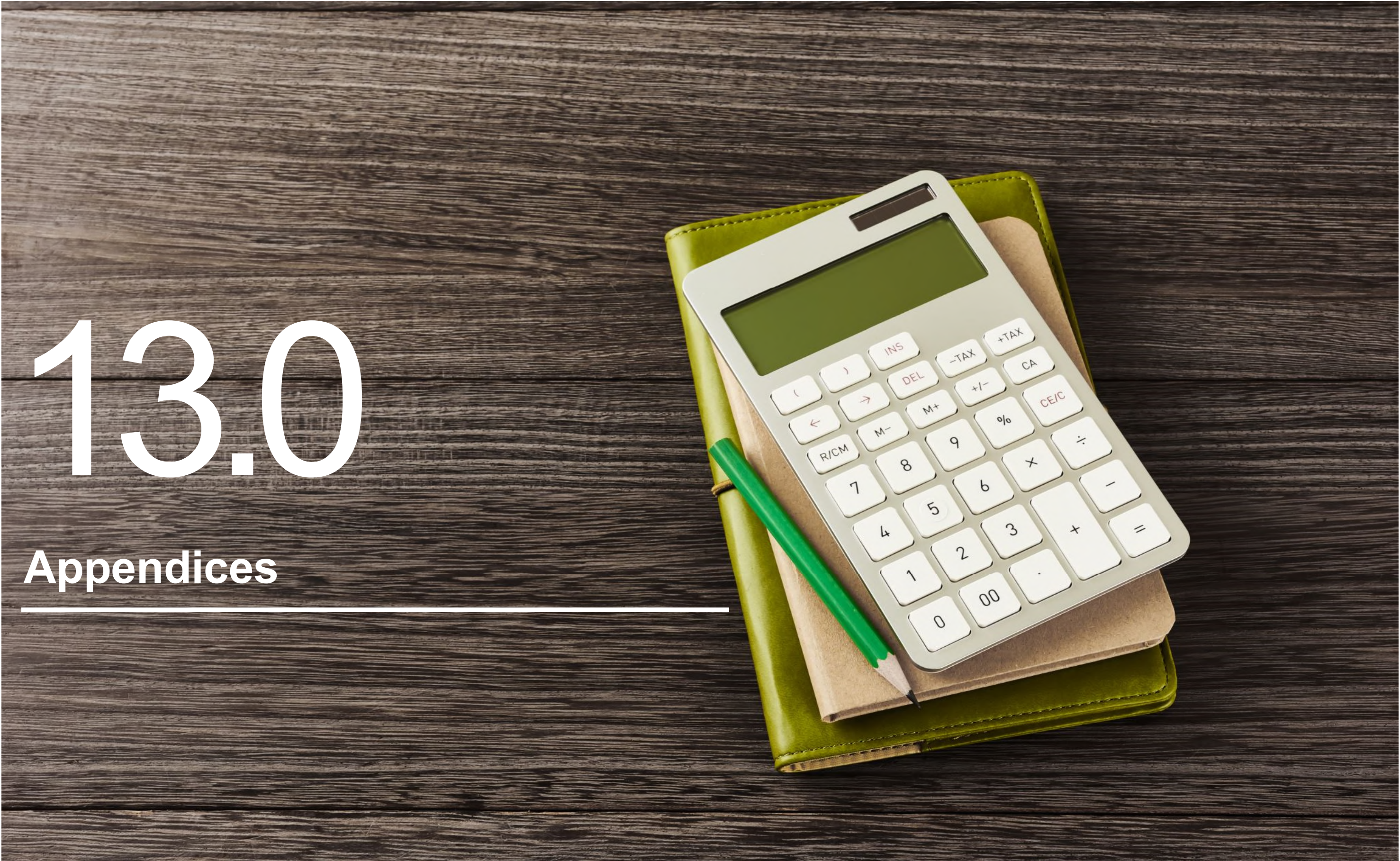
The energy strategy has been developed in accordance with the industry recognised Energy Hierarchy, Be Lean, Be Clean and Be Green, utilising the SAP 10 emission factors to present the results.

