



CWC

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One North Parade

Manchester

BREEAM – Ene 04 Low Carbon
Design

Date: 03/09/2025

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Revision Record

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1.0 Executive Summary

This report has been prepared to show One North Parade proposed development, located in central Manchester, achieves compliance with BREEAM UK New Construction – Ene 04: Low Carbon Design. The proposed development will include open plan offices, a restaurant, bicycle storage, shower and changing facilities. Therefore, the development falls under Use Class E(g) (*Offices*) and E(b) (*Food and Drinks*) in accordance with the Town and Country Planning (Use Classes) Order 2020. For the purposes of the dynamic thermal modelling within IES:VE, the building has been modelled under 'B1 Offices' classification, as this remains the relevant category within the compliance software.

To achieve compliance with the energy targets, the following design features have been included, following the energy hierarchy approach:

- Enhanced fabric performance to reduce the initial energy demand
- High efficiency heat pump technology for space heating
- High efficiency LED lighting with PIR sensors throughout and daylight dimming in offices

2.0 Introduction

Crookes Walker Consulting Limited (CWC) have been commissioned to undertake energy assessments for the One North Parade development located in central Manchester.

2.1 Site Location

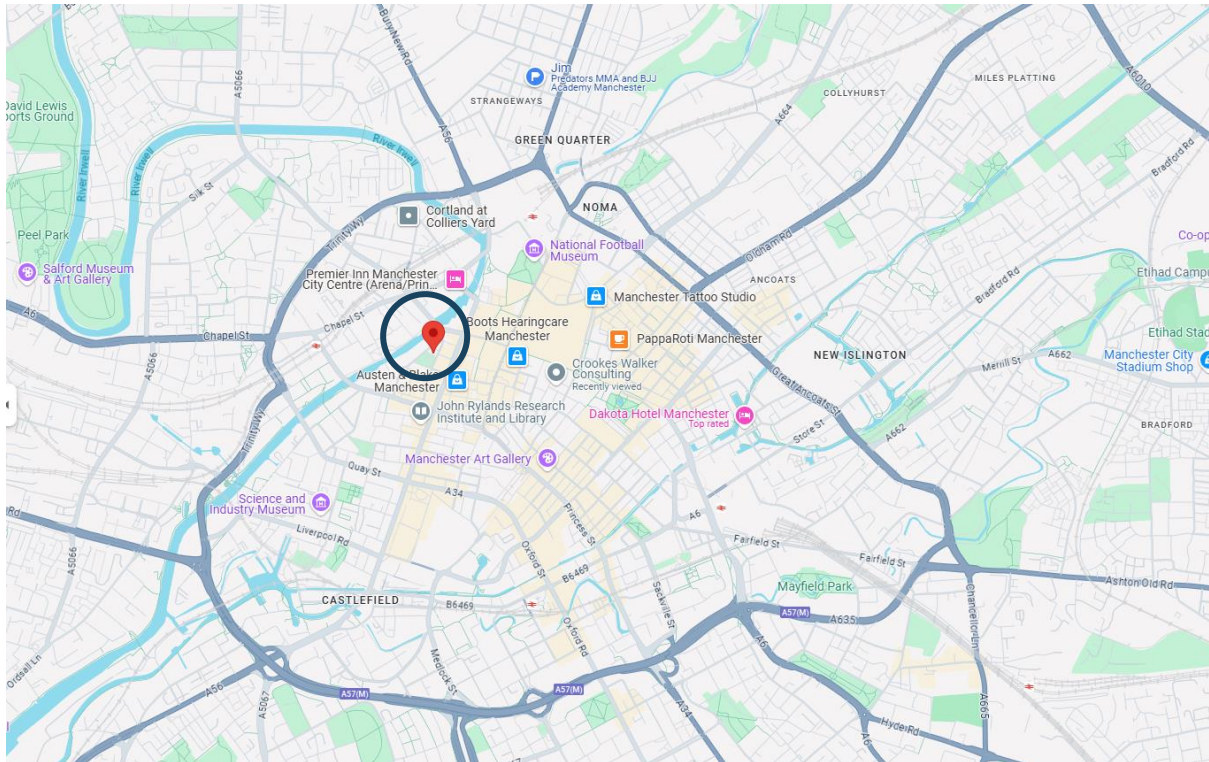


Figure 1. Site Location

The site is located in Manchester city centre, therefore the Manchester DSY1 2020 High 50th percentile weather file has been used for the BREEAM assessment.

2.2 Modelling Disclaimer

The building has been modelled with accredited software package IESVE accredited software Version 2024.0.1.0 which is approved for the purpose of demonstrating compliance with the energy efficiency and carbon emission requirements of the building regulations.

