

University of Manchester Student Residences
Environmental Standards Statement

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1 Executive Summary

This Environmental Standards Statement (ESS) has been prepared in support of the Reserved Matters Application (RMA) for The University of Manchester (UoM) Owens Park development, relating to landscaping, appearance, scale and layout pursuant to the approval of an Outline Planning Application in January 2024. , Ref. 138126/00/2023. This report accords with the principles established within the ESS and Energy Strategy submitted under the Outline Planning Application.

The proposed development comprises 29 residential blocks which will provide a total of 3300 student bedrooms, as well as a central amenity hub and 5 satellite hubs to serve 5 distinct neighbourhoods. The development will also comprise a variety of green space including a large central green space in the heart of the campus.

This Statement seeks to demonstrate how Manchester City Council's (MCC) sustainability policies within the Core Strategy (2012), Manchester Guide to Development (2007) and the recently adopted Places for Everyone (2024), have informed the proposed development in embedding sustainability in the design. This Statement should be read in conjunction with the Energy Strategy and BREEAM pre-assessment, appended, as well as other relevant technical reports also submitted as part of the planning application.

The topics in this report covered include, Energy, Environmental design, Water management and weather resilience, Waste management, Construction management, Biodiversity and Climate resilience. This report satisfies condition 40(a) attached to the Outline Planning Permission which states that an updated Energy Strategy (ES) and Environmental Standards Statement (ESS) shall be submitted prior to the commencement of development within each phase.

In summary, the development is actively targeting and achieving the required environmental standards in line with the planning policy and aims to align with the carbon reduction requirements of the building regulations.

This report accords with the principles established within the ESS, and Sustainability & Energy Strategy, submitted under the Outline Planning Application.

2 Introduction

2.1 Scope of the Document

This Environmental Standards Statement has been prepared in support of a Reserved Matters Application for the phased erection of purpose-built student accommodation (Sui Generis) up to 3,300 beds, to include all associated ancillary uses, demolition, and other necessary works.

Note that this report accords with the documents previously submitted for Outline Planning;

- Energy & Sustainability Strategy
- Environmental Standards Statement

This Statement seeks to demonstrate how Manchester City Council's (MCC) environmental sustainability policies will inform the proposed development.

The Statement comprises the following sections:

Planning Policy Review to set the context for the development and identify key present and potential future planning related environmental sustainability targets;

Energy Statement to summarise how the development responds to the carbon reductions, and

Environmental Standards Review to outline how the development will respond to the Environmental Standards set out in Chapter 4 of the Guide to Development in Manchester Supplementary Planning Document and Planning Guidance (Adopted April 2007), and relevant Core Policies (Adopted July 2012), as well as Places for Everyone (adopted March 2024), which form part of the Manchester Local Plan.

This Statement should be read in conjunction with the separate Energy Statement (RPS), also submitted with the planning application, which aims to address how the proposed development is responding to Zero Carbon and sustainability related policies including Manchester City Council (MCC) and Greater Manchester Combined Authority (GMCA).

It is recognised that sustainable development cuts across a number of issues and disciplines, reference should be made to the accompanying planning documents for further technical details. Of particular note are the following documents:

- Flood Risk and Drainage Strategy – Kennedy Redford
- Waste Management – Buro Happold
- Construction Environmental Management Plan – GRAHAM
- Ecological Survey – Thomson
- Framework Travel Plan – Buro Happold
- Air Quality Assessment – Buro Happold

2.2 Description of the Development

The proposed development comprises of 29 residential blocks which will provide a total of 3300 student bedrooms, as well as a central amenity hub and 5 satellite hubs to serve 5 distinct neighbourhoods. The development will also comprise a variety of green space including a large central green space in the heart of the campus.

2.3 Site Description

The University of Manchester Student Residencies development site is set within a range of residential and support facilities which combine to create a rich environment for student living.

The development site is characterised by its woodland setting and different neighbourhoods varying in age, architectural style, student accommodation offer, rent, and room provision. The current neighbourhoods are clearly defined and encourage the formation of tight-knit communities that associate themselves with their specific accommodation - often creating nicknames.

The site boundary encompasses Oak House, and Woolton Hall - areas with their own distinct character and community. This clear neighbourhood character is something that the design of the new development aims to preserve.

The green infrastructure of The University of Manchester Student Residencies, including the mature existing woodland belts, hedgerows, and grass areas, is a key feature of its character. Its protection has been a key consideration in the planned development. Its enhancement through designed landscape improvements will ensure that it continues to provide an attractive and biodiverse backdrop to life in and around the campus.

The figures below show an aerial view of the proposed site boundary (red line), and an indication of the site layout respectively.



Figure 1 - Ariel view of The University of Manchester Student Residencies proposed red line boundary

University of Manchester Student Residencies
Environmental Standards Statement
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3 Planning Policy Context

3.1 Scope of the Policy Review

To better understand the sustainability drivers for this development and set the policy context, a summary of key sustainable development policies at a national and local level has been provided. These reviews are in addition to that of the Sustainability and Energy Strategy that will be submitted in support of the planning application, which sets out the overarching strategy and vision of the proposed development.

3.2 National Policy

National Planning Policy Framework (Updated Feb 2024)

The National Planning Policy Framework and relevant planning practice guidance sets out the Government's planning policies for England. **The presumption in favour of sustainable development** is at the heart of the framework, cascading through to local plans and the approval process for planning applications.

Key issues addressed are summarised below:

Building a strong, competitive economy	Achieving well-designed places
Ensuring the vitality of town centres	Making effective use of land and protecting green belt land
Promoting healthy and safe communities	Meeting the challenge of climate change, flooding and coastal change
Promoting sustainable transport	Conserving and enhancing the natural and historic environment
Supporting high quality communications	Facilitating the sustainable use of minerals

25 Year Environmental Plan (2018)

This plan sets out the Government's ambition to '*...champion sustainable development, lead in environmental science, innovate to achieve clean growth and increase resource efficiency to provide benefits to both our environment and economy*'.

The plan provides fresh impetus for the principles of sustainable development to be at the heart of decision-making, setting out clear objectives and common language for policy and decision makers to adopt.

Policies and actions are structured around six key areas:

Chapter 1: Using and managing land sustainability
Chapter 2: Recovering nature and enhancing the beauty of landscapes
Chapter 3: Connecting people with the environment to improve health & wellbeing
Chapter 4: Increasing resource efficiency and reducing pollution and waste
Chapter 5: Securing clean, healthy, productive and biologically diverse seas and oceans
Chapter 6: Protecting and improving our global environment

Climate Change Act 2008

The Climate Change Act sets out the UK Government's pathway to reduce greenhouse gas emissions by at least 80% (relative to 1990 levels) by 2050. This includes the requirements to set legally binding carbon budgets over five-year periods to act as intermediate milestones.

On 27th June 2019, a more ambitious target of net zero carbon by 2050 was adopted by the UK Government in response to public sentiment and the release of the Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C (October 2018).

Part L 2021 Building Regulation (2023 amendments) and Future Homes Policy (January 2022)

The Ministry of Housing, Communities & Local Government published Part L 2021 in January 2022. A series of energy and carbon targets have been set for the upcoming progressive energy improvement policies towards achieving net zero carbon standard in the future:

- A 31% reduction in carbon emissions over the previous Part L 2013 standard, achieved through a more minor increase to fabric standards, alongside low carbon heating and/or renewables e.g. PV.
- The intention for an average dwelling built to Future Homes Standard 2025 will have 75-80% fewer carbon emissions than one built to Part L 2013.

The approved document took effect on 15 June 2022 and therefore this development will be developed in line with the updated standard. It is not proposed that the development meets the FHS.

3.3 Local Policy

Places for Everyone (Adopted 21st March 2024)

The places for everyone (Pfe) sets out how the regions should be developed between 2022 to 2039 and provides a strategic framework for local plans. It also sets out policies relevant to planning applications.

The policies relevant to this development include:

PfE Policy JP-S1: Sustainable Development

- A significant upscaling of PV.
- Reduction of heating and cooling demand in commercial buildings.
- Moving away from carbon intensive gas as the primary source of heat.
- Applicants to demonstrate how savings have been maximised following the energy hierarchy.
- Meeting Part S of the Building regulations in relation to new EV charging points.
- Supporting consideration to embodied energy in construction and post occupancy evaluations.

PfE Policy JP-S2: Carbon and Energy

- Be Part L 2021 compliant / net zero carbon in regulated operational carbon emissions.
- incorporate EV charging points in line with Part S.
- provide a heat networks assessment where within "Heat and Energy Networks Opportunity Areas"
- Achieve at least BREEAM Excellent standard for the Ene01 credit.
- Provide an energy statement.
- From 2025, residual carbon emissions not mitigated on-site should be offset, in agreement with the local authority, through a financial contribution to a carbon offset fund.

PfE Policy JP-S3: Heat and Energy Networks

- Heat and Energy Networks states that Within the identified "Heat and Energy Network Opportunity Areas", unless it can be demonstrated that there are more effective alternatives for minimising carbon emissions, or such connection is not practicable or financially viable.
- "Heat and Energy Network Assessment" (to be included within the Energy Strategy). Locational circumstances will be key in this case – covered by 5.29, points a. and b.

- 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.

PfE Policy JP-C1: An Integrated Network

This policy outlines measures to create an accessible, low-carbon Greater Manchester with world-class connectivity by:

- Sustainable Development: Promoting development patterns that minimize travel needs and encourage sustainable access to jobs, housing, and essential services.
- Digital Infrastructure: Supporting the provision of high-quality digital networks.
- Sustainable Transport Design: Prioritizing development that increases walking, cycling, and public transport usage.
- Transport Transformation: Investing in integrated, reliable, environmentally responsible, and socially inclusive transport systems that reduce carbon emissions and improve access to services.
- Road Space Hierarchy: Prioritizing road use for pedestrians, cyclists, public transport users, and essential services over personal motorized vehicles.
- Skill Development: Building local expertise in the transport sector to meet future needs.

The policy focuses on fostering a connected, inclusive, and environmentally sustainable urban environment.

PfE Policy JP-S4: Flood Risk and the Water Environment

This policy aims to protect water resources, improve water quality, and manage flood risks through an integrated, catchment-based approach by:

- Restoring rivers to natural states where feasible.
- Using natural flood management techniques to slow water drainage and reduce pollutants.
- Designing and locating developments to minimise flood risks and enhance resilience, including retrofitting or relocating vulnerable infrastructure.
- Requiring sustainable drainage systems (SuDS) to manage surface water runoff at greenfield rates, unless impractical, with local plans tailoring policies for critical drainage areas.
- Ensuring SuDS provide multifunctional benefits (e.g., water quality, recreation, and conservation), avoid water contamination, are integrated across development phases, and are properly maintained.
- Addressing contaminated land and preventing urban pollution impacts on water environments.
- Mandating residential water efficiency standards of 125 litres/person/day, with potential for tighter limits (110 litres/person/day) in areas of local need.

The policy emphasises sustainable water management, flood resilience, and environmental protection.

PfE Policy JP-G8: A Net Enhancement of Biodiversity and Geodiversity

This policy aims to achieve a net gain in biodiversity and protect geodiversity through local planning and development activities by:

- Enhancing habitats' quality, quantity, and diversity, focusing on priority habitats and species.
- Strengthening habitat connectivity through ecological networks and corridors, especially to support species movement amid climate change.
- Restoring and improving habitat management while preventing fragmentation and addressing invasive species.
- Protecting sites designated for nature and geological conservation, prioritising international and national sites.
- Increasing access to nature, particularly in urban settings.
- Supporting initiatives like the Great Manchester Wetlands Nature Recovery Network.
- Safeguarding and restoring valuable soil resources, including peat-based soils and agricultural land.

PfE Policy JP-S5: Air Quality

This policy outlines measures to improve air quality, especially in sensitive areas such as residential zones, schools, and green infrastructure. Key actions include:

- Designing developments and focusing transport investments to reduce reliance on polluting transport modes.
- Applying up-to-date air quality guidance in planning decisions, requiring construction management plans and air pollution data for relevant developments.
- Limiting developments that generate significant air pollution, such as industrial activities and energy generation.
- Expanding electric vehicle charging infrastructure in both public and private settings.
- Supporting the implementation of the Clean Air Plan.
- Promoting sustainable urban goods distribution using ultra-low-emission vehicles and local delivery facilities.
- Designing streets and urban spaces to prevent pollution concentration and improve airflow.
- Managing traffic and parking near schools and other sensitive sites.
- Enhancing green infrastructure and adopting innovative materials to remove pollutants from the air.
- Prioritising sustainable travel modes and minimising exposure to air pollution in development locations.

The policy emphasises reducing air pollution sources, safeguarding public health, and supporting cleaner transportation and urban design.

Core Strategy Development Plan Document (Adopted 11th July 2012):

The Manchester Local Plan guides development within Manchester. The Core Strategy is the key document in Manchester's Local Plan, covering a period of 15 years from 2012 to 2027. It sets out the long-term strategic policies for Manchester's future development, forming the framework for planning applications.

Sustainability cuts across the objectives set out within the Core Strategy. A summary of key policies relevant to the Environmental Standards and Energy Statement are summarised below:

Policy Ref	Summary of Requirements
DM1 Development Management	• Environmental design • BREEAM certification
EN4 Reducing CO2 Emissions by Enabling Low and Zero Carbon Development	• Apply principles of the Energy Hierarchy • Use of building materials with low embodied carbon
EN 6 Target Framework for CO2 reductions from low or zero carbon energy supplies	• 15% CO2 emissions betterment on Part L 2010
EN 8 Adaptation to Climate Change	• Minimise flood risk • Reduction in urban heat island effect through use of Green Infrastructure • Control overheating in buildings through passive design • Linked and diverse green space to assist species to adapt
EN 9 Green Infrastructure	• Maintain and enhance green infrastructure where possible • Encouragement of green roofs, green walls, tree planting and other forms of green infrastructure to allow for the adaptation to climate change in heavily urbanised areas.
EN 14 Flood Risk	• Flood risk assessment in line with PPS25 • Minimise surface water run-off, through SuDS and Green Infrastructure
EN16 Air Quality	• Take measures to minimise and mitigate the impact of emissions from traffic and combustion plant resulting from the development
EN 17 Water Quality	• Avoid adverse impact on water quality, including during construction
EN 19 Waste	• Apply principles of the waste hierarchy (prevention, reduction, re-use, recycling/composting, energy recovery, final disposal)

Policy Ref	Summary of Requirements
	Waste management plan to minimise construction and demolition waste
T1 Sustainable Transport	Encourage modal shift away from car travel to public transport, cycling and walking

Guide to Development in Manchester Supplementary Planning Document and Planning Guidance (Adopted April 2007)

The Guide to Development in Manchester is effectively a hybrid document bringing together all the development principles that assist in creating a city which people choose to live, learn, work and relax. It does not create new planning policy but rather complements existing policies by providing additional guidance on compliance. Where policies from the former Unitary Development Plan (UDP) are referenced, these are superseded by the Core Strategy as outlined within Appendix C – Superseded UDP Policies of Manchester Core Strategy 2012-2027. Otherwise, the principles and guidance on the Environmental Standards Statement remain current and complimentary to the Local Plan.