- 'Be Lean' - **Energy demand** will be reduced by achieving a well-insulated envelope that is an improvement on Building Regulation values, which is both airtight and thermal bridge free. High performance glazing provides a positive energy balance whilst mechanical ventilation with heat recovery maintain good air quality with minimal heat loss. **Energy efficient** building systems such as LED lighting and low-power fans and pumps will further drive down regulated energy use. Robust quality control, commissioning and handover procedures on site will further drive down energy use.
- 'Be Clean' - Combined heat & power was considered however this has been discounted due to poor base load and desire to avoid on-site combustion of fossil fuels. Connection to the district heating scheme was also considered however the distance from the existing network means connection would be infeasible.
- 'Be Green' - The remaining energy demand will be met through **low and zero carbon** energy sources. The development's heating, cooling and part of the hot water needs will be provided through efficient air-source heat pumps.

Through the above measures, the proposed development is performing significantly better than the minimum requirements of Part L of the Building Regulations and achieves an improvement of 40.6% over the Building Regulations Part L 2013 (which supersedes the Part L 2010) Target Emission Rate, which surpasses those outlined in the Manchester City Council Core Strategy. The building also achieves a 22.6% improvement over the Building Regulations Part L 2021.

In line with Manchester City Council policies and aspirations, other sustainability measures include:

- **Good daylight** will be achieved in occupied spaces through the balanced and considered use of glazing. High performance glazing will reduce energy loss.
- As part of the façade adjacent to glazed areas, there are to be manually purge perforated panels used to purge the space and assist with summertime overheating. This strategy ensures **thermal comfort** under normal operational hours.
- Mechanical ventilation with heat recovery will be used to maintain a consistent supply of filtered fresh air to maintain good **indoor air quality**. Low VOC materials and finishes will minimise internal sources of pollutants.
- The promotion of **walking and cycling** with strong connection links from the site to the surrounding area. This is further supported with the provision of cycle storage facilities for occupant use.
- Good **public transport** links in the immediate vicinity with further national links in the nearby city centre.
- **Water efficient** fixtures and fittings will be specified to reduce water consumption below the levels required for national building regulations.
- **Metering and sub-metering** of consumption will enable ongoing, targeted reductions in water use.
- **Leak detection and shut-off** will prevent both major and minor leaks within the buildings as well as in external areas.
- The need for **irrigation** will be minimised through appropriate landscaping which are adapted to the UK's conditions.
- All **timber** used in the project will be from a responsible or sustainable source, using certified FSC or PEFC sources.
- To ensure **responsible and sustainable procurement**, materials will be specified in line with a documented sustainable procurement plan. This will include the use of certification schemes such as ISO14001 and BES 6001.
- Materials that are **durable and resilient** will be specified to maximise their lifespan and avoid the need for disposal and replacement.
- The use of a **Resource Management Plan** will set targets for resource efficiency and procedures for waste management.
- Appropriate and accessible **waste facilities** will be provided to encourage occupants to recycle waste effectively.
- Using the roof area to integrate biodiversity and create a microclimate for planting, green walls and rainwater gardens.
- **Diversity of planting** to create valuable habitat throughout the seasons.
- The site will feature no **on-site combustion** for heating and hot water which would be detrimental to local air quality.
- **External lighting** will be designed to minimise the impact of light pollution. Light fittings will be specified with a reduced light spill and controlled using photocells and timeclocks to limit unnecessary operation.
- Limits to noise emitting plant to prevent impacts on its surroundings.
- Responsible construction practices to minimise resource use and the impact of noise, dust, and pollution.



Appendix A – Policy

A review into the anticipated statutory compliance requirements in relation to sustainability has been undertaken. A summary of the finds, applicable policies and likely necessary actions has been provided below. Full planning guidance and validation requirements should be sought from the project's planning consultant.

National Planning Policy Framework

The revised National Planning Policy Framework (NPPF) was updated in July 2021 and sets out the government's planning policies for England and states a clear presumption in favour of sustainable development. The revised Framework replaces the previous NPPF published in July 2021.

The NPPF supports the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourages the reuse of existing resources, including conversion of existing buildings, and encourages the use of renewable resources.

The NPPF, Section 14 outlines its energy and climate change policies. New developments should be planned for in ways that:

- avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaption measures, including through the planning of green infrastructure; and
- 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:

- provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts).
- consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
- identify opportunities for development to draw its energy supply from decentralised, renewable, or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

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 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

- take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

The key focus of the NPPF is to support local and regional planning authorities.