These assessments were undertaken by an Energy Specialist; an individual who has acquired substantial expertise or a recognised qualification for undertaking assessments within the residential sector and is not professionally connected to a single technology or manufacturer.

It should be noted that the data generated by this work is obtained using computer calculations. These calculations are the best means of predicting the performance of the building at this stage. Full certainty can only be achieved by measuring the performance of the building and associated systems after a period of use.

Whilst the calculations have been undertaken in good faith using reasonable skill and care, Crookes Walker Consulting Limited can take no responsibility for differences between the computer calculations and the actual performance of the completed building due to the inherent complexity and variability of the physics in a building and its environment.

2.3 View of Thermal Model

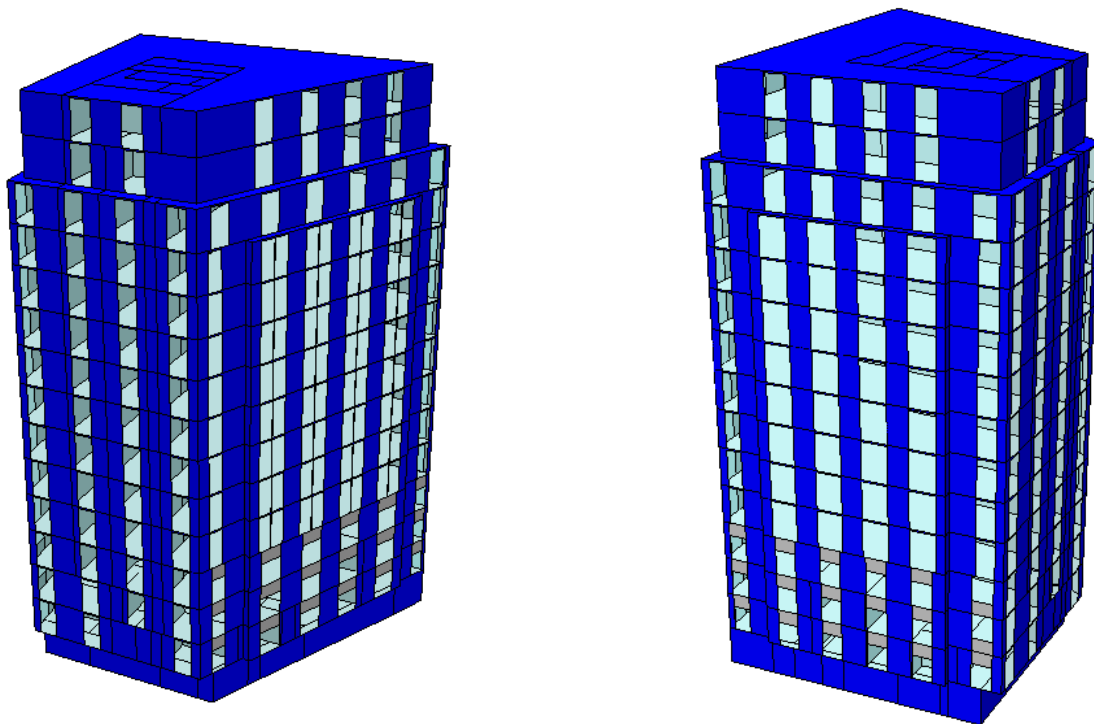


Figure 2. Thermal Model North view (left) and East view (right)