‘Section 4 Environmental Standards’ sets out the Council’s commitment to making Manchester “the Greenest City in Britain”. An Environmental Standards Statement is required to accompany all planning applications, demonstrating the required environmental standards under the following headings have been met:

- Energy Strategy
- Environmental design
- Water management and weather resilience
- Waste management
- Construction management
- Biodiversity
- Climate resilience

4 Energy Strategy

4.1 Introduction

This section of the report has been written in accordance with Policy EN6 of the Manchester Core Strategy (2012-2027), that require an Energy Statement be submitted, as well as to satisfy condition 40(a) of the Outline Planning Permission which states that an updated Energy Strategy (ES) and Environmental Standards Statement (ESS) shall be submitted prior to the commencement of development within each phase.

4.2 Approach to low energy building design

The development is set to meet BREEAM Excellent energy credit (ENE01) and Passivhaus principles with the operational energy targets set out below:

- Planning Strategy Operational Energy Use Target (2030) 70 – 100 kWh/m²/annum
- Planning Strategy Operational Energy Use Target (2035) 35 - 55 kWh/m²/annum

The results from the Part L modelling show that the residential blocks are achieving 6 Ene01 credits (excellent), in line with policy JP-S2.

Energy Hierarchy

The proposed development has been designed in accordance with a clear energy hierarchy approach, of

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

The proposed design solutions support UoM's goals to address the path to net zero carbon and enhance the students experience in the following ways:

- The design provides natural light to all occupied rooms and background mechanical ventilation with heat recovery to all bedrooms and kitchens.
- Optimised amount of glazing, considering daylighting, carefully controlling glare, solar gain, heat losses, security, safety, and thermal bridges.
- Choice of construction materials to provide a robust and highly insulated structure.
- Prevention of unwanted air infiltration and heat loss through robust construction details.
- Avoidance of gas heating to avail of a decarbonised electrical grid.
- Water heating provided via high efficiency, low-GWP, air source heat pumps.
- Roof-mounted photovoltaics (PV) on each unit providing embedded electricity generation.

Minimising Energy Demand

The design aims to minimise the demand through a combination of passive design measures. The building U-values and air permeability will be better than part L (as shown in the table below).

Construction Element of ground floor occupied spaces	Non-Dwelling
External wall	0.15 W/m ² K
Ground Floor U-Value	0.18 W/m ² K
Roof U-Value	0.1 W/m ² K
Glazing U-Value (overall)	0.8 W/m ² K
Glazing G-Value	0.35 (light transmittance 0.67)
Internal Partitions	2.57 W/m ² K
Internal Floor/ceiling	1.05 W/m ² K
Internal ceiling tiles	2.42 W/m ² K
Design air permeability	An air tightness of 1.09 m ³ /hour/m ² @ 50 Pa is targeted for the scheme as per Passivhaus standards and has been incorporated into the model.

Maximising Energy Efficiency

The primary considerations for energy efficiency within The University of Manchester Student Residencies include:

- i. The use of air source heat pumps, to provide domestic water heating in all buildings on the development.
- ii. High efficacy LED lighting in all areas
- iii. Demand-controlled lighting with photocell and presence/absence detection in all communal, circulation and shared spaces.
- iv. High efficiency heat recovery equipment on all ventilation systems.
- v. Low demand water appliances and leak detection.
- vi. Automatic local thermostat & time controls on each electric space heater, operating as:
 - heaters set to 18°C, during hours of operation (say 7am - 10am & 6pm - 10pm).
 - occupants have the option to increase temperature to 21°C by pressing the "+" button twice on the panel (heater will stay at 21°C for 2hours before reverting to 18°C).
 - anti-tamper function to avoid occupant alterations.
 - "open window" function (heater will switch off if temp. drop >4°C in 30mins). If the heater switches off the occupant will have to manually reset the heater.

Utilise Renewable Energy

Each building will be provided with a PV array, to cover all available and suitable parts of the roof.

It is assumed that all PV will be installed at circa a 10° angle on inclination; final peak load per block to be confirmed. The PV installation will include:

- Complete PV system in accordance BS7671, BS EN 62124, ENA 59/2-1.
- Panel efficiency - 20% minimum / 440 Wp (based on 1700 x 1000mm panel).
- Panels should be from known and approved manufacturer with >10-year product & 25-year linear power warranty.
- Inverters to be provided with a minimum of 10-year warranty.

Utilise Low carbon Energy

The proposed new buildings are designed to be “all-electric”, with no reliance on gas or fossil fuel for the heating of the premises. The use of primarily heat-pump heating will take advantage of the advancing decarbonisation of the electricity grid.

Utilise other energy sources – Connection to heat network

The proposed development site is near a heat and energy networks opportunities zone, as set out in the heat networks and opportunities map for the Greater Manchester Area.

PfE Policy JP-S 3 paragraph 2b requires new developments which are unable to connect to an existing heat network to incorporate appropriate capability to enable future connection.

Within The University of Manchester Student Residences scheme, the heating demand for the student-residences is primarily derived from the domestic hot water load and space heating demand is low given a high performing building envelope and ventilation heat-recovery, therefore it is not proposed to connect to a heat network.

Consideration of further mitigation measures towards net zero in operation

It should be noted that during the peak PV generation period the student accommodation properties are not fully occupied during these summer months, and as such the majority of the PV energy generated during this period will be given back to the national grid where the energy can be better utilised.

The energy used by the buildings are offset elsewhere by the grid (in the form of provision of a 100% REGO backed renewable energy supply) and therefore the metered energy usage by the buildings will not show a net zero in operation as a result.

Consideration of potential further mitigation measures to move towards net zero in operation:

- Use of Ground Source Heat Pumps (GSHP):- Due to limited available land surrounding the development for the inclusion of the necessary boreholes and the extent of the necessary buried services infrastructure this option has been dismissed.
- Extended use of Air Source heat pumps (ASHP) to include space heating:- This has been considered but as a result of limited roof space available after inclusion of ASHP for Hot water generation and Photovoltaics maximisation coupled with the fact that the limited heat load (due to Passivhaus improvements in building fabric insulation) this option has been dismissed.
- Use of wind technology:- This has been considered but as a result of limited roof space available after inclusion of ASHP for Hot water generation and Photovoltaics maximisation this option has been dismissed.
- Use of solar hot water heating panels:- This has been considered but due to the increased space requirements for additional storage tanks and associated pumps coupled with the limited roof space available after inclusion of ASHP for Hot water generation and Photovoltaics maximisation this option has been dismissed.

Further Information

Note that further details and information pertaining to the design process and assumptions outlined within this section are detailed in:

- Appendix A.1 Energy Statement (RPS) with Part L1A Compliance Summary and TM59
- Appendix A.2 – BREEAM Pre-assessment

5 Environmental Standards Review

5.1 Overview

This section summarises how the proposed development has, as a minimum, responded to Section 4 Environmental Standards of the Guide to Development in Manchester Supplementary Planning Document and Planning Guidance (Adopted April 2007) and environmental sustainability policies set out in the Core Strategy (2012).

As environmental sustainability cuts across a number of issues and disciplines, references have been made to accompanying planning submission documents for technical details. Summaries of these documents against the policies set out in the Core Strategy are provided below, organised under the Section 4 Environmental Standards headings within the Guide to Development in Manchester.

5.2 Energy Efficiency and Renewable Energy

Policy EN4 Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development, PfE Policy JP-S2

The development will comply with current Building Regulations Part L (2021), set out in the Core Strategy (note that JP-S2 supersedes sections of the Manchester Core Strategy policy EN4 as set out in the Addendum to Manchester Core Strategy 2024).

The proposed development has been designed in accordance with a clear energy hierarchy approach, of:

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

Policy EN 6 Target Framework for CO₂ reductions from low or zero carbon energy supplies, , PfE Policy JP-S2

Applications for developments are expected to meet the targets set out in Policy EN6 & PfE Policy JP-S2 as a minimum. (note that JP-S2 supersedes sections of the Manchester Core Strategy policy EN6 as set out in the Addendum to Manchester Core Strategy 2024).

Domestic

Target 1 (Network Development Area): CHP/district heating anchor or connection, or where not feasible, a 15% increase on Part L 2010

Target 2 (Electricity Intense Buildings): 15% improvement on Part L 2010

Target 3 (Micro Generation Area): 15% improvement on Part L 2010

Through adopting the 'energy hierarchy' approach summarised above, the proposed development has the potential to achieve Part L 2021 which equates to a 31% improvement over Part L 2013. This is driven by the client aspiration for a future proof building - well above the Core Strategy requirement of 15% improvement on Part L 2010, which is an approximate 9% reduction against Part L 2013 for dwellings.

5.3 Environmental Design

This section aims to summarise key headlines on how the proposed development will address Core Policy DM 1 Development Management, parts of which are superseded by the new Places for Everyone, as per the Addendum to the Manchester Core Strategy.

Whole Life Carbon

An embodied carbon assessment has been undertaken for a typical residential block. The assessment has found the current design emissions to be **730kgCO₂e/m²** which surpasses the target value of **625 kgCO₂e/m²**. However, this is largely due to early-stage uncertainties and assumptions made during the analysis. Graham Construction's design has shown significant carbon savings when benchmarked against a 'no low-carbon materials' scenario, reducing the baseline emissions by 173 kgCO₂e/m².

Sustainable and Efficient use of Materials

Reducing the environmental and social impact of the material used for the development has been considered by the design team and through early engagement and consultation with contractors. This includes:

Specification of low VOC, locally sourced and biobased materials where possible.

Ensuring robustness, longevity and reduced maintenance, by specifying high quality, high durability materials, and construction systems using offsite manufacture to bring the design together.

Use of tougher façade materials such as Sprinkwell stone to address the Manchester climate.

Materials and products will be specified with sustainability, durability, lifecycle replacement, and ease of access, maintenance and cleaning in mind to maximise longevity and ease of up-keep.

With regards to material efficiencies, the design uses an efficient grid with columns running generally full height through the floors, avoiding the need for transfer structure at the lower levels. In terms of end of life / recycling opportunities, opportunities to maximise demountable and future re-use of the frame and façade will be investigated.

As the project progresses, the proposal will be continually reviewed to identify any areas vulnerable to damage both internally and externally and where possible the risk will be removed. The external envelope will be developed to utilise robust, long lasting, and sustainable materials. Windows will be specified with long warranties and lifespans to support the energy model with good air tightness and thermal qualities.

Internal areas which will see high levels of pedestrian traffic such as main entrances, public areas and circulation routes will be well detailed to ensure durability. In these zones hard-wearing and easily maintainable finishes will be specified.

The structure design will maximise the opportunities for functional adaptability to keep commercial units in use throughout its useful design life.

In addition to the above, sustainable procurement and responsible sourcing will be considered at detailed design and during construction of the proposed development.

Policy EN 16 Air Quality, PFE Policy JP-S5

An air quality assessment has been undertaken to determine if there are any significant impacts associated with the construction and operation of the development. The modelled results show that the UK Air Quality Objectives (AQOs) will not be exceeded at any future receptor location. Furthermore, the PM_{2.5} concentrations are modelled to be in compliance with the annual average PM_{2.5} Target concentration, which is more stringent than the current AQO.

As the AQOs will not be exceeded on-site, no further mitigation is deemed to be required and it is considered that the future users have been safeguard against air pollution, thus Condition 37a can be dispelled.

Indoor Air quality will be maintained through offering tenants natural and mechanical ventilation in line with Part F requirements. This means that minimum ventilation rates can be provided through a filtered air supply, thereby increasing indoor air quality.

For further information please refer to:

- Air Quality Assessment – Buro Happold
- Framework Travel Plan – Buro Happold

Policy T1 Sustainable Transport, PfE Policy JP-C1: An Integrated Network

Site location

The Site is located in Fallowfield, approximately 3 kilometres south of Manchester city centre and 2 kilometres south of the UoM's main campus (Oxford Road and Sackville Street areas), on the south side of the city centre. Fallowfield Campus is the main residential campus for the UoM.

The Site is bounded by Wilmslow Road (A6010) to the west, Moseley Road (B5093) to the south. The remainder of the Fallowfield Campus situated to the north (i.e., Ashburne Hall, Sheavyn House) and east (i.e., Richmond Park, Uttley Hall, Unsworth Park and Armitage Sports Centre).

The Fallowfield Campus is located in a highly accessible location, in good proximity to local amenities that cater for students' needs giving access to goods and services, food and beverage and leisure activities and with excellent connections by public transport and cycle to the city centre and university areas to the north.

Footways

There is an extensive provision of pedestrian infrastructure within and around the Site. Footways are provided on both sides of the carriageway, on the local roads surrounding the Site. Footways are of good quality and well-lit.

Levenshulme to the east of the Site is also an Active Neighbourhood. This means that the movement of people is prioritised over the movement of motorised traffic. This scheme aims to create an Active 'filtered' Neighbourhood, by reducing traffic in the area and encouraging residents to use other forms of sustainable transport, particularly walking and cycling. Measures implemented to encourage sustainable modes include the introduction of planters on the roads to stop through traffic. A consultation was undertaken recently to obtain public feedback from local residents and businesses on the scheme, and additional measures have been agreed with MCC.

Cycling routes

Regional cycle routes within proximity to the Site include the Fallowfield Loop, an off-road route which starts in Chorlton and takes riders to Fallowfield and Levenshulme, through Gorton to the National Cycle Centre and the Etihad Stadium. The Fallowfield Loop walking and cycling route (to the south of the Site) was completed in December 2022.

There are ten cycle shelters around the Fallowfield campus, providing cycle parking spaces for staff students and visitors. As part of the development plans, it is proposed that cycle parking provision be made for 25% of the student population living within the red line boundary, which equates to a total requirement of 825 cycle parking spaces. The proposed bike store provision achieves a total of 834 spaces across ten secure bike sheds, including 5% accessible spaces for larger/non-standard bikes. The bike sheds are proposed as BREEAM compliant enclosures with biodiverse roofs, enclosing double-tier racks with ducting included for E-bike charging points if required in the future.

A TfGM Bee Network cycle hire docking station is also located off the A6010 Wilmslow Road, to the west of the Site. The docking station includes pedal cycles and E-cycles. The Bee Network cycles can be hired via a mobile phone app.

For further information, please refer to:

- Transport Assessment – Buro Happold

5.4 Water Management and Weather Resilience

Policy EN14 Flood Risk, PFE Policy JP-S4

Flood risk continues to be a key consideration for prospective developments and resilience to climate change is critical to ensure building longevity and optimal resident experience.

A Flood Risk Assessment (FRA) was undertaken by Buro Happold as part of the Outline Planning Application in 2023 in line with national and local policy. This concluded the proposed development is at low risk of flooding from all sources. However, there is a potential risk of surface water flooding impacting site. Off-site flows are predicted to impact the south-east of the site at the present location of Woolton Hall. Flood flows are predicted to enter the site from the east via Whitworth Lane and flow through the site back to Moseley Road at the southern entrance to the site.

The following measures have been taken to minimise flood risk of the development:

- Raising levels of the development above the reported risk datums to avoid risk from surface water flooding.
- Production of a robust drainage strategy designed to RIBA Stage 3 which restricts discharge to greenfield runoff rates, improves capacity within the network and reduces risk of pollution events.
- Integrates a range of SuDS to delay discharge off site, improve biodiversity and student experience.
- Gravity drainage system reduces maintenance risk and supports sustainable surface water drainage network.