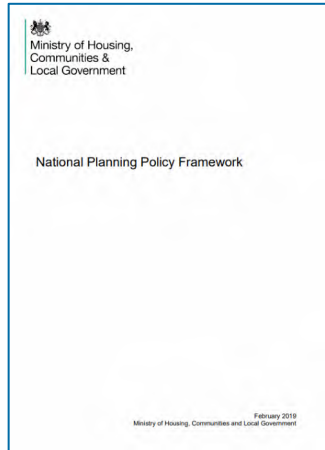


Figure A-1. Relevant planning documentation

Regional Policy

Places for everyone - Following receipt of the 2020 Greater Manchester Strategic Framework (GMSF) Integrated Assessment (IA) and Addendum Report (2020), the Greater Manchester (GM) Authorities have amended the GMSF, primarily as a result of Stockport withdrawing from the Plan Local.

The Places for Everyone Plan is the result of a process that began with the publication of the first Greater Manchester Spatial Framework in 2016, and has been informed by the feedback received from residents, businesses, and community

Greater Manchester's Vision is to be at the forefront of action on climate change and to make its fair contribution to international commitments by becoming a carbon neutral city region by 2038. In acknowledgment of climate change, by 2020, all 10 districts and the Greater Manchester Combined Authority have declared a climate emergency. To support this vision a 5 Year Environment Plan was launched in 2019 to identify the urgent actions that are needed to ensure Greater Manchester can follow the required pathway for carbon neutrality.

- Be carbon neutral by 2038
- Hold cumulative carbon dioxide emissions to within our carbon budget
- Initiate a programme of mitigation to reduce emissions including by:
 - Significantly upscaling solar photovoltaic energy.
 - Reducing heat demand in homes.
 - Moving away from carbon intensive gas as the primary source of heat.
 - Reducing heating and cooling demand for public and commercial buildings.
 - Increasing biofuel use.
 - Enable sustainable choices for travel and decarbonise transport.
 - Significantly upscaling building retrofit; and
 - Increase the delivery of nature based solutions and biodiversity net gain.

Following is an outline of the relevant objectives and policies for the Framework:

Objective 7: Playing our part in ensuring that Greater Manchester is a more resilient and carbon neutral city-region.

To meet the 2038 carbon neutrality target, the Greater Manchester will:

- Promote carbon neutrality of new development by 2028.
- Promote sustainable patterns of development that minimise the need to travel and contribute to cleaner air.
- Locate and design development to reduce car dependency.
- Facilitate provision of infrastructure for cleaner vehicles.
- Improve energy efficiency and the generation of renewable and low carbon energy.

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 including:

1. Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling; Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy.
2. Promoting the use of life cycle cost and carbon assessment tools to ensure the long-term impacts from development can be captured.
3. Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities.
4. Keeping fossil fuels in the ground.
5. Planning for a balanced and smart electricity grid by identifying geographical locations which could support energy assets.
6. Increasing the range of nature based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, tree-planting and natural flood management techniques.
7. Development of Local Area Energy plans to develop cost effective pathways to achieve carbon targets.
8. An expectation that new development will:
 - a. Be zero net carbon from 2028 by following the energy hierarchy (with any residual carbon emissions offset), 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 19% carbon reduction against Part L of the 2013 Building Regulations.

- b. Incorporate adequate electric vehicle charging points to meet likely long-term demand, taking account of the potential maximum energy demand for the site.
- c. Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date.
- d. Achieve energy demand reductions for residential development in terms of space heat demand, hot water energy demand and the delivery of on-site renewable energy generation.

For renewable energy generation priority should be given to PV installation where technically feasible, alternative technologies will be appropriate where the equivalent generation is evidenced.

- e. For non-residential developments, achieve at least BREEAM excellent standard (or equivalent) for the 'Ene 01 – reduction of energy use and

carbon emissions' category rising to 'BREEAM outstanding' equivalent for ENE 01 from 2028.

- f. Include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets, including the minimisation of overheating risks and appropriate measures for post occupancy evaluation. Whole life cycle emissions should be considered where possible.

District Local Plans may set out specific carbon emission reduction targets, particularly if carbon neutral targets have been set sooner than 2038 or promote other measures through which energy efficiency of buildings and renewable energy generation can be achieved.

Policy JP-S 3: Heat and Energy Networks**Heat and Energy 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. The following measures will help to achieve this:

1. Delivery of renewable and low carbon energy schemes will be supported with particular emphasis on the use of decentralised energy networks in areas identified as "Heat and Energy Network Opportunity Areas". These will be identified where:
 - a. Existing heat/energy networks are operational or have been commissioned.
 - b. Proposals for new heat networks/energy networks are being progressed, or future opportunities have been identified in city-region master planning.
 - c. Sufficient density of existing heat demand occurs; and
 - d. Significant future development is proposed at the strategic development locations.
2. Within the identified "Heat and Energy Network Opportunity Areas", there will be:
 - a. A requirement that new residential developments that are '10 dwellings or more' or other developments over 1,000 m² floorspace should evaluate the viability of:
 - i. Connecting to an existing or planned heat/energy network (where such a network has been identified within the Heat Network Opportunity Areas); and/or
 - ii. Installing a site-wide or communal heat/energy network solution.
 - b. A requirement, where unviable to connect to an existing network or install a site-wide or communal heat/energy network, for new development to incorporate appropriate capability to enable future connection (e.g., adequate space in plantroom for plate heat exchangers, capped-off flow/return connections).
 - c. A 'presumption in favour of network connection' where new residential developments over 10 dwellings and other developments over 1,000 sq m floorspace are within 500m of an existing heat network, or where a network is being delivered.

- d. An expectation that new industrial development will demonstrate that opportunities for using waste heat locally have been fully examined and included in proposals unless proven to not be viable.

- e. An expectation that where publicly owned buildings and assets adjoin new major development sites, opportunities for these buildings and assets to connect to site-wide proposals will be considered; and

- f. An expectation that any site-wide networks will be designed so as to enable future expansion to adjoining buildings or assets as appropriate.

3. In support of the above, all decentralised heat/energy network viability assessments are required to demonstrate consideration and analysis of:

- a. Identification of existing and proposed heat/energy loads.
- b. Identification of heat/energy supply sources.
- c. Identification of opportunities to utilise renewable and low carbon energy sources.
- d. Identification of opportunities to utilise waste and secondary heat sources.
- e. Impact of proposals and technology choices on local air quality.
- f. Design according to national best practice in relation to efficient heat network design (e.g., CIBSE CP1 Heat Networks: Code of Practice for the UK, or equivalent); and
- g. Adopting appropriate consumer protection standards (e.g., HeatTrust, or equivalent).

Local Policy – Manchester City Council

Manchester City Council Council's Core Strategy was adopted in July 2012 and is the key development plan within the Local Development Framework. Policy EN 4 outlines the Manchester City Council's response to climate change by reducing CO₂ emissions in developments. Policy EN 6 outlines the targeted CO₂ emissions reductions for the proposed development from low or zero carbon energy supplies.

EN 4: Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development

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

- All developments 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.

EN 6: Target Framework for CO₂ reductions from low or zero carbon energy supplies

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.

Non-domestic CO ₂ emissions reduction targets	
Table 12.2	
Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible, a 15% increase on Part L 2010
Target 2: Electricity intense buildings (Applies to commercial uses with a high proportion of emissions from electricity use (>45 kg CO ₂ /m ²))	+10%increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

Figure A-2 Non-domestic CO₂ emissions reduction targets

EN 8: Adaption to Climate Change

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

- Minimisation of flood risk by appropriate siting, drainage, and treatment of surface areas to ensure rainwater permeability
- Reduction in urban heat island effect through the use of Green Infrastructure such as green roofs, green walls, increased tree cover and waterways
- The need to control overheating of buildings through passive design
- The opportunity to provide linked and diverse green space to enhance natural habitats which will assist species adaptation

EN 14: Flood Risk

In line with the risk-based sequential approach contained within PPS25, development should be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding; this should take account of all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA).

In addition to the requirements for site-specific Flood Risk Assessments (FRAs) set out in PPS25, an appropriate FRA will also be required for all development proposals, including changes of use, on sites greater than 0.5ha within Critical Drainage Areas (CDAs) and Canal Hazard Zones identified in the SFRA.

All new development should minimise surface water run-off, including through Sustainable Drainage Systems (SUDS) and the appropriate use of Green Infrastructure.

Developers should have regard to the surface water run-off rates in the SFRA User Guide. In CDAs, evidence to justify the surface water run-off approach / rates will be required.

The City of Manchester contains many sections of rivers which are culverted or 'hidden'; where these are indicated in the SFRA beneath the proposed development site, further investigation will be required and the development proposal should take this into account; where feasible and appropriate development should seek to open up culverted/hidden rivers to reduce the associated flood risk and danger of collapse, taking advantage of opportunities to enhance biodiversity and Green Infrastructure.

EN 15: Biodiversity and Geological Conservation

The Council will seek to maintain to enhance sites of biodiversity and geological value throughout the city. Particular consideration will be given to:

- The Council's objective to protect and conserve the City's existing trees and woodlands and the aim for a net increase in trees across the City.

Developers will be expected to identify and implement reasonable opportunities to enhance, restore or create new biodiversity, either on-site or adjacent to the site, contributing to linkages between valuable or potentially valuable habitat areas where appropriate.