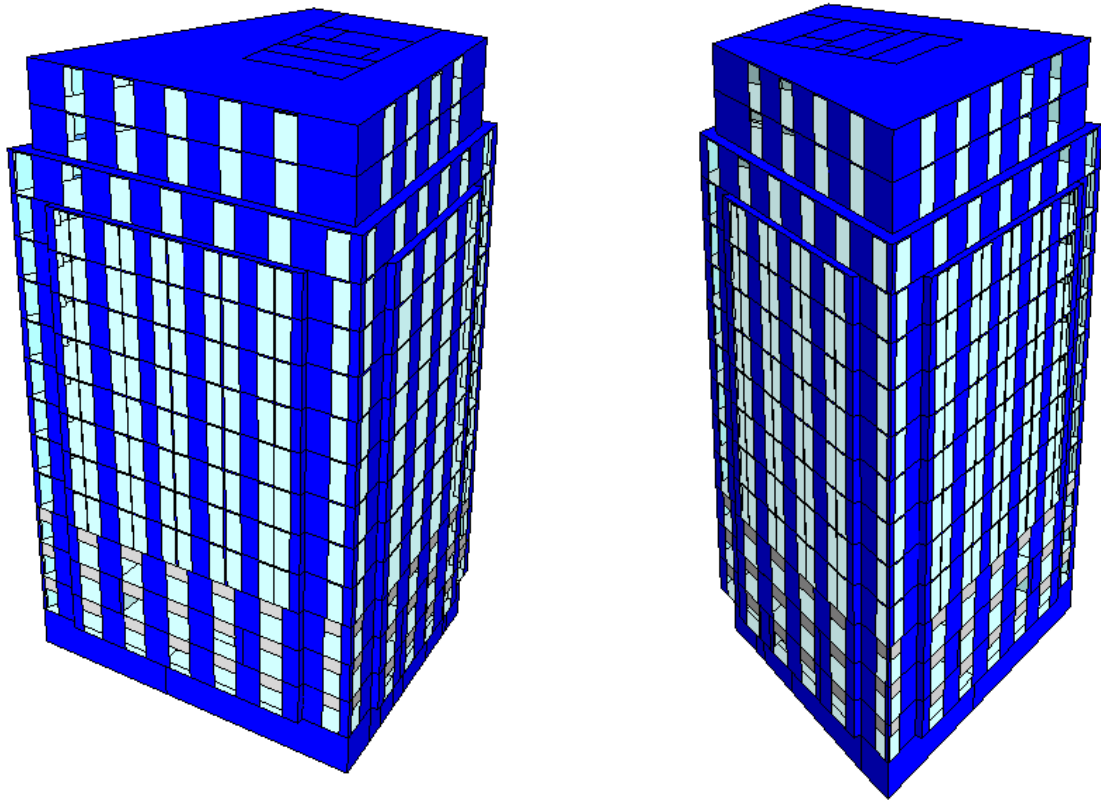


Figure 3. Thermal Model South view (left) and West view (right)

3.0 Assessment Targets

'Low Carbon Design' (Ene 04) aims to encourage the adoption of design measures, which reduce building energy consumption and associated carbon emissions and minimise reliance on active building services systems.

The key values for this assessment criteria are to:

- Maximise the financial environment benefits of adopting passive and other low carbon solutions.
- Encourage the use of free heating and cooling strategies, to reduce the buildings energy demand and eliminate or reduce the use of active cooling.
- Ensure that the most appropriate Low and Zero Carbon technologies (LZC) are adopted for the project.
- Promote innovation to deliver practical and cost-effective low carbon.

Passive Design Analysis

This assessment must quantify the reduced total energy demand and carbon dioxide (CO₂-eq) emissions resulting from the passive design measures included within the design. To calculate this reduction, the model must be simulated as per the notional fabric specification, whilst retaining the proposed systems, in order to assess the betterment found through the proposed fabric design.

Low and Zero Carbon Feasibility Study

A feasibility study of various LZC technologies must be completed during the concept Design Stage, with the model being simulated with and without the inclusion of the renewable technologies to quantify the reduced regulated carbon dioxide (CO₂-eq) emissions resulting from the LZC technologies.

4.0 Input Parameters

4.1 Fabric Parameters

A fabric first approach has been taken for the One North Parade development, including fabric u-values that are better than the minimum required for compliance with Building Regulations. Table 1 below includes the fabric parameters included in the assessment:

	Fabric Parameters
External Wall	0.17 W/m ² K
Glazing	1.40 W/m ² K 0.40
Roof	0.10 W/m ² K
Ground Floor	0.10 W/m ² K
Air permeability	3.00 m ³ /(h.m ²)@50Pa

Table 1. Fabric Parameters

4.2 System Parameters

Tables 2 to 7 confirm the system parameters that have been included in the assessment.

	System Parameters - Offices
HVAC Type	ASHP with central balanced mixed mode ventilation including cooling
Heating Efficiency	4.50
Cooling Efficiency	6.50
Ventilation SFP	1.10 W/l/s
Heat Recovery Efficiency	80%

Table 2. System Parameters – Offices

	System Parameters – Reception/Security
HVAC Type	ASHP with central balanced mixed mode ventilation including cooling
Heating Efficiency	4.50
Cooling Efficiency	6.50
Ventilation SFP	1.10 W/l/s
Heat Recovery Efficiency	80%

Table 3. System Parameters – Reception/Security

	System Parameters – Restaurant
HVAC Type	ASHP with central balanced mixed mode ventilation including cooling
Heating Efficiency	4.50
Cooling Efficiency	6.50
Ventilation SFP	1.00 W/l/s
Heat Recovery Efficiency	85%

Table 4. System Parameters – Restaurant

	DHW Parameters – All Zones
DHW Heating Type	Central Heat Pump
Heating Efficiency	4.00

Table 5. DHW Parameters – Throughout

Lighting Parameters		
	Efficacy	Controls
Office	135 lm/W	PIRs with daylight dimming
All other areas	120 lm/W	PIRs

Table 6. Lighting Parameters

	Mechanical Ventilation Flow Rates
Offices	12 l/s/p
Changing Room	20 ACH
Eating/Drinking Area	12 l/s/p
Food Preparation Area	15 l/s/p

Table 7. Mechanical Ventilation Strategy

All the assessed spaces within the building are assumed to have a design setpoint that would fall within the recommended temperature ranges given by CIBSE, as a requirement by Criterion 3.a. of Hea 04.