For further information, please refer to:

- Drainage Strategy – Kennedy Redford

Policy EN 17 Water Quality, PFE Policy JP-S4

The development recognises the importance of mitigating against any adverse impact on water quality, in line with Policy EN 17. Since there are a small number of parking spaces proposed and no other significant sources of potential water pollution, such as chemical stores, no measures to minimise pollution are considered necessary.

Construction site impacts will be managed for the Contractor to provide copies of their pollution prevention policies and demonstrate how these are implemented on site, for example through site specific procedures, tool box talks and site noticeboards. This will be managed through the conditioned Construction Environmental Management Plan (CEMP).

In terms of water use management, a Building Management System will allow for automatic monitoring of energy/water usage and effective control of primary systems at the level of individual flats.

5.5 Waste Management

Policy EN 19 Waste

An Operational Waste Management Strategy has been prepared by Buro Happold for the development, demonstrating compliance with local and national policy. Waste streams and quantities have been estimated to ensure sufficient space has been allocated for storage and collection, as well as opportunities to minimise waste and facilitate high recycling rates. Key waste proposals from the Waste Management Strategy for the student residencies are summarised below:

- **Point of generation** – waste generated in each building will be separated at source into a minimum of four streams (residual waste, paper and cardboard, dry mixed recycling, food waste).
- **Point of generation to waste storage rooms** – students will move waste from point of generation to waste storage rooms containing bins located on the ground floor throughout the day.

- **Waste storage rooms to bin collection points** – Facilities Management (FM) staff will move bins to temporary bin presentation areas within the public realm on collection days. A refuse vehicle will directly pick up waste from a temporary bin presentation area. Bins will be returned directly to their respective waste storage rooms.

Waste segregation and collection frequency

Waste will be segregated into four primary waste streams within the residential accommodation blocks: residual, paper and cardboard, dry mixed recycling and food waste. The University of Manchester currently collect all the listed waste streams in most areas within the current campus. To future proof the design and waste management strategy for incoming legislation such as the Simpler Recycling Directive, source segregation of food waste has been incorporated.

All waste streams are anticipated to be collected twice per week. However, a total storage capacity of four days' waste generation has been allowed for in the case of missed collections, bank holidays etc.

Waste storage

All residential waste will be stored within ground floor waste rooms dedicated for each block. Total bin numbers required for each store have been calculated using the waste generation forecasts and taking into account the twice weekly waste collection and four days storage capacity.

Waste Collection

On waste collection days, the appropriate waste streams will be moved from ground floor waste rooms to temporary bin presentation points by Facilities Management (FM) staff, to facilitate a safe and efficient waste collection.

For further information, please refer to:

- Waste Management Plan – Buro Happold

5.6 Construction Management

A CEMP (Construction Environmental Management Plan) has been prepared by GRAHAM which specifies best practice measures which will be implemented to minimise potential impacts. The CEMP is intended to satisfy the requirements of the principles set out in the International Environmental Management System Standard ISO 14001:2015.

The CEMP comprises of several management plans which cover a variety of aspects in relation to minimising the impact of the development on the environment which satisfy planning condition 18, these include the following:

- Ecology and Biodiversity
- Land
- Water
- Dust and Air Quality
- Noise and Vibration
- Energy and Carbon
- Site and Waste Resource

Purpose and benefits of the Plan

The plan defines the Environmental Management procedures, work practices and management responsibilities relating to the construction of the project.

The plan demonstrates how GRAHAM intends to satisfy the requirements of the client

The plan demonstrates how GRAHAM intends to produce environmental performance indicators

The Plan defines the scope of environmental issues, together with the requirements for action by GRAHAM that shall be set out to avoid, minimise and mitigate construction effects on the environment, existing surrounding communities and new residents of the local area

The plan sets out the individual responsibilities of Directors, Managers, Supervisors and Operatives, with their respective roles defined in a clear system of managerial control.

The plan establishes the structure and content for the procedures to monitor compliance, including specific auditing by GRAHAM.

The plan establishes a regular procedure for reporting environmental information and ensures that environmental issues are firmly on the agenda of progress review meetings.

The plan ensures that complete documented records are kept for easy, accessible reference.

The plan provides a statement of Intent to statutory, regulatory and local authorities to take effective action to work in compliance with all statutory provisions and protect the environment.

The CEMP is a live document which must be updated and developed throughout the course of the project. An update to the CEMP will be carried out every six months as a minimum.

For further information, please refer to:

- Construction Environmental Management Plan - GRAHAM

5.7 Biodiversity

Policy EN15 Biodiversity and Geological Conservation, PfE Policy JP-G8

The protection of the site and enhancement of biodiversity in line with Manchester's Biodiversity strategy has been considered as part of the proposed development.

To comply with the Town and Country Planning Act 1990 (as amended) and the Places for Everyone 2024-2039 strategy, the project does not require off-site compensation in the form biodiversity units to achieve the mandatory 10% net gain. However, to comply with the trading summary rule of BNG, a total of 5.76 biodiversity units are needed to compensate for the urban tree losses on-site.

To meet the trading rules, further off-site habitat compensation may be required. These units are specifically for individual trees habitats or habitats of higher distinctiveness to compensate these units.

An agreement is being made between John Graham Construction Ltd and the University of Manchester to include off site planting within the wider University owned grounds, several areas have identified for an off-site habitat creation project and will include the provision of a number of individual small trees or new woodland to be planted.

The landscape at Fallowfield has developed the characteristics of mature woodland and woodland edge habitats, with tall trees in belts and groups interspersed with small open spaces and sunny glades. At the same time the range of planting types and species is relatively limited, relying heavily on non-native evergreen shrubs and high-maintenance grass lawns. In the future, the selection and installation of plants must consider the use of species which are adaptable to local and future conditions, and which promote biodiversity. The project aims to achieve a biodiversity net gain through the following design solutions:

- Maximising tree retention by designing around existing trees without compromising layout, developable area of the build environment.
- Avoid trees removal and protect existing trees using offsite precast concrete construction methodology.
- Avoid damage to trees and root systems by designing services infrastructure along existing network.
- Enhance and protect biodiversity and create linked habitats through our landscaping design, lighting schemes and by creating more biodiverse areas by building efficient, taller buildings.

For further information, refer to:

- Biodiversity Net Gain Report – Thomson

5.8 Adaptation to Climate Change

Policy EN 8 Adaptation to Climate Change, PfE Policies JP-S2, JP-S4 and JP-G8

The design team acknowledge that climate change presents one of the biggest global challenges of our time and welcome the leadership demonstrated by MCC by encouraging local solutions through Core Strategy Policy EN 8 Adaptation to Climate Change.

Steps taken to increase climate resilience of the proposed development include:

The detailed drainage strategy developed for the site will ensure:

- No flooding will occur within the surface water drainage system in all storm events up to 1in30 years + 40% climate change.
- No flooding of buildings or off-site will occur during all storm events up to 1in100 years + 45% climate change.
- Additional ventilation will be provided where a potential risk of overheating is identified in order to mitigate the overheating risk. This shall generally be provided through manually openable windows, however enhanced mechanical ventilation rates will be provided in areas where open windows would result in the internal ambient noise levels exceeding the requirements of Building Regulations Approved Document O.
- Achieving Passivhaus principles for all residential blocks, BREEAM Excellent with futureproofing for 50 year climate change impact.
- Retaining and enhancing habitats and introducing more drought and heat tolerant species will create a more resilient landscape to assist in the development's adaptation to climate change

For further information, refer to:

- Flood Risk and Drainage Strategy – Kennedy Redford
- Ecology and Biodiversity Technical Summary – Thomson
- Energy Statement – RPS

Appendix 1 – BREEAM Pre-Assessment



BREEAM New Construction v6 Predictive Assessment

Fallowfield UoM

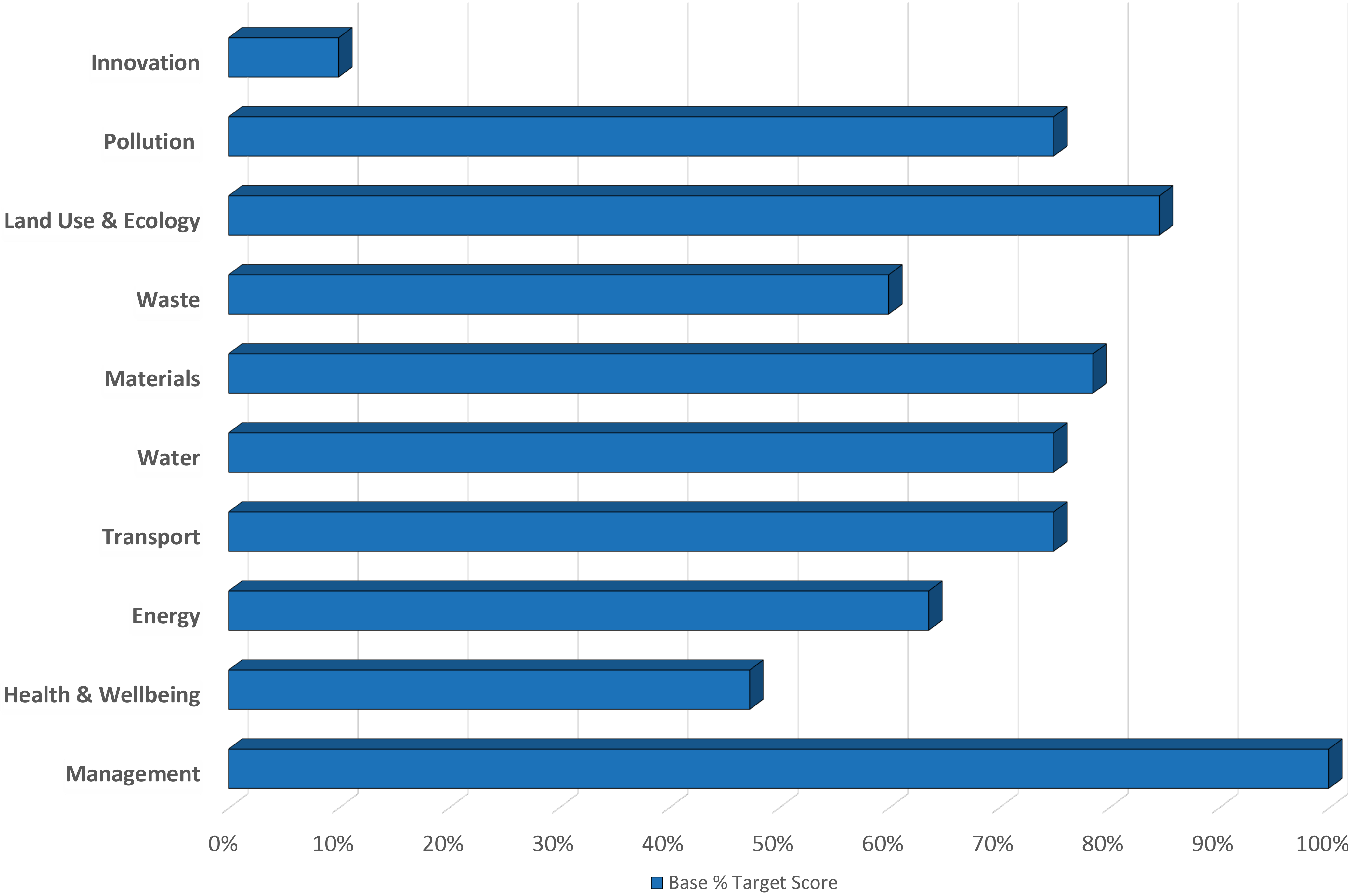
Prepared for Graham Construction
ESL 24-0549

12 February 2025



Project Name: Fallowfield UoM
Prepared for: Graham Construction
Building Type: Multi - residential
Project Stage: Design Stage Assessment
Scheme: BREEAM New Construction v6
Manual Version: V6.1
Project type: Fully Fitted
Target Score: Excellent

The results of the assessment are illustrated in the summary graph below, which indicates targeted credits. Detailed overleaf are the credits available and targeted so far. Currently, the development is targeting a score of 73.95%



	No. Credits Available	Section Weighting (%)	Base Target Credits	Base % Target Score	Target Score
Management	21	11%	21	100.00%	11.00%
Health & Wellbeing	19	14%	9	47.37%	6.63%
Energy	22	16%	14	63.64%	10.18%
Transport	12	10%	9	75.00%	7.50%
Water	8	7%	6	75.00%	5.25%
Materials	14	15%	11	78.57%	11.79%
Waste	10	6%	6	60.00%	3.60%
Land Use & Ecology	13	13%	11	84.62%	11.00%
Pollution	12	8%	9	75.00%	6.00%
Innovation	10	10%	1	10.00%	1.00%
Target Score					73.95%



Project Name: **Fallowfield UoM**

Building Type: **Multi - residential**

Project Type: **Fully Fitted**

Scheme Version: **BREEAM New Construction v6**

Targeted **73.95** **Excellent**

Potential Additional **84.82** **Excellent**

			Predictive Assessment				
Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
MANAGEMENT							
Man 01	Project Brief and Design	Project Delivery Planning	1	1		2	Prior to the completion of RIBA Stage 2, identify and define roles, responsibilities and contribution of project team for key phases of the project delivery. Evidence how the consultation has influenced the project brief.
		Stakeholder Consultation (Interested Parties)	1	1		2	Consult all relevant parties on minimum consultation content at RIBA Stage 2. Prior to completion of RIBA Stage 4 feedback to all relevant parties must be given and received. The credit will require further analysis, however has potential to be achieved.
		Pre-requisite for BREEAM Advisory Professional credits: Have the client & project team formally agreed performance targets?				2	BREEAM target must be formally agreed with the design team.
		BREEAM Advisory Professionals (AP) (Concept Design)	1	1		2	Appointment of BREEAM AP prior to RIBA Stage 2. BREEAM approach must be formally agreed with the design team.
		BREEAM AP (Developed Design)	1	1		4	BREEAM AP monitor and report progress against agreed BREEAM performance targets throughout the project up to PC Stage. This is contingent on the first credit (above).