EN 16: Air Quality

The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester's principal traffic routes and at Manchester Airport. Developers will be expected to take measures to minimise and mitigate the local impact of emissions from traffic generated by the development, as well as emissions created by the use of the development itself, including from Combined Heat and Power and biomass plant.

When assessing the appropriateness of locations for new development the Council will consider the impacts on air quality, alongside other plan objectives. This includes cumulative impacts, particularly in Air Quality Management Areas.

EN 17: Water Quality

With reference to the Manchester-Salford-Trafford SFRA and other relevant documents:

- Development should avoid any adverse impact on water quality, including during the construction phase, and wherever possible should seek to enhance water quality, both chemical and ecological.
- Development should minimise surface water run-off from development and associated roads, and maximise the use of appropriate sustainable drainage systems, to minimise groundwater contamination, and to avoid pollutants reaching watercourses.
- Development close to a watercourse should also ensure that waste or litter cannot enter the watercourse from the site.
- Development should, where feasible and appropriate, seek to open up any culverted or hidden watercourse beneath the site to improve the ecological status of that watercourse.

T 1: Sustainable Transport

To deliver a sustainable, high quality, integrated transport system to encourage modal shift away from car travel to public transport, cycling and walking, to support the needs of residents and business and to prepare for carbon free modes of transport.

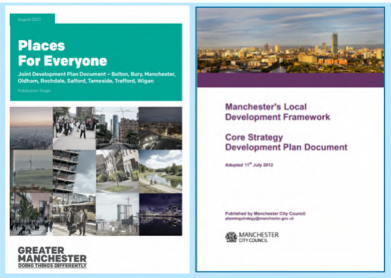


Figure A-3. Relevant planning documentation

Appendix B – Services Input

The tables below provide a summary of the fixed building services inputs used for the ‘Be Lean’ and ‘Be Green’ scenarios of the development.

Space Heating & Cooling:	
IES System	System 1: Radiators + MVHR
NCM Type	Central heating using water: radiators
Space heating emitters type 1	Radiators
Space heating fuel type 1	Electricity
Space heating seasonal efficiency type 1 (SCOP)	3.2
Ventilation type	AHU
AHU SFP central (W/l/s)	1.6
Heat recovery type 1	Thermal Wheel
Heat recovery efficiency type 1	80%
IES System	System 3: VRF system
NCM Type	Split/Multi Split System
Space heating emitters type 1	VRF
Space heating fuel type 1	Electric
Space heating seasonal efficiency type 1 (SCOP)	3.2
Space cooling emitters	VRF
Space cooling fuel	Electricity
Space cooling seasonal efficiency (SEER)	4
Space cooling nominal efficiency (EER)	4
IES System	System 4: Retail Unit
NCM Type	Split/Multi Split System
Space heating emitters type 1	ASHP
Space heating fuel type 1	Electric
Space heating seasonal efficiency type 1 (SCOP)	2.8

Domestic Hot Water (DHW):	
IES System	DHW 1 – ASHP All spaces
DHW heating type	Heat pump
DHW heating fuel	Electricity
DHW heating seasonal efficiency (%)	3.0
DHW heating delivery efficiency (%)	1.0
DHW heating storage volume (L)	2000
DHW heating storage losses (kWh/(l day))	0.026
DHW circulation losses (W/m)	10
DHW pump power (kW)	0.2
Time switch	No

Lighting:	
Luminaire efficacies (Lm/cW) – Bedrooms, Circulation spaces	100
Luminaire efficacies (Lm/cW) - other	90
Lighting controls - offices, reception, circ, toilets, chng rms	Auto on / Auto off
Daylight dimming (applied to perimeter zones 6.0m deep) - offices, reception	Yes
Time Switch (photoelectric / occupancy)	No / No
Parasitic power (photoelectric / occupancy) - Offices only	0.1/ 0.1

Other:	
Pump speed	Variable Speed - Multiple pressure sensors
HVAC systems metering	Yes
HVAC systems out of range warning	Yes
Lighting systems metering	Yes
Lighting systems out of range warning	Yes
Power factor correction	>0.95

Community Heating	Base Case
None	-

PV	Value
Module nominal efficiency	20.6%
Module array type	Monocrystalline
Array size (m²)	200
Azimuth (°)	180
Inclination (°)	30
Shading factor	-