5.0 Results

Passive Design Analysis

Site Location

The site is in Manchester city centre

Site Weather

The Northwest of England has a wide range of expected temperatures throughout the year; hence the HVAC design should account for heating and cooling within the occupied spaces to ensure occupant comfort.

Microclimate

Manchester is known to be overcast; hence natural lighting should be optimised. Glazing should be covered by internal blinds to provide occupants with control during the summer months.

Building Layout & Form

The proposed development comprises open plan offices, restaurant, kitchen, changing rooms and a shower facility.

Building Orientation

The proposed design includes glazing facing South, blinds should be included for all glazed windows to minimise unwanted solar gains in the summer months.

Thermal Mass or Other Fabric Thermal Storage

The development has a low thermal mass.

Building Occupancy Type

The building occupancy differs for different room types in the development, and this has been taken into consideration.

Daylighting Strategy

Manchester is known to be overcast; hence natural lighting should be optimised. Large areas of glazing should be covered internally to provide the occupants with control during the summer months.

Adaption to Climate Change

As per the requirement of BREEAM Hea 04: Thermal Comfort, the proposed design has been assessed using future weather data.

The building performance improvement has been calculated by comparing the actual performance of the modelled building design, to the notional performance of the building. These results are shown in Table 8 below.

Notional Annual Energy (kWh)	Actual Annual Energy (kWh)	% Reduction
334,307.62	212,362.13	36.47

Table 8. Actual vs. Notional Energy Consumption

A Low Zero Carbon (LZC) study has been undertaken to establish the benefit of including LZC technologies by comparing the proposed design against a copy of the thermal model without LZC technology, and this was completed by including for electric panel heaters in all heated areas in the development.

The performance of the building including the proposed design parameters stated in this report decreases the total -annual emissions by 44.97% when including heat pumps for space heating when compared against electric panel heaters used for space heating and no LZC technology.

Emissions without LZC (kgCO ₂ /annum)	Emissions with LZC (kgCO ₂ /annum)	% Reduction
51,564.94	28,375.97	44.97

Table 9. LZC Study

LZC Feasibility

A preliminary assessment was undertaken to consider the likelihood of differing Low and Zero Carbon technologies being included within the design, with further assessments being undertaken on those which were deemed 'likely' to be included within the design. Table 10 below shows the results of the initial assessment.

Low or Zero Carbon Technology	Likelihood of Being Feasible	Main Reason for Dismissal	Feasible to Export Energy?	Cost for Carbon Emission Reduction	Typical Payback
Hydro-power	Unlikely	There is not a running watercourse nearby.	Yes, if the technology is feasible for the development	High	N/A See main reason for dismissal
Combined Heat & Power	Unlikely	Unlikely to be sufficient base load to allow the technology to operate effectively.	No – not feasible to export energy	Medium	N/A See main reason for dismissal
Ground Source Heat Pumps	Likely	GSHP pipework not readily available.	No – there is no existing network	High	12 years
Air/Water Source Heat Pumps	Likely	This technology is likely to be applicable.	No – there is no existing network	Medium	8 – 10 years
Wind Power	Unlikely	Wind power equipment may cause noise problems.	Yes, if the technology is feasible for the development	High	N/A See main reason for dismissal
Biomass	Unlikely	Not an adequately consistent heat load.	No, there is no existing network to be utilised	High	N/A See main reason for dismissal
Solar PV	Unlikely	There is no space for Solar PV	Yes, can be easily linked to the grid supplied electricity	Medium	N/A See main reason for dismissal

Table 10. LZC Assessment

Energy Generated from Low Zero Carbon Technology

The energy generated from the proposed LZO technologies has been calculated, these results are shown in Table 11 below showing a total of 33.84% of energy used on site is generated from LZO technologies.

Total Energy from LZO (kWh)	Total Energy from LZO (kWh)	Total Actual Building Energy Consumption (kWh)	% of energy generated from LZO
Heat Pump	71,875.8	212,362.128	33.84

Table 11. Energy Generated from LZO

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