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
Man 02	Life Cycle Cost and Service Life Planning	Elemental Life Cycle Cost (LCC)	2	2		2	An outline, entire asset elemental life cycle cost plan has to be carried out at RIBA stage 2 in line with Standardised method of life cycle costing for construction procurement PD 156865:2008. This could be undertaken retrospectively if required, however would need to be based on a Stage 2 cost plan. The value of this is considered limited.
		Component Level Life Cycle Cost Options Appraisal	1	1		4	A component level LCC plan has been developed by the end of RIBA Stage 4 in line with 'Standardised method of life cycle costing for construction procurement' PD 156865:2008.
		Capital Cost Reporting	1	1		4	Report the capital cost for the fit-out works in pounds per meter square (£k/m2) via the BREEAM Assessment Scoring and Reporting tool.
		Pre-requisite: Legal and sustainable timber				4	All timber and timber-based products used during construction process of the project are legal and sustainable i.e. FSC or PEFC certified.
		Environmental Management	1	1		4	Contractor operates EMS: certificate of ISO 14001, EMAS or have a structure that is in compliance with BS 8555:2003 and has reached stage four of the implementation stage. And implement best practice pollution prevention procedures: PPG6, Pollution Prevention Guidelines.
		Pre-requisite for BREEAM AP on site: Have the client & the contractor formally agreed performance targets?				4	BREEAM target must be formally agreed with the main contractor.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
Man 03	Responsible Construction Practices	BREEAM AP (Site)	1	1		4	A BREEAM AP is appointed to monitor the project to ensure ongoing compliance with the relevant sustainability performance/process criteria, and therefore BREEAM target, during the Construction, Handover and Close Out stages.
		Responsible Construction Management	2	2		4	Principal contractor achieves score register the site under the Considerate Contractors Scheme (CCS) or Fleet Operator Recognition Scheme (FORS) and achieves score required for targeted credits.
		Monitoring of Construction Site Impacts - Utility and Water Consumption	1	1		4	Principal contractor monitor energy and water consumption on site during the build.
		Monitoring of Construction Site Impacts - Transport of Construction Materials and Waste	1	1		4	Principal contractor to monitor fuel consumption of transport of materials and waste to/from site.
Man 04	Commissioning and Handover	Commissioning - Testing Schedule and Responsibilities Minimum Standard: 1 credit Very Good, Excellent and Outstanding	1	1		4	Schedule of commissioning and testing prepared, with confirmation of commissioning completed to relevant standards as defined by BRE. Where BMS specified, carry out specific commissioning and training of system. Appoint appropriate team member to monitor and programme precommissioning, commissioning and testing. Principal contractor accounts for commissioning and testing in overall programme.
		Commissioning - Design and Preparation	1	1		4	Achieve above, plus for buildings with complex services and systems, appoint a specialist commissioning manager to undertake design reviews and provide input on programme and management of commissioning.
		Testing and Inspecting Building Fabric	1	1		4	Thermographic survey to be undertaken by professional holding a UKTA certificate and an airtightness test undertaken by professional holding with membership of ATTMA or IATS. Appointment of specialist.
		Building User Guide Minimum Standard: 1 credit Very Good, Excellent and Outstanding				4	2 sets of building user guides to be developed: a technical and non-technical

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
		Handover	1	1		4	A training schedule is prepared for building occupiers at handover including proposed occupation plans (introduction to Building User Guides, installed systems an key features, O&M manual, commissioning records, aftercare information).
Man 05	Aftercare	Aftercare Support	1	1		4	Operational infrastructure and resources in place to collect energy and water consumption data for a minimum of 12 months from occupation. And aftercare support provision for at least 12 months from occupation (i.e. helpline).
		Commissioning - Implementation Minimum Standard: 1 credit Excellent and Outstanding	1	1		4	Over a 12 month period (after occupation) the seasonal commissioning activities: at summers/winter months; full/part load conditions are required to be carried out by a commissioning manager.
		Post Occupancy Evaluation (POE)	1	1		4	Third party appointment to undertake post occupancy evaluation exercise one year after initial building occupation to gain feedback from building users to inform operational processes.
MANAGEMENT		TOTAL	21	21	0		
		% of total score	11.00%	11.00%	0.00%		
HEALTH & WELLBEING							
Hea 01	Visual Comfort	Control of Glare from Sunlight	1			3	Glare control strategy designs out potential glare in relevant building areas where risk is identified. The glare control strategy must avoid increasing lighting energy consumption and be occupant controlled devices such as blinds or external shading.
		Daylighting	2		2	3	Daylighting study to be carried out and achieve average the requirements for ADF, view of sky and uniformity ratio.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
		View Out	1		1	3	Not achievable. 95% of the floor area in 95% of spaces for each relevant building area is within 8 m of an external wall. The window or opening must be ≥ 20% of the surrounding wall area or compliance is sought via BS 8206.
		Internal and External Lighting Levels, Zoning and Controls	1	1		4	Internal lighting designed to provide lux levels in accordance with SLL Code for Lighting, CIBSE LG 7 and other relevant industry standards; and zoned to allow occupant control. External lighting designed in accordance with BS5489-1:2013 and BS EN 12464-2:2-14.
Hea 02	Indoor Air Quality	Pre-requisite: Indoor Air Quality (IAQ) Plan				2	Indoor air quality plan to be produced and comply with Guidance Note 6.
		Ventilation	1		1	4	Provide fresh air into the building in accordance with the criteria of the relevant standard for ventilation. Consideration of carbon dioxide (CO ₂) or air quality sensors. Design intakes and exhaust 10m apart and 20m from sources of external pollution or in accordance with BS EN13779:2007 Annex 2.
		Emissions from Construction Products	2	1		4	Specified products meet testing requirements and emissions levels criteria for Volatile Organic Compound (VOC) Emissions as per BREEAM manual and all wood-based products used for internal fixtures and fittings must be tested and classified as formaldehyde E1 class as a minimum.
		Post-construction Indoor Air Quality Measurement	1	1		4	The formaldehyde concentration in indoor air is measured post construction. Where levels are found to exceed limits remediation to be undertaken. Measured levels of formaldehyde and TVOC to be reported to BREEAM Assessor.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
Hea 04	Thermal Comfort	Thermal Modelling	1	1		3	Thermal modelling to be carried out in accordance with CIBSE AM 11.Air conditioned building to be designed in accordance with CIBE Guide A and the PMV & PPD to be reported; for naturally ventilated building consider overheating in line with CIBSE TM52/TM59.
		Design for Future Thermal Comfort	1	1		3	The thermal modelling demonstrates the building is designed for a projected climate change environment and for conditioned building report PMV & PPD.
		Thermal Zoning and Controls	1	1		3	Above thermal comfort analysis informs temperature control strategy, and strategy provides compliant zoning and controls to its users.
Hea 05	Acoustic Performance	Acoustic Performance	4	1		3	Meet relevant acoustic performance standards for sound insulation, indoor ambient noise levels and reverberation. Suitably qualified acoustician to undertake calculation asap and set out pre completion testing requirements.
Hea 06	Security	Security of Site and Building	1	1		2	Security Needs Assessment (SNA) undertaken by Suitably Qualified Security Specialist (SQSS) during RIBA Stage 2 and design embodies recommendations. Any deviation from recommendations to be justified and agreed with SQSS.
Hea 07	Safe and Healthy Surroundings	Safe Access	1			4	Dedicated and safe cycle paths are provided from the site entrance to any cycle storage, and connect to off-site cycle paths. Pedestrian drop-off areas, delivery areas, dedicated parking or waiting areas are designed for vehicles.
		Outside Space	1	1		4	There must be an outside space providing building users with an external amenity area. This space must be appropriately sized, contain seating and be non-smoking.

HEALTH & WELLBEING	TOTAL	19	9	4
	% of total score	14.00%	6.63%	2.95%
	% of each credit	0.74%		

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
ENERGY							
Ene 01	Reduction of Energy Use and Carbon Emissions	Energy Performance Minimum Standard: 4 credits Excellent, 6 credits Outstanding	9	4	1	4	Credits are achieved through energy modelling (BRUKL report) and reduction in regulated CO ₂ emissions.
		Prediction of Operational Energy Consumption Minimum Standard: 4 credits for Outstanding	4	4		4	Complete a BREEAM compliant prediction of operation energy consumption analysis (TM54) alongside the required passive design review.
Ene 02	Energy Monitoring	Sub-Metering of End-Use Categories Minimum Standard: First sub-metering credit	1	1		4	Separate energy metering installed for different end uses, including lighting and EV charging.
Ene 03	External Lighting	External Lighting	1	1		4	Average initial luminous efficacy of not less than 70 luminaire lumens per circuit Watt. Automatic control to prevent operation during daylight hours and presence detection in building.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
Ene 04	Low Carbon Design	Passive Design Analysis	1	1		2	Hea 04 to be achieved. Analysis is carried out at RIBA Stage 2 and identifies passive design measures to reduce the total heating, cooling, mechanical ventilation, lighting loads and energy consumption.
		Free Cooling	1			4	Passive design is achieved and any of the free cooling strategies are implemented: night time cooling; ground coupled air cooling; displacement ventilation; ground water cooling; surface water cooling; evaporative cooling; desiccant dehumidification and evaporative cooling, using waste heat; absorption cooling, using waste heat; building does not require any significant form of active cooling or mech. ventilation i.e. naturally ventilated.
		Low Zero Carbon Feasibility Study	1	1		2	LZC Study carried out at RIBA Stage 2 by an energy specialist to establish most appropriate low or zero carbon energy source(s). Technology(is) to be specified and resulted in a meaningful reduction in regulated CO2 emissions. This study needs to build on the Capita Energy Strategy report by assessing carbon reductions available per technology.
Ene 06	Energy Efficient Transportation Systems	Energy Consumption	1	1		4	Conduct an analysis of the transportation demand and usage patterns is carried out and energy consumption has been estimated in accordance with BS EN ISO 25745 Part 2 and 3.
		Energy Efficient Features - Lifts	1	1		4	Energy efficient features offering the greatest potential energy savings are to be specified: standby condition during off-peak periods; lift care lighting and display across is >70lamp lumens/circuit Watt; drive controller capable of variable speed, variable-voltage and variable-frequency. Where use of regenerative drive saves energy it needs to by specified.
Ene 08	Energy Efficient Equipment	Energy Efficient Equipment	2		2	4	Identify the building's unregulated energy consumption (i.e. small power, plug-in equipment) and demonstrate a meaningful reduction in the total annual unregulated energy consumption of the building.

ENERGY	TOTAL	22	14	3
	% of total score	16.00%	10.18%	2.18%
	% of each credit	0.73%		

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
TRANSPORT							
Tra 01	Transport Assessment and Travel Plan	Travel plan	2	2		2	Travel Plan and Transport Assessment to be carried out at early design stages clearly considering the impact onto the surrounding infrastructure and to calculate the public transport Accessibility Index (AI) for the assessed building. Preliminary calculations confirmed high AI due to the tram link. This study must be carried out ASAP.
Tra 02	Sustainable Transport Measures	1. Existing Accessibility Index is >8 (unless prison or MOD site/rural location, where must be >4)	10	1		2	1 point - Existing Accessibility Index is >8 (unless prison or MOD site/rural location, where must be >4)
		2. Demonstrate an increase over the existing Accessibility Index.				2	2 points - Negotiation with local bus, train companies to increase the frequency of the local service; or, 3pts if or dedicated bus service, diverted bus route or new bus stop; or 3pts provide dedicated bus service,
		3. Provide a public transport information system in a publicly accessible area, to allow building users access to up-to-date information on the available public transport and transport infrastructure.		1		4	1 point - Provide a public transport information system in a publicly accessible area, to allow building users access to up-to-date information on the available public transport and transport infrastructure.
		4. Provide electric recharging stations of a minimum of 3kw for at least 10% of the total car parking capacity for the development.		1		4	1 point - Electric recharging stations of a minimum of 3kW for at least 10% of the total car park.
		5. Set up a car sharing group or facility to facilitate and encourage building users to car share. Raise awareness of the sharing scheme.				4	1 point for Car sharing group or facility, priority spaces for car sharers for at least 5% of the total car parking capacity, locate priority parking nearest the development.
		6. During preparation of the brief, the design team consults with the local authority (LA) on the state of the local cycling network and public accessible pedestrian routes, to focus on whichever the LA deems most relevant to the project, and how to improve it.			2	1	2 points - Consult and then agree and implement one proposition chosen with the local authority, that has a significant impact on local cycling network / pedestrian routes .
		7. Install compliant cycle storage spaces to meet the minimum levels set out in a BREEAM manual Table 7.5		1		4	1 point - Building type dependent: for student accommodation - 1 or 2 residents (or 1 per 4 where existing Accessibility Index >8), and 1 per 10 staff
		8. Provide at least two compliant cyclists' facilities for the building users – Showers; – Changing facilities; – Lockers; – Drying spaces.				4	1 point - Option 7 must be achieved in addition to at least 2 compliant cyclist facilities: showers, changing rooms, lockers or drying space.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
		9. At least three existing accessible amenities are present within 500m of the main entrance.		1		2	1 point - Food outlet, ATM, access to an outdoor space, access to recreation/leisure facility, post office, community facility, GP surgery and child care. All depending on type of the building.
		10. Enhanced amenities		2		2	2 points - One new accessible amenity (as per point 9 above) must be provided. 3 points - more than one new accessible amenity provided
		11. Implement one site-specific improvement measure, not covered by the options already listed in this issue, in line with the recommendations of the travel plan.			1	4	1 - 3 points - Implement one site-specific improvement measure, not covered by the options already listed in this issue, in line with the recommendations of the travel plan.

Max 10 pts for
Tra 02

TRANSPORT	TOTAL	12	9	2
	% of total score	10.00%	7.50%	1.67%
	% of each credit	0.83%		

WATER							
Wat 01	Water Consumption	Water Consumption Minimum Standard: 1 credit Good, Very Good, Excellent and 2 credits Outstanding	5	3		4	Specification of water efficient domestic water-consuming components, grey/rain water collection to reduce the water consumption. Use the BREEAM Wat 01 calculator to assess the efficiency of sanitaryware.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
Wat 02	Water Monitoring	Water Monitoring Minimum Standard: Criterion 1 - water meter on mains Good, Very Good, Excellent and Outstanding	1	1		4	Specification of water meter with pulsed output and BMS connected on mains water supply to each building. Install water sub-meters for all water consuming systems over 10% of the building demand.
Wat 03	Water Leak Detection	Leak Detection System	1	1		4	Water leak detection system with audible alarm capable of detecting a major leak on the mains water supply within the building and between the building and the utilities water meter.
Wat 04	Water Efficient Equipment	Water Efficient Equipment	1	1		4	Identification of all unregulated water demands that could be realistically mitigated or reduced. Demonstration, through either good practice design or specification, a meaningful reduction in the total water demand of the building.