Appendix C – Be Lean and Be Green BRUKL Document

Be Lean BRUKL output document

Be Green BRUKL Part L 2013 output document

BRUKL Output Document

 HM Government

Compliance with England Building Regulations Part L 2013

Project name

Upper Brook Street Masterplan – McLaren PBSA (Be Lean)As designed

Date: Wed May 24 14:08:54 2023

Administrative information

Building Details

Address: Upper Brook Street, Manchester,

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: Cundall

Telephone number: +44 (0)20 7438 1600

Address: One Carter Lane, London, EC4V 5ER

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	12.8
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	12.8
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	9.2
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	0.15	0.15	00000013:Surf[2]
Floor	0.25	0.12	0.12	00000013:Surf[44]
Roof	0.25	0.12	0.12	00000013:Surf[45]
Windows***, roof windows, and rooflights	2.2	0.91	1.2	00000013:Surf[1]
Personnel doors	2.2	1.2	1.2	L000000A:Surf[2]
Vehicle access & similar large doors	1.5	-	-	No vehicle access doors in building
High usage entrance doors	3.5	1.2	1.2	00000013:Surf[33]
U _a -Limit = Limiting area-weighted average U-values [W/(m²K)]			U _i -Calc = Calculated maximum individual element U-values [W/(m²K)]	
U _a -Calc = Calculated area-weighted average U-values [W/(m²K)]				
* 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	
m³/(h.m²) at 50 Pa	10		3	

BRUKL Output Document

 HM Government

Compliance with England Building Regulations Part L 2013

Project name

Upper Brook Street Masterplan – McLaren PBSA (Be Green)As designed

Date: Wed May 24 14:15:36 2023

Administrative information

Building Details

Address: Upper Brook Street, Manchester,

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: Cundall

Telephone number: +44 (0)20 7438 1600

Address: One Carter Lane, London, EC4V 5ER

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	12.8
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	12.8
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	7.6
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	0.15	0.15	00000013:Surf[2]
Floor	0.25	0.12	0.12	00000013:Surf[44]
Roof	0.25	0.12	0.12	00000013:Surf[45]
Windows***, roof windows, and rooflights	2.2	0.91	1.2	00000013:Surf[1]
Personnel doors	2.2	1.2	1.2	L000000A:Surf[2]
Vehicle access & similar large doors	1.5	-	-	No vehicle access doors in building
High usage entrance doors	3.5	1.2	1.2	00000013:Surf[33]
U _a -Limit = Limiting area-weighted average U-values [W/(m²K)]				U _i -Calc = Calculated maximum individual element U-values [W/(m²K)]
U _a -Calc = Calculated area-weighted average U-values [W/(m²K)]				
* 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	
m³/(h.m²) at 50 Pa	10		3	

BRUKL Part L 2021 output document

BRUKL Output Document

 HM Government

Compliance with England Building Regulations Part L 2021

Project name	Upper Brook Street Masterplan – McLaren PBSA (Be Green)	As designed
Date:	Wed May 24 12:20:07 2023	

Administrative information	
Building Details	Certification tool
Address: Upper Brook Street, Manchester,	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 module version: v6.1.e.1
Certifier details	
Name: Cundall	
Telephone number: +44 (0)20 7438 1600	
Address: One Carter Lane, London, EC4V 5ER	
	Foundation area [m²]: 726.87

The CO ₂ emission and primary energy rates of the building must not exceed the targets		
Target CO ₂ emission rate (TER), kgCO ₂ /m²annum	2.48	
Building CO ₂ emission rate (BER), kgCO ₂ /m²annum	1.93	
Target primary energy rate (TPER), kWh _{pe} /m²annum	26.69	
Building primary energy rate (BPER), kWh _{pe} /m²annum	20.72	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency				
Fabric element	U _a -Limit	U _a -Calc	U _i -Calc	First surface with maximum value
Walls*	0.26	0.15	0.15	00000013:Surf[2]
Floors	0.18	0.12	0.12	00000013:Surf[44]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.12	0.12	00000013:Surf[45]
Windows** and roof windows	1.6	0.91	1.2	00000013:Surf[1]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	1.2	1.2	L000000A:Surf[2]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	1.2	1.2	00000013:Surf[33]
U _a -Limit = Limiting area-weighted average U-values [W/(m²K)] U _a -Calc = Calculated area-weighted average U-values [W/(m²K)] U _i -Calc = Calculated maximum individual element U-values [W/(m²K)] * Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows. ** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position. ^ For fire doors, limiting U-value is 1.8 W/m²K NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				
Air permeability	Limiting standard	This building		
m³/(h.m²) at 50 Pa	8	3		