WATER	TOTAL	8	6	0
	% of total score	7.00%	5.25%	0.00%
	% of each credit	0.88%		

MATERIALS							
Mat 01	Environmental Impacts from Construction Products - Building Life Cycle Assessment (LCA)	Superstructure - Concept Design	6	6		2	Using BREEAM simplified Building LCA tool or an IMPACT approved tool, the design team will carry out building Life Cycle Assessment (LCA) before planning submission. Integrate the LCA options appraisal within the wider design decision-making process.
		Superstructure - Technical Design				4	Using BREEAM simplified Building LCA tool or an IMPACT approved tool, carry out building LCA for superstructure design options at RIBA Stage 4.
		Substructure and Hard Landscaping Options Appraisal during Concept Design	1	1		2	Using BREEAM simplified Building LCA tool or an IMPACT approved tool, carry out the LCA options appraisal for s substructure and hard landscaping at RIBA Stage 2.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
Mat 02	Environmental Impacts from Construction Products - Environmental Product Declarations (EPD)	Specification of Products with a Recognised Environmental Product Declaration (EPD)	1		1	4	To specify products with recognised EPD and use BREEAM Mat 01/02 results submission tool. The requirements will be passed to the future contractor by contract.
Mat 03	Responsible Sourcing of Construction Products	Pre-requisite: Legal and sustainable timber				4	100% of timber and timber-based products used in the project are 'Legal' and 'Sustainable' as per UK Government's Timber Procurement Policy (TPP).
		Enabling Sustainable Procurement	1	1		2	Sustainable Procurement Plan includes sustainability aims, objectives and strategic targets to guide procurement process must be in place before RIBA Stage 2. The contractor will be required to develop their own sustainable procurement plan in line with this.
		Measuring Responsible Sourcing	3	2	1		The contractor sources materials with responsible sourcing certification, such as BES 6001 and ISO 14001.
Mat 05	Designing for Durability and Resilience	Protecting Vulnerable Parts of the Building from Damage and Protecting Exposed Parts of the Building from Material Degradation	1	1		4	The building incorporates suitable durability and protection measures and specification to limit materials degradation between environmental factors. This will include impact protection and finishes / treatments to protect the building from environmental and chemical degradation.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
Mat 06	Material Efficiency	Preparation and Brief	1			1	Set targets and report opportunities and methods for optimise the use of materials for each of the RIBA Stage. Consideration should be given to pre-fabrication and WRAP compliance.
		Concept Design				2	
		Developed Design				3	
		Technical Design				4	
		Construction				5	

MATERIALS	TOTAL	14	11	2
	% of total score	15.00%	11.79%	2.14%
	% of each credit	1.07%		

WASTE							
Wst 01	Construction Waste Management	Pre-demolition Audit	1			2	Pre-demolition audit must be carried out at RIBA Stage 2 and include any existing building, structures and hard surfaces. Audit needs to be referenced in RMP below.
		Construction Resource Efficiency Minimum Standard: 1 credit Outstanding	3	1	1	4	Prepare a compliant Resource Management Plan (RMP) covering the targets of non-hazardous waste arising from site construction and main contractor to achieve a construction waste resource efficiency benchmark of 11.1 (1 credit), 6.5 tonnes (2 credits) or 3.2 tonnes (3 credits) of construction waste generated per 100m2 GIA
		Diversion of Resources from Landfill	1	1		4	Prepare a compliant RMP and divert at least 90% (tonnes) of demolition and 80% (tonnes) non-demolition waste from landfill.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
Wst 02	Recycled Aggregates	Pre-requisite: If demolition occurs on site, to encourage the reuse of the site-won material on site, complete Pre-demolition Audit				2	As per Wst 01 above.
		Project Sustainable Aggregate Points	1			4	Identify all aggregate types, quantities and calculate the distance travelled by transport type. Points are awarded using BREEAM Wst 02 calculator.
Wst 03	Operational Waste	Operational Waste Minimum Standard: 1 credit Excellent and Outstanding	1	1		4	A dedicated central space for storage of recyclable waste, clearly labelled and accessible to building occupants/facilities operators. Provision of 3 internal kitchen bins for each kitchen, minimum total capacity 30 litres / each bin minimum 7 litres, dedicated space, and either home composting facilities in kitchen or communal space
Wst 05	Adaptation to Climate Change	Resilience of structure, fabric, building services and renewables installation	1	1		2	Conduct a climate change adaptation strategy appraisal for structural and fabric resilience by the end of RIBA Stage 2. Carry out risk assessment to identify and evaluate the impact on the building from extreme weather conditions. Provide an update at RIBA Stage 4.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
Wst 06	Design for Disassembly and Adaptability	Design for Disassembly and Functional Adaptability - Recommendations	1	1		2	Carry out and implement a functional adaptation appraisal at RIBA Stage 2 and developed recommendations and solutions (i.e. alternative building uses, functions, etc.)
		Disassembly and Functional Adaptability – Implementation	1	1		4	Provide an update during RIBA Stage 4, how the recommendations have been implemented i.e. plant replacement, horizontal / vertical expansion, refurbishment potential etc. Complete a building adaptability and disassembly guide for the project.

WASTE	TOTAL	10	6	1
	% of total score	6.00%	3.60%	0.60%
	% of each credit	0.60%		

LAND USE & ECOLOGY							
LE 01	Site Selection	Previously Occupied Land	1	1		2	At least 75% of new development footprint is built on the previously occupied land.
		Contaminated Land	1			4	Specialist’s land contamination report and summary details of the implementation plan of the remediation strategy to be developed. Assumed no contamination therefore not feasible to achieve.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
Ecology Route Selection							1
LE 02	Ecological Risks and Opportunities	Pre-requisite: Statutory Obligations				1	Comply with all relevant UK, EU or international legislation relating to the ecology of the site
		Survey and Evaluation	1	1		1	A Suitably Qualified Ecologist (SQE) carries out a survey and evaluation early enough to influence site preparation works, layout, and where necessary, strategic planning decisions. The SQE's survey and evaluation determines the site's ecological baseline, and recommendation and data collected are shared with project team to influence decisions
		Determining Ecological Outcomes	1	1		2	The first credit achieved. Liaise with stakeholders to determine optimum ecological outcomes, and to identify, appraise, and selection measures to meet this. Evaluation is shared with design team to influence decision-making process.
LE 03	Managing Impacts on Ecology	Prerequisite: Ecological Risks and Opportunities				2	LE 02 has been achieved. The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site.
		Planning and Measures On-Site	1	1		2	Roles and responsibilities to be assigned. Plan and implement site preparation and construction work early; collaborate and implement solutions and measures with stakeholders.
		Managing Negative Impacts	2	2		4	Negative impacts from site preparation and construction works have been managed according to the hierarchy and no overall loss of ecological value has occurred (two credits), or loss has been minimised (one credit). Ecology reports prepared for planning suggest no overall loss will occur.
		Prerequisite: Managing Negative Impacts on Ecology				2	LE 03 has been achieved. Roles and responsibilities to be assigned. Site preparation and construction works have been planned. The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
LE 04	Ecological Change and Enhancement	Ecological Enhancement	1	1		4	Measures have been implemented that enhance the site's ecological value, based on input from the project team and SQE in collaboration with stakeholders an data collated as part of LE02. Date collated are analysed, and where potentially valuable, provided to local environmental records centres.
		Change and Enhancement of Ecology	3	2		4	Credits awarded based on the change in ecological value occurring, calculated in accordance with GN36. - 75% and 94% Minimising loss (1 credit) - 95% and 104% - No net loss for the habitats assessed, (2 credits) - 105% and 109% - Net gain for the habitats assessed (3 credits) - 110% or above - Significant net gain (exemplary level credit)
LE 05	Long Term Ecology Management and Maintenance	Prerequisite: Statutory Obligations, Planning and Site Implementation				2	LE 03 and LE 04 have been achieved. The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site.
		Management and Maintenance throughout the Project	1	1		4	Measures have been implemented to manage and maintain ecology throughout the project, based on input from LE02. These measures monitor and review the effectiveness of the mitigation and enhancement measures in place for LE 03 & 04. A section on Ecology and Biodiversity is included in the BUG
		Landscape and Ecology Management Plan	1	1		4	A Landscape and Ecology Management Plan, or equivalent, has been developed in accordance with BS42020:2013 Section 11.1 covering 5 years after project completion

LAND USE & ECOLOGY	TOTAL	13	11	0
	% of total score	13.00%	11.00%	0.00%
	% of each credit	1.00%		

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
POLLUTION							
Pol 01	Impact of Refrigerants	Pre-Requisite: Systems with Electric Compressors				4	
		Impact of Refrigerants	2	2		4	1 credit where Refrigerant's Direct Effect Life Cycle CO ₂ equivalent emissions (DELCO ₂ e) of ≤ 1000 kgCO ₂ e/kW cooling/heating capacity; 2 credits where DELCO ₂ e is ≤ 100 kgCO ₂ e/kW
		Leak Detection	1		1	4	All systems are hermetically sealed or only use environmentally benign refrigerants or a permanent automated refrigerant leak detection system is required.
Pol 02	Local Air Quality	Local Air Quality	2	2		4	Emissions from all installed combustion plant that provide space heating and domestic hot water do not exceed BREEAM requirements.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
Pol 03	Flood and Surface Water Management	Flood Resilience	2	1		4	Site specific Flood Risk Assessment will be needed by specialist to confirm that if the site is a low probability of flooding from all sources of flooding.
		Surface Water Run Off	2	2		4	Surface water run-off design solutions must be bespoke. Specialist to provide calculation and confirm the proposed attenuation measures, i.e. SUDs. Calculation for rate and volume of surface water run-off.
		Minimising Watercourse Pollution	1		1	4	Include water pollution prevention measures in the design, to include petrol interceptors as appropriate. Note that the 5mm discharge requirement is not expected to be met.
Pol 04	Reduction of Night Time Light Pollution	Reduction of Night Time Light Pollution	1	1		4	External lighting design is in line with ILP guidance of obtrusive light and can be automatically switched off. Illuminated advertisements are designed in compliance with ILP PLG05 The Brightness of Illuminated Advertisements. All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00. Inline with Table 2 of the ILP guidance and its accompanying notes outlines four sets of recommendations: 1. Limits to the average upward light ratio of the luminaires, to restrict sky glow. 2. Limiting illuminance at the windows of nearby properties for which light trespass might be an issue. 3. Limiting the intensity of each light source in potentially obtrusive directions beyond the site boundaries. 4. Limiting the average luminance of the building if it is floodlit.
Pol 05	Reduction of Noise Pollution	Reduction of Noise Pollution	1	1		4	A BS 4142:2014 compliant noise impact assessment to be carried out by Acoustician, and recommendations for mitigation incorporated in design.

POLLUTION	TOTAL	12	9	2
	% of total score	8.00%	6.00%	1.33%
	% of each credit	0.67%		

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
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EXEMPLARY							
Man 03	Responsible Construction Practices	Responsible Construction Practices	1	1		4	Responsible Construction Management based on Considerate Contractors Scheme score of >39 (plus BRE specific requirements that are good site management practices).
Hea 01	Visual Comfort	Daylighting	1			4	When relevant building areas exceed good practice daylight factor OR the relevant building areas exceed good practice average and minimum point daylight illuminance criteria.
		Internal and External Lighting Levels, Zoning and Controls	1			4	Lighting in each zone can be manually dimmed down to 20%.
Hea 02	Indoor Air Quality	Emissions by Construction Products	1			4	All decorative paints and varnishes specified must meet performance standard EU Directive 2004/42/CE and testing standard BS EN ISO 1189-2:2013, Pat2. In addition, all 7 remaining product categories meet testing requirements and emissions levels criteria for Volatile Organic Compound (VOC) Emissions.
Hea 06	Security	Security of Site and Building	1			4	A SABRE risk assessment is completed for the project.
Ene 01	Reduction of Emissions	Beyond zero net regulated carbon	3			4	The building achieves an EPR NC≥0.9 and zero net regulated CO2-eq emissions. Energy generation from on-site and near-site LZC sources offsets 100% of carbon emissions (both regulated energy use plus % of unregulated emissions). Up to 3 credits dependant on % of unregulated energy use that is offset by LZC sources.
		Post-occupancy evaluation of operational energy consumption	2			4	Complete TM45, and install submetering of high energy loads and tenancy / functional areas. Commit to funds to pay for post occupancy evaluation of operational energy consumption e.g. NABERS or BREEAM in Use, and commit to sharing results with BRE.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
Wat 01	Water Consumption	Water Consumption	1			4	Specification of water efficient domestic water-consuming components to reduce the water consumption 65% beyond the baseline. Use the BREEAM Wat 01 calculator to assess the efficiency of sanitary wear including rainwater and greywater harvesting.
Mat 01	Life Cycle Impacts	Core Building Services Options Appraisal	1			2	Carry out LCA options of at least 3 significantly different core building services.
		LCA and LCC Alignment	1			2	Align LCA and LCC options appraisal activity. Both credits LCA and LCC must be achieved.
		Third Party Verification	1			2	A suitably qualified third party work or verifies the building LCA work and produces a report.
Mat 03	Responsible Sourcing of Materials	Responsible Sourcing of Construction Products	1			4	Achieve 50% of the points available in the Mat 03 calculation through sourcing of main building materials from responsible suppliers.
Wst 01	Construction Waste Management	Construction Resource Efficiency and Diversion of Resources from Landfill	1			4	To achieve a construction waste resource efficiency benchmark of 1.6m3 (or 1.9 tonnes) of construction waste generated per 100m2 GIA and divert at least 85% by volume or 90% tonnage of non-demolition waste from landfill and 85%y volume or 95% in tonnage of demolition waste from landfill.
Wst 02	Recycled Aggregates	Project Sustainable Aggregate Points	1			4	Identify all aggregate types, quantities and calculate the distance travelled by transport type. Points are awarded using BREEAM Wst 02 calculator.

Credit Ref.	Credit Title	Credit Name	Available	Targeted	Potential	RIBA Stage	BREEAM requirements summary
Wst 05	Adaptation to Climate Change	Responding to Climate Change	1			4	Achieved when credits Hea 04 Thermal comfort, 8 credits in Ene 01, Ene 04 Passive analysis, 3 credits in Wat 01, Mat 05 Material degradation and Pol 03 Flood risk and 2 credits for Surface water run-off credits are achieved.
LE 02	Ecological Risks and Opportunities	Wider Site Sustainability	1			4	Wider sustainability related activities and potential ecosystem service benefits are considered as part of determining the optimal ecological outcomes for the site.
LE 04	Ecological change and Enhancement	Change and enhancement of ecology	1			4	The change in ecological value calculated under criterion 6 above confirms significant net gain has been achieved as set out in GN36 - BREEAM, CEEQUAL and HQM Ecology Calculation Methodology – Route 2.

EXEMPLARY	TOTAL	10	1	0
	% of total score	10.00%	1.00%	0.00%
	% of each credit	1.00%		

Appendix 2 Energy Statement

FALLOWFIELD STUDENT RESIDENTIAL DEVELOPMENT

ENERGY STRATEGY STATEMENT



UMRF-RPS-XX-XX-
RP-M-5002
Energy Strategy
P03
20 February 2025

Document status					
Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
01	Initial Issue	Brian Doran	Brian Keane	Brian Keane	25 Nov 24
P02	Planning Issue	Brian Keane	Brian Keane	Steve Ogden	10 Feb 25
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Approval for issue		
Steve Ogden		10 February 2025

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Appendices

- Appendix A Acronyms/Abbreviations
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- Appendix C Site Plan

1 EXECUTIVE SUMMARY

This report outlines the Energy Strategy for the new student accommodation blocks that create the Fallowfield Residences Redevelopment.

RPS has been commissioned for the Building Services design development to RIBA Stage 3 through the collaborative process with other design team members.

The development will meet BREEAM *Excellent* and Passivhaus standards.

The design of the MEP services will also achieve significant betterment to the requirements of Building Regulations Approved Document L (to at least the minimum requirement in line with Ene01 for BREEAM *Excellent* and EPC rating A).

The development has been designed to achieve Net Zero Carbon in line with The University of Manchester's sustainability commitments definitions through a fabric first approach, provision of on-site renewables and a commitment to procure 100% REGO backed renewable energy in construction and operation.

The proposed design solutions, support the University's goals to address the path to net zero carbon and enhance the students' experience in the following ways:

- The design provides natural light to all occupied rooms and background mechanical ventilation with heat recovery to all bedrooms and kitchens.
- Optimised amount of glazing, considering daylighting, carefully controlling glare, solar gain, heat losses, security, safety, and thermal bridges.
- Choice of construction materials to provide a robust and highly insulated structure.
- Prevention of unwanted air infiltration and heat loss through robust construction details.
- Avoidance of gas heating to avail of a decarbonised electrical grid.
- Water heating provided via high efficiency, low-GWP, air-source heat-pumps.
- Roof-mounted photovoltaics (PV) on each Unit providing embedded electricity generation.



Figure 1 – Aerial view of existing site plan

2 INTRODUCTION

2.1 The Site

The proposed Student Residential Development is located in Fallowfield, south of Manchester city centre on the University's, existing Owens Park, Oak House and Woolton Hall sites. The scheme has received outline planning permission for:

- *The phased demolition of existing buildings and phased development of up to 3,300 Purpose Built Student Accommodation bedrooms.*
- *Associated facilities including waste storage, laundry and cycle storage.*
- *Up to 4,500 sq. m of floorspace to be used for ancillary purposes associated with the student residential use of the site (drinking establishment and hot food takeaway).*
- *Ancillary supporting staff accommodation (up to 55 bedrooms.)*
- *Up to 1,200 sq. m of ancillary residential dwellings plus associated car parking, hard and soft landscaping, open space, utilities, footpaths and roads.*

A BREEAM "Excellent" rating is targeted for the development (the BREEAM assessment encompassing all residential buildings of the complete site).

Outline Planning permission ref 138126/OO/2023 was approved on 19th January 2024 for the demolition and redevelopment of the site to deliver 3,300 purpose-built student accommodation (PBSA) bed spaces, alongside all supporting infrastructure and ancillary services.

2.2 Applicable Planning Policy

Greater Manchester has committed to achieving carbon neutrality by 2038. Relevant planning documents include the following:

- Manchester City Council: Local Development Framework, Core Strategy Development Plan Document; adopted 11th July 2012 (incl 2024 amendment).
- PLACES FOR EVERYONE, joint development plan document for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan, 2022 to 2039; adopted 21st Mar 2024.

Places for everyone requires all new developments to be net zero carbon by 2028.

The documents define the extent of transformation needed in Manchester to achieve energy and carbon neutrality goals.

The Places for Everyone (PfE) Plan sets out how the boroughs should develop for the years 2022 to 2039 and provides a strategic framework for local plans. It also sets out policies to inform the preparation and determination of planning applications. Therefore, policies relevant to this development include:

- **PfE Policy JP-S1: Sustainable Development**
 - a significant upscaling of PV
 - reduction of heating and cooling demand in commercial buildings.
 - Moving away from carbon intensive gas as the primary source of heat
 - applicants to demonstrate how savings have been maximised following the energy hierarchy.
 - meeting Part S of the Building regulations in relation to new EV charging points.
 - Supporting consideration to embodied energy in construction and post occupancy evaluations.

- **PfE Policy JP-S2: Carbon and Energy**
 - Be Part L 2022 compliant / net zero carbon in regulated operational carbon emissions.
 - incorporate EV charging points in line with Part S
 - provide a heat networks assessment where within "Heat and Energy Networks Opportunity Areas".
 - Achieve at least BREEAM Excellent standard for the Ene01 credit.
 - Provide an energy statement.
 - From 2025, residual carbon emissions not mitigated on-site should be offset, in agreement with the local authority, through a financial contribution to a carbon offset fund.
- **PfE Policy JP-S3: Heat and Energy Networks**
 - Heat and Energy Networks states that Within the identified "Heat and Energy Network Opportunity Areas", unless it can be demonstrated that there are more effective alternatives for minimising carbon emissions, or such connection is not practicable or financially viable.
 - "Heat and Energy Network Assessment" (to be included within the Energy Strategy). Locational circumstances will be key in this case – covered by 5.29, points a. and b.
 - 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.

3 ENERGY HIERARCHY

The proposed development has been designed in accordance with a clear energy hierarchy approach, of

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

3.1 Minimising Energy Demand

We propose to minimise energy demand via a combination of suitable passive design features. The building element U-values and air permeability will be better than Part L (as tabulated below).

Windows in occupied areas are openable for comfort control and allowing a mixed-mode ventilation strategy. The mechanical ventilation system will have high efficiency heat recovery to reduce the ventilation heat demand in the heating season. During the warmer months, a natural ventilation solution can be deployed, in the form of openable windows and/or façade openings.

Table 1– Proposed Fabric Performance

Building Element	Target Performance (W/ m²K)
External wall	0.15
Ground floor	0.18 (Part L 2021 Minimum)
Roof	0.10
Windows	0.8 (g-value: 0.35; Light Transmittance: 0.67)
Internal partitions	2.57
Internal floor/ceiling	1.05
Internal ceiling tiles	2.42
Design air permeability	An air tightness of 1.09 m³/hour/m² @ 50 Pa is targeted for the scheme as per Passivhaus standards and has been incorporated into the model.
Notes: Exact U-Values will be finalised as part of the detailed design, to accommodate buildability and material-efficiency requirements; overall envelope U-Values will not significantly deviate.	

3.2 Maximise Energy Efficiency

The MEP systems' efficiencies are indicated in tabular form below.

The primary considerations for energy efficiency within the Fallowfield Student Residential Development include:

- i. The use of air source heat pumps, to provide domestic water heating in all buildings on the development.
- ii. High efficacy LED lighting in all areas.
- iii. Demand-controlled lighting with photocell and presence/absence detection in all communal, circulation and shared spaces.
- iv. High efficiency heat recovery equipment on all ventilation systems.
- v. Low demand water appliances and leak detection.
- vi. Automatic local thermostat & time controls on each space heater, operating as:
 - heaters set to 18°C, during hours of operation (say 7am - 10am & 6pm - 10pm).
 - occupants have the option to increase temperature to 21°C by pressing the "+" button twice on the panel (heater will stay at 21°C for 2hours before reverting to 18°C).
 - anti-tamper function to avoid occupant alterations.
 - "open window" function (heater will switch off if temp. drop >4°C in 30mins). If the heater switches off the occupant will have to manually reset the heater.

Table 2– Proposed MEP Services and Target Efficiencies

System	Location		Efficiency
Heating	Bedrooms	Direct-electric panel heaters	100%
	Toilets, circulation	Direct-electric panel heaters	100%
	Hubs - occupied spaces	VRF	6.0 (seasonal efficiency)
Cooling	Hubs - occupied spaces	VRF	6.0 (seasonal efficiency)
DHW	Residential bldgs.	ASHP (CO₂)	4.52 (seasonal efficiency)
	Hubs	Multi-point unvented electric heaters	100%
Mechanical ventilation	Student clusters	MVHR (mixed mode)	1.2 W/l/s, 85% HR
	Hubs - occupied spaces	MVHR	
Lighting	All Areas, including external spaces	LEDs	100 lum/W

3.3 Utilise Renewable Energy

Each building will be provided with a PV array, to cover all available and suitable part of the roof of the building.

It is assumed that all PV will be installed at circa a 10° angle on inclination; final peak load per block to be confirmed.

The PV installation will include:

- Complete PV system in accordance BS7671, BS EN 62124, ENA 59/2-1.
- Panel efficiency - 20% minimum / 440 Wp (based on 1700 x 1000m panel).
- Panels should be from known and approved manufacturer with >10-year product & 25-year linear power warranty.
- Inverters to be provided with a minimum of 10-year warranty.

3.4 Utilise Low Carbon Energy

The proposed new buildings are designed to be “all-electric”, with no reliance on gas or fossil fuel for the heating of the premises. The use of primarily heat-pump heating will take advantage of the advancing decarbonisation of the electricity grid.

3.5 Utilise other Energy Sources – Connection to Heat Network

The figure adjacent indicates the heat and energy networks opportunities map for the Greater Manchester Area. The proposed development site is near a heat and energy networks opportunities zone.

PfE Policy JP-S 3 paragraph 2b requires new developments which are unable to connect to an existing heat network to incorporate appropriate capability to enable future connection.

Within the Fallowfield development scheme, the heating demand for the student-residences is primarily derived from the domestic hot water load and space heating demand is low given a high performing building envelope and ventilation heat-recovery.

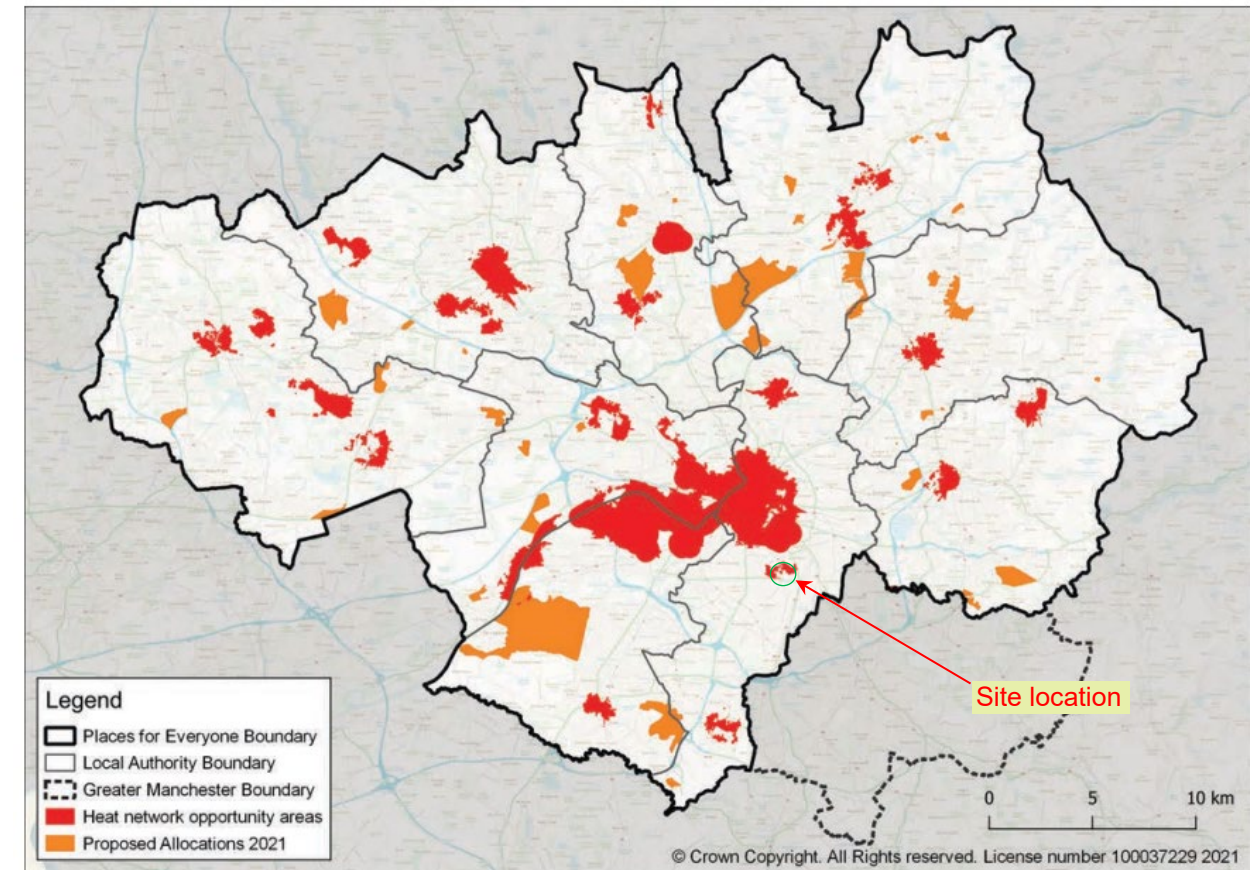


Figure 2 – Greater Manchester heat opportunities areas (reproduced Fig. 5.1 of Places for Everyone Plan)

4 ENERGY TARGETS

4.1 Energy Targets and Benchmarks

The following benchmarks have been used to assess the results of operational energy model against which the results will be measured in order to establish whether the design achieves the intended net zero targets.

Table 3 - Operational energy benchmark

Operational energy benchmark for comparison	Total EUI (kWh/m ² /annum)
Planning Strategy Operational Energy Use Target (2030)	70 – 100
Planning Strategy Operational Energy Use Target (2035)	35 -- 55

Our dynamic thermal analyses to date assessed how the proposed Fallowfield development will perform in terms of energy efficiency and meeting the net zero energy targets for residential buildings. It focused on estimating the operational energy consumption for a typical student accommodation block. The aims of this analysis were therefore:

- To determine the operational energy beyond Part L regulated energy.
- Provide predicted operational energy consumption and energy usage intensity (EUI).
- The *Places for Everyone* plan requires the development to achieve 4 BREEAM Ene01 credits.

Table 4– Results of Energy Modelling (SBEM)

End use energy	Energy Use Intensity, EUI (kWh/m ²)		
	39-week	43-week	52-week
Heating	3.9	4.0	4.0
Hot Water	1.9	2.1	2.5
Internal Lighting	7.3	8.2	10.1
Fans and Pumps	7.8	8.7	10.5
Cooling	0.0	0.0	0.0
Lifts ¹	4.5	4.6	4.7
External Lighting ²	0.0	0.0	0.0
Cooking Electricity	3.1	3.4	4.2
Small Power ³	15.6	17.4	21.5
Server Room ⁴	0.0	0.0	0.0
Totals	44.2	48.4	57.5

1 - Calculations completed outside of thermal model.

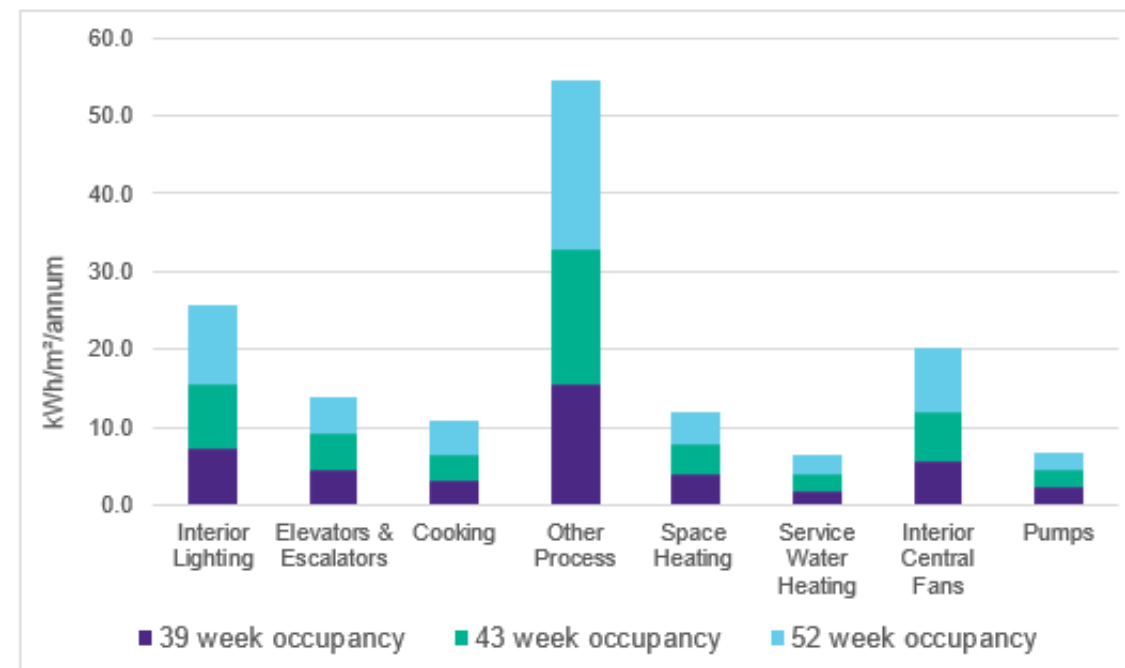
2 - External lighting has been excluded from this assessment.

3 – Allowance for additional miscellaneous loads incl within equipment gains in small power loads.

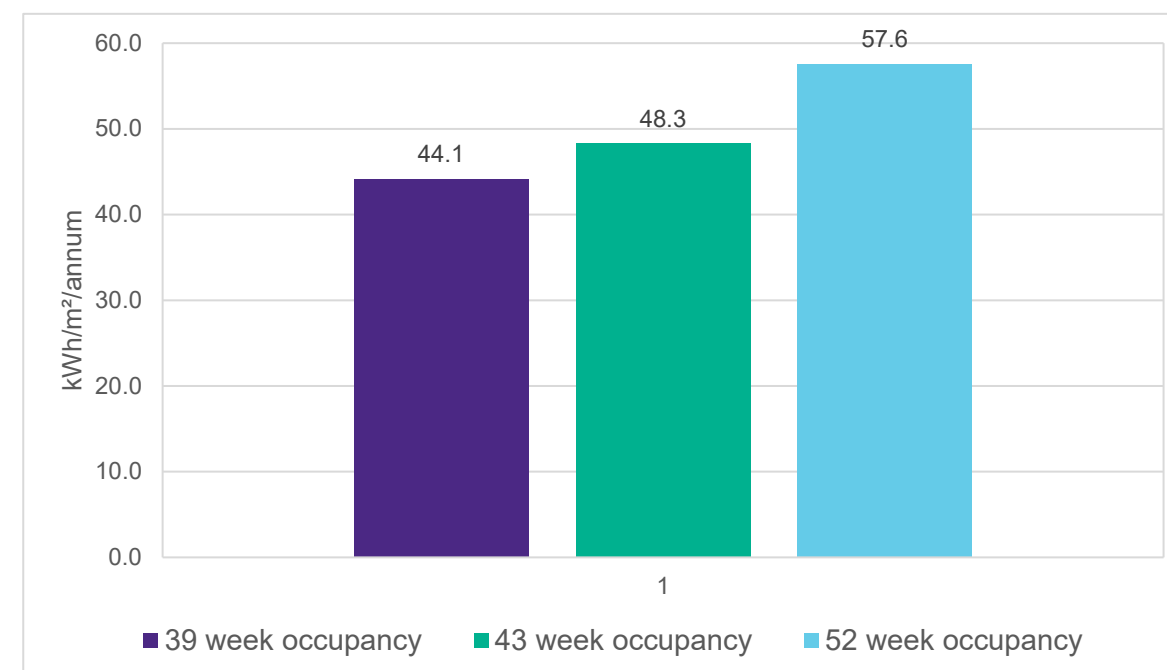
4 - Server room energy (heating and cooling if any) has not been included within this assessment.

Detailed energy modelling encompassed calculation of energy performance in a wide sense, including steady-state tools, as well as dynamic simulation modelling (DSM).

The results of this assessment are presented as a range of possible energy usage outcomes. The actual building energy usage would be expected to lie somewhere between the low-end and high-end building occupancy estimates assuming the assumptions made are reasonable and all energy uses are considered.



Graph 1 - End-use EUI breakdown per scenario



Graph 2 - Building EUI per scenario

4.2 EV Charging

A significant quantity of Electric Vehicle Charging (EVC) points is anticipated to meet planning requirements and the aspirations of the University.

In line with Building Regulations Approved Document S (*Infrastructure for the charging of electric vehicles*), the following would be the minimum requirement for a new build of this nature (where more than 10 parking spaces, are provided):

- a. One electric vehicle charge point must be provided for the building.
- b. At least one in every five remaining parking spaces must be provided with cable routes.

Final quantities are subject to Local Planning Authority feedback following Planning Submission.

4.3 Overheat Risk

Analysis of the risks of overheating have been carried out to in line with CIBSE standard TM59, (*Design methodology for the assessment of overheating risk in homes to assess overheating risk in homes*).

This analysis has been used to optimise the building design, glazing proportions and characteristics as well as ventilations solutions to ensure compliance with summertime comfort criteria.

The TM59 overheating report is included within Appendix B of this report.

4.4 Measures for Post-occupancy Evaluation

As noted within PfE Policy JP-S1 (Sustainable Development), all developments should support considerations for post occupancy evaluations.

Within the design proposals for the new buildings, the design will encompass the following measures to facilitate building managers to carry out environmental and energy evaluations, post occupancy.

- Electricity sub-metering of all end use demands, to identify energy usage by location and services – lighting, heating, ventilation systems, power, EVC, etc. Metering provision to be in line with industry good-practise guideline (CIBSE *TM39 Building energy metering*).
- Water sub-metering on all end-use demand.
- Leak detection, via metering, on water mains around the site.
- Provision of recommended post-occupancy measures, to evaluate the system efficiencies and provide a Monitoring and Targeting procedures for the occupants.

4.5 Whole Lifecycle Emissions

A BREEAM Mat01 compliant Lifecycle Assessment (LCA) is being carried out. This criterion aims to reduce the burden on the environment from construction products by recognising and encouraging measures to optimise construction product consumption efficiency and the selection of products with a low environmental impact (including embodied carbon), over the life cycle of the building.

4.6 Consideration of Further Mitigation Measures towards Net Zero in Operation

It should be noted that during the peak PV generation period the student accommodation properties are not fully occupied during these summer months, and as such the majority of the PV energy generated during this period will be given back to the national grid where the energy can be better utilised.

The energy used by the buildings are offset elsewhere by the grid (in the form of provision of a 100% REGO backed renewable energy supply) and therefore the metered energy usage by the buildings will not show a net zero in operation as a result.

Consideration of potential further mitigation measures to move towards net zero in operation:

- Use of Ground Source Heat Pumps (GSHP):- Due to limited available land surrounding the development for the inclusion of the necessary boreholes and the extent of the necessary buried services infrastructure this option has been dismissed.
- Extended use of Air Source heat pumps (ASHP) to include space heating:- This has been considered but as a result of limited roof space available after inclusion of ASHP for Hot water generation and Photovoltaics maximisation coupled with the fact that the limited heat load (due to Passivhaus improvements in building fabric insulation) this option has been dismissed.
- Use of wind technology:- This has been considered but as a result of limited roof space available after inclusion of ASHP for Hot water generation and Photovoltaics maximisation this option has been dismissed.
- Use of solar hot water heating panels:- This has been considered but due to the increased space requirements for additional storage tanks and associated pumps coupled with the limited roof space available after inclusion of ASHP for Hot water generation and Photovoltaics maximisation this option has been dismissed.

Appendix A

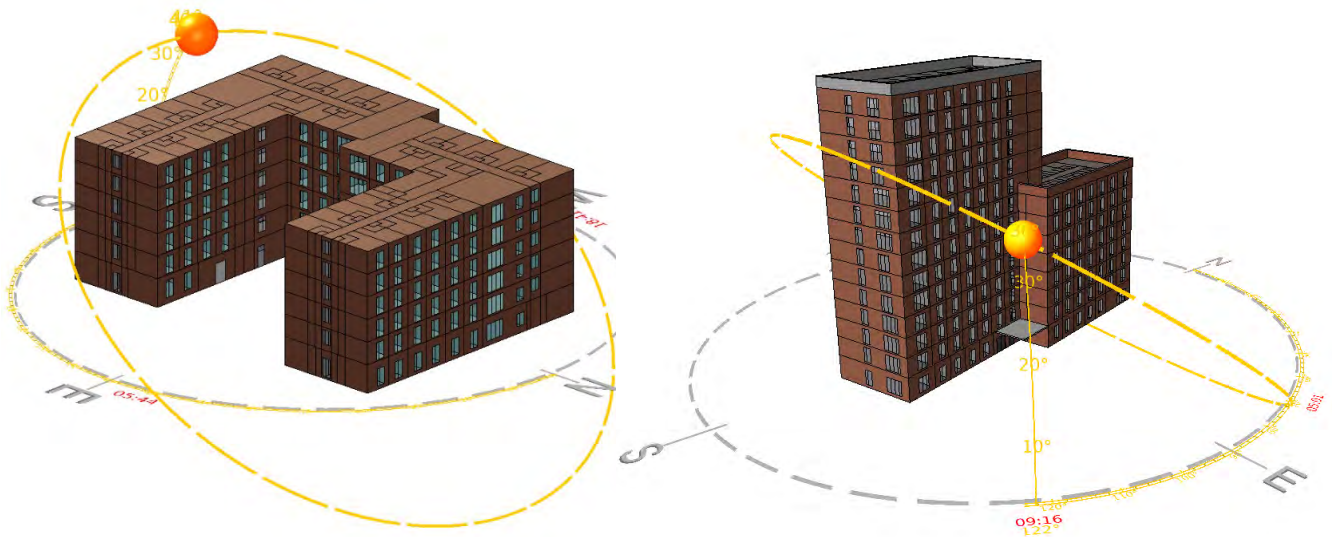
Acronyms/Abbreviations

A/C	Air conditioning
ADL	Approved Document L (Building Regulations); referred to as “Part L”
AHU	Air handling unit
ASHP	Air Source Heat Pump
BER/TER	Building Energy Rating/Target Energy Rating (as related to Part L analysis)
Bldg	Building
BMS/BEMS	Building Management (Controls) System/Building Energy Management (Controls) System
BREEAM	Building Research Establishment Environmental Assessment Method
BSRIA	Building Services Research and Information Association
BWIC	Builders-work in connection (with the MEP services)
CAPEX	Capital Expenditure
CIBSE	Chartered Institute of Building Services Engineers
CWS	Domestic Cold-Water Service
DB	Distribution Board
ENWL	Electricity Northwest Ltd
FW	Foul Water (drainage)
HP	Heat Pump
HV	High Voltage
HVAC	Heating Ventilation and Air Condition
LCA/LCC	Lifecycle analysis/Lifecycle costing
LPHW	Low Pressure Hot water (heating
LV	Low voltage
M&E	Mechanical and Electrical Services
MEP	Mechanical Electrical and Plumbing (Public Health) Services
NCM	National Calculation Method
O&M	Operating and Maintenance (Manual)
OPEX	Operating Cost
PPM	Planning Preventative Maintenance
RIBA	Royal Institute of British Architects
RMU	Ring Main Unit
SB	Switch board
SBEM	Standard Building Energy Model
UU	United Utilities

Appendix B
Overheating Report

TM59 OVERHEATING REPORT

University of Manchester, Fallowfield Campus



UMRF-RPS-XX-XX-RP-M-50004

BSL30018

14 November 2024

THERMAL COMFORT REPORT

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1 EXECUTIVE SUMMARY

The purpose of this report is to assess the thermal comfort within the occupied rooms of the proposed building in order to demonstrate compliance with the requirements of CIBSE TM59 - Design Methodology for the Overheating Risk in Homes. The assessments models and reports thermal comfort of a typical S and L block within the development on the University of Manchester Fallowfield Campus. The risk of overheating assessment has been assessed against a projected climate change scenario by utilising weather file in line with the TM59 methodology.

In this study dynamic thermal simulation has been performed using compliant computer modelling software (Virtual Environment software by Integrated Environmental Solutions – IES VE) to predict sub-hourly internal air temperatures. The software used to carry out the simulation at detailed design stage provides full dynamic thermal analysis in accordance with CIBSE AM11.

This assessment includes an analysis of overheating in the worst case S and L student accommodation blocks. These blocks are impacted by local noise levels, which pose restrictions on the hours of night time window opening to west-facing bedrooms in the S block and west-facing and south-facing bedrooms in the L block between 11pm and 8am. The proposed mitigation strategy demonstrates that the measures are sufficient to ensure compliance for all bedrooms and kitchens under the Manchester DSY1 2020 High 50th percentile weather file.

Communal corridors with domestic hot water pipework gains **do not meet** the targets with respect to the TM59 requirements, **however it is worth noting that there are no mandatory targets for communal corridors to meet. These have been reported solely for information purposes.**

For the future weather file scenario, the overheating analysis demonstrates that bedrooms fail to achieve compliance with the overheating requirements. It should however be noted that **compliance with a future weather file is not required and is only reported for information purposes.**

This report accounts for all relevant design features and includes for anticipated building usage. Should the final design and/or use of the building differ from that described in this assessment, or should the actual weather be warmer than the accredited weather file utilised, then overheating may occur beyond that predicted.

2 CIBSE TM59 – DESIGN METHODOLOGY FOR THE OVERHEATING RISK IN HOMES

TM59 (2017) provides a methodology to assess the risk of overheating in homes. The assessment is based on the adaptive methodology set out in CIBSE TM52: The Limits of Thermal Comfort: Avoiding Overheating in European Buildings. The document builds on the requirements of TM52 by setting a limit to the period that the internal temperatures during the night in bedrooms, exceeds a prescribed limit. In addition, the document calls for the monitoring of temperatures in communal corridors.

2.1 Performance standards for the avoidance of overheating

For homes that are predominantly naturally ventilated, the method with two criteria should be used to assess overheating. The first overheating criteria, which applies to both living rooms/kitchens and bedrooms and is an adaptive comfort criteria. The second overheating criterion is a fixed temperature criteria which applies only to bedrooms. Both criteria must be met for all spaces within a dwelling to demonstrate compliance.

For mechanically ventilated homes, the fixed temperature method with a single criterion should be used to assess overheating. This single criterion must be met for all spaces (living rooms/kitchens and bedrooms) within a mechanically ventilated dwelling to demonstrate compliance.

2.1.1 Criteria for homes predominantly naturally ventilated

Where operable windows are present, regardless of the presence of a mechanical ventilation heat recovery unit, compliance with TM59 is contingent on satisfying the following two conditions:

- a) **For living rooms, kitchens and bedrooms:** the number of hours during which DT is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 percent of occupied hours. (CIBSE TM52 Criterion 1: Hours of exceedance).
- b) **For bedrooms only:** to guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10 pm to 7 am shall not exceed 26 °C for more than 1% of annual hours. (Note: 1% of the annual hours between 22:00 and 07:00 for bedrooms is 32 hours, so 33 or more hours above 26 °C will be recorded as a fail).

2.1.2 Criteria for homes predominantly mechanically ventilated

Where operable windows are not viable, due to poor air quality or noise restrictions (or any other reason), the guidance recommends assessing the overheating risk using the fixed temperature method offered in CIBSE Guide A. This stipulates that the operative temperature in all occupied zones does not surpass 26°C for more than 3% of the annual occupied hours.

2.1.3 Adjustments for homes with vulnerable occupants

Care homes and accommodation for vulnerable occupants, which are predominantly naturally ventilated (see definition above), should use criteria (a) and (b) from section 2.1.1 above but should assume Type I occupancy (see CIBSE TM52 (2013) for description).

If they are predominantly mechanically ventilated (see definition above), the fixed temperature method should be used, see section 2.1.2 above.

2.1.4 Criteria for communal corridors

The methodology also sets separate overheating compliance criteria for communal corridors in multi-residential buildings, albeit there is no mandatory maximum temperature target to be avoided.

The inclusion of corridors in the overheating analysis is mandatory where community heating pipework runs through them. The overheating test for corridors should be based on the number of annual hours for which an operative temperature of 28 °C is exceeded.

Whilst there is no mandatory target to meet, if an **operative temperature of 28 °C is exceeded for more than 3% of the total annual hours**, then this should be identified as a significant risk within the assessment.

The TM59 criteria (taken from TM59 section 4.2) for naturally ventilated homes are summarised in the table below.

TM 59 Criteria	Applicable Rooms	Occupied Hours	Naturally ventilated homes
Criterion 1	Living rooms, kitchens and bedrooms	Living room/Kitchen – 9 am to 10 pm (occupied) Bedrooms – 24-hour occupancy	The number of hours during which ΔT is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than <u>3% of occupied hours.</u>
Criterion 2	Bedrooms only	Bedrooms – 24-hour occupancy	The operative temperature in the bedroom from 10 pm to 7 am shall not exceed 26°C for more than <u>1% of annual hours.</u> <u>33 or more hours above 26°C will be recorded as a fail.</u>

Table 1: TM 59 criteria for homes predominantly naturally ventilated

The TM59 criteria for mechanically ventilated homes (taken from TM59 section 4.3) is as follows:

- For homes with restricted window openings, the CIBSE fixed temperature test must be followed, i.e. all occupied rooms should not exceed an operative temperature of 26 °C for more than 3% of the annual occupied annual hours (CIBSE Guide A (2015a)).

2.2 Basis of design comfort criteria

Category	Explanation	Acceptable Category Range °C
I	High level of expectation and/or occupants are very temperature sensitive	+2
II	Normal expectation	+3
III	An acceptable moderate level of expectation	+4
IV	Low level of expectation. This should only be accepted for a limited part of the year	>+4

Table 2: Categories and acceptable temperature ranges for comfort criteria

2.2.1 Definition of TM59 Criterion 1

Criteria 1 for overheating is defined in terms of ΔT , the difference between the actual operative temperature in the room at any time (T_{op}) and T_{max} the limiting maximum acceptable temperature. ΔT is calculated as:

$$\Delta T = T_{op} - T_{max} (^{\circ}\text{C})$$

ΔT is rounded to the nearest degree (i.e., for $0.5 \leq \Delta T < 1.5$ the value 1°C is used, for $1.5 \leq \Delta T < 2.0$ the value 2°C and so on).

2.2.2 Definition of T_{max}

$T_{max} = 0.33 T_{rm} + 18.8$ + [acceptable category range from table 2]

where T_{rm} is the exponentially weighted running mean of the daily mean outdoor air temperature for the design summer year appropriate for the building location.

The values for the maximum acceptable temperature (T_{max}) are calculated from the running mean of the outdoor temperature (T_{rm}) and the suggested acceptable range using the following equation:

$$T_{max} = 0.33 T_{rm} + 18.8$$

Thus, for Category II (**applicable to the occupied areas of this building**) where the acceptable range is 3°C :

$$T_{max} = 0.33 T_{rm} + 21.8$$

2.3 Weather files

The guidance requires that dwellings be tested against CIBSE design summer year (DSY) weather files. It stipulates the following weather files shall be used:

- a. Design shall demonstrate the minimum requirement to achieve compliance with the DSY1 weather file most appropriate to the site location, for the 2020s, high emissions, 50th percentile scenario. This does not necessarily mean the nearest location and the file shall reflect the most compatible climatic conditions.
- b. Other files including the more extreme DSY2 and DSY3 files, as well as future files (i.e. 2050s or 2080s), could be used to further test designs of particular concern, but a pass is not mandatory for the purposes of the simpler test presented in this document.

3 **APPROACH**

The performance of the design proposal has been assessed using an accredited dynamic thermal modelling software suite (IES VE). It predicts internal air temperatures based on climate weather data for the local geographic location. Studies provide detailed temperature profiles for each space throughout the summer months. The IES VE Apache software (supported by the SunCast, MacroFlo and Radiance modules) and the methodology adopted are compliant with the requirements of CIBSE Application Manual AM11 and meet the requirements of the guidance.

Modelling has been carried out for all occupied spaces using appropriate hourly weather data, internal gains, and ventilation and infiltration losses. Ventilation, solar shading, built form and construction, material selections and load profiles are all considered in detail.

Input parameters including building orientation, geometry and thermo-physical data for the main construction elements have been specified in accordance with the design proposal.

Input parameters are as declared in the following sections.

4 MODELLING INPUT DATA

The comfort model is based on information current at the time, October 2024. This section indicates the key input data.

To ensure compliance is achieved in practice it is imperative that the design and construction team adhere to the details here laid out.

4.1 Project description and floor area

The proposed project would create a new student accommodation block in Manchester.

The S block has a floor area of approximately 5,580 m² and the L block has a floor area of approximately 5,540 m². Note this is a gross area measurement taken directly from the model, using IES VE modelling conventions. Areas quoted within this report are for modelling purposes only.

4.2 Built form

The model geometry reflects the project proposal as the following figures illustrate.

Note: In some instances, models may not fully reflect the architectural intent; simplification is sometimes necessary for means of efficient calculation.

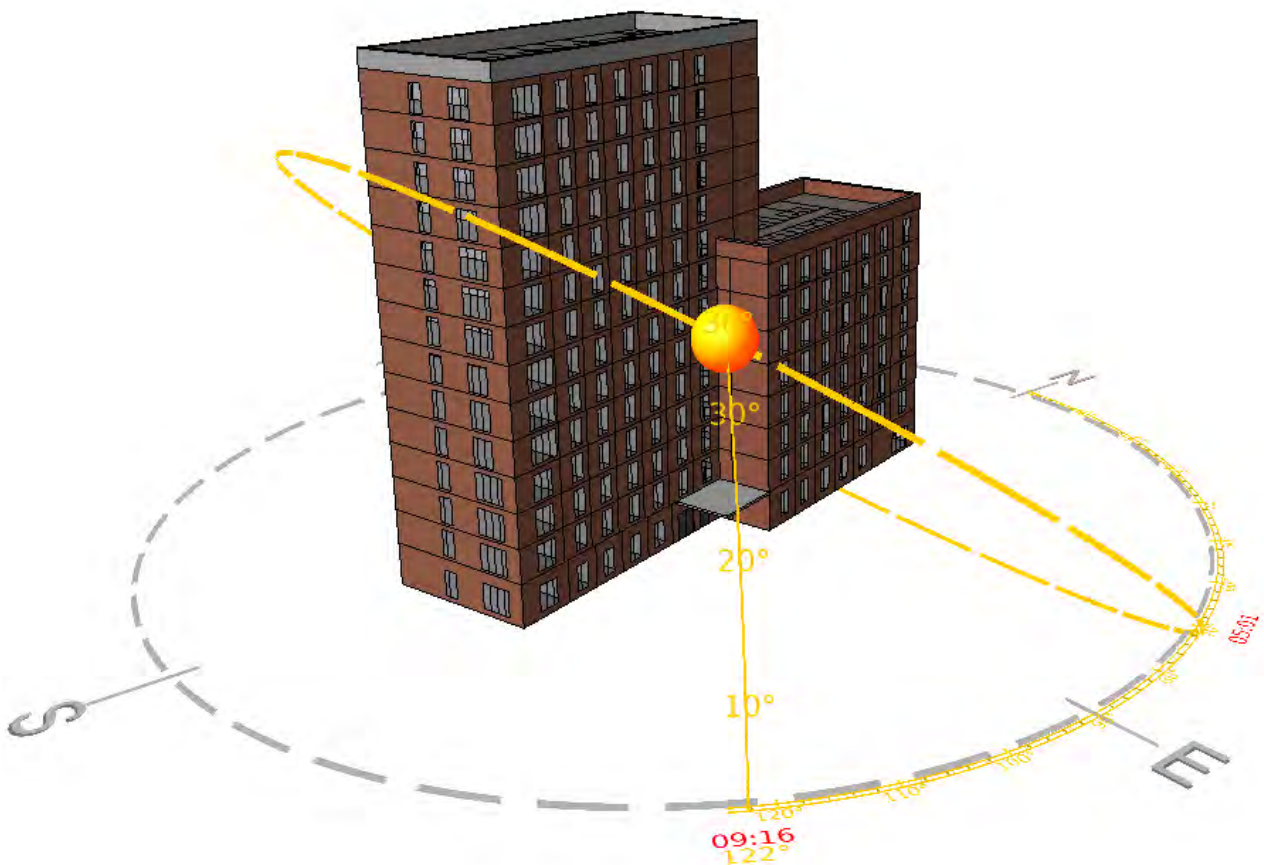


Figure 1: South-East Perspective Typical S Block

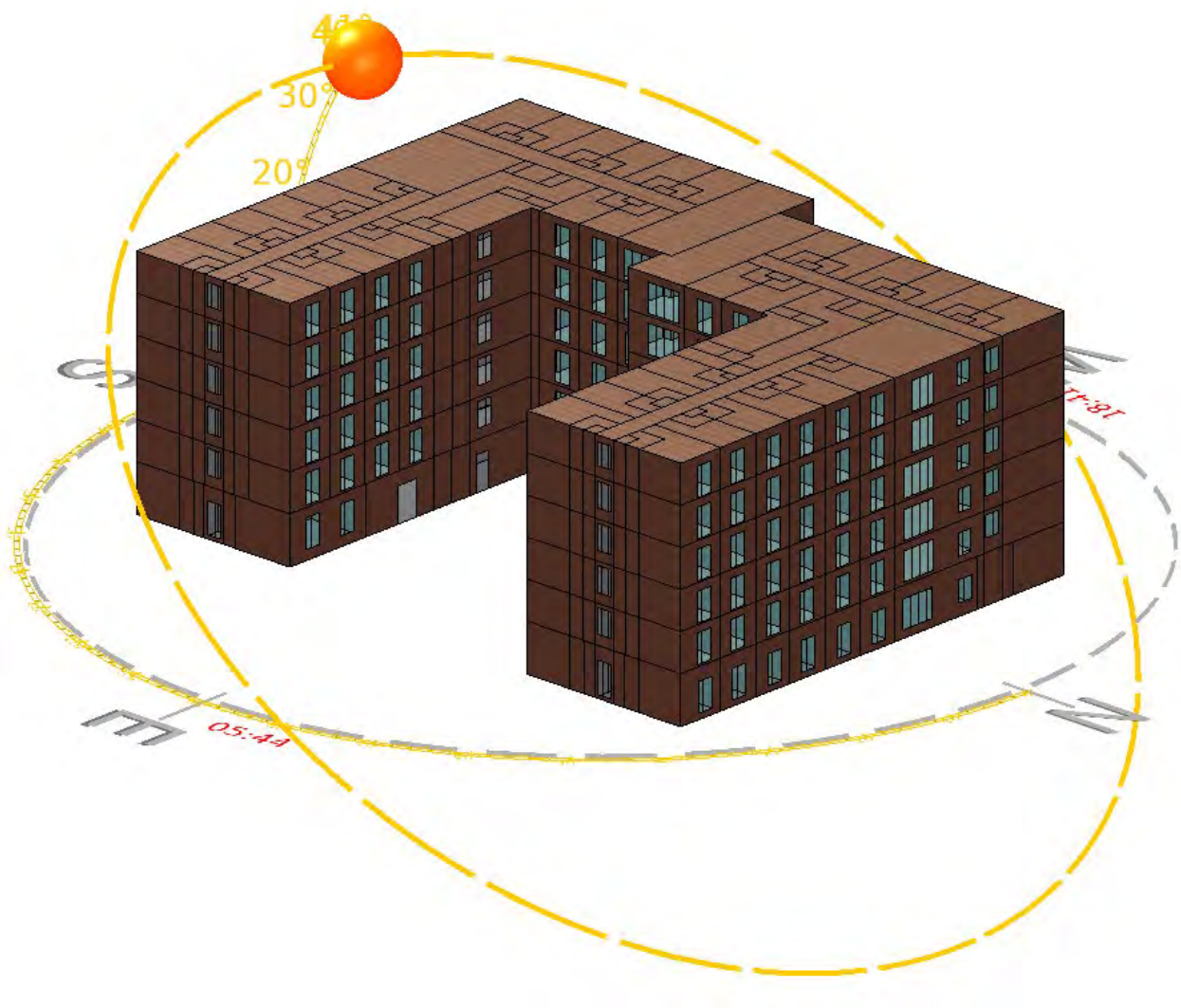


Figure 2: North-East Perspective Typical L Block

4.3 Weather data

This study uses the Design Summer Years for Manchester, this being the most appropriate location to the site and as required by the guidance. The weather file has the 1st of January as a Wednesday.

The weather files used are as follows:

- Manchester_DSY1_2020High50.epw
- Manchester_DSY1_2080Low50.epw

The key summer weather statistics are as follows:

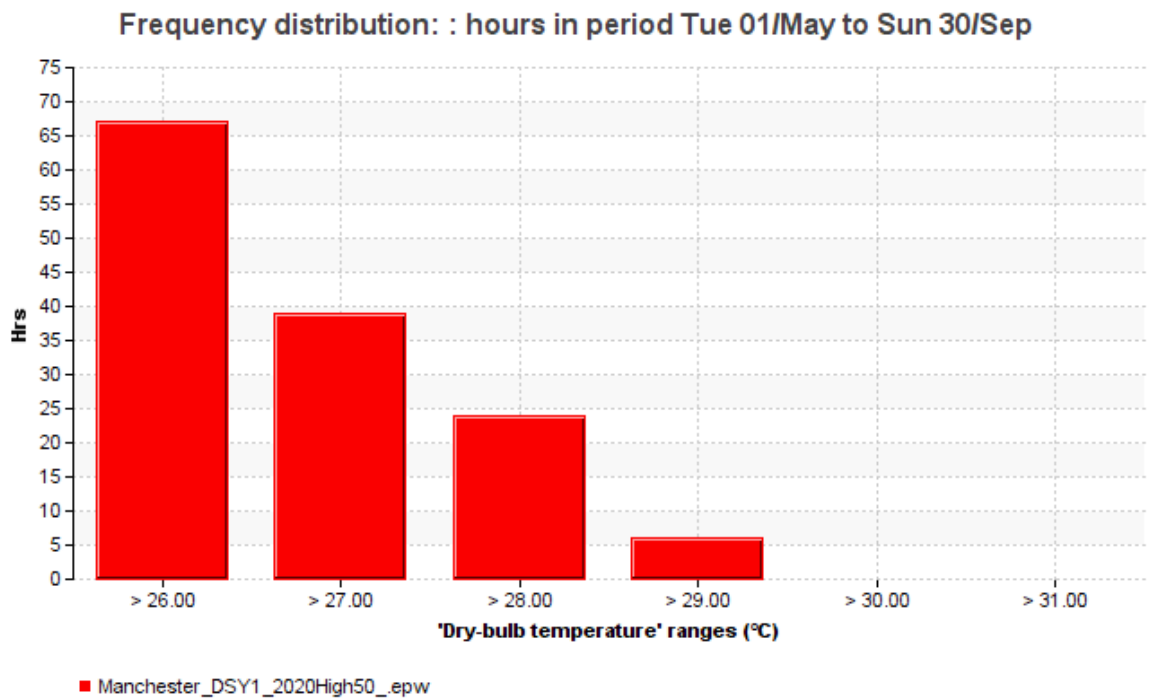


Figure 3: Dry-bulb temperature (Manchester_DSY1_2020High50)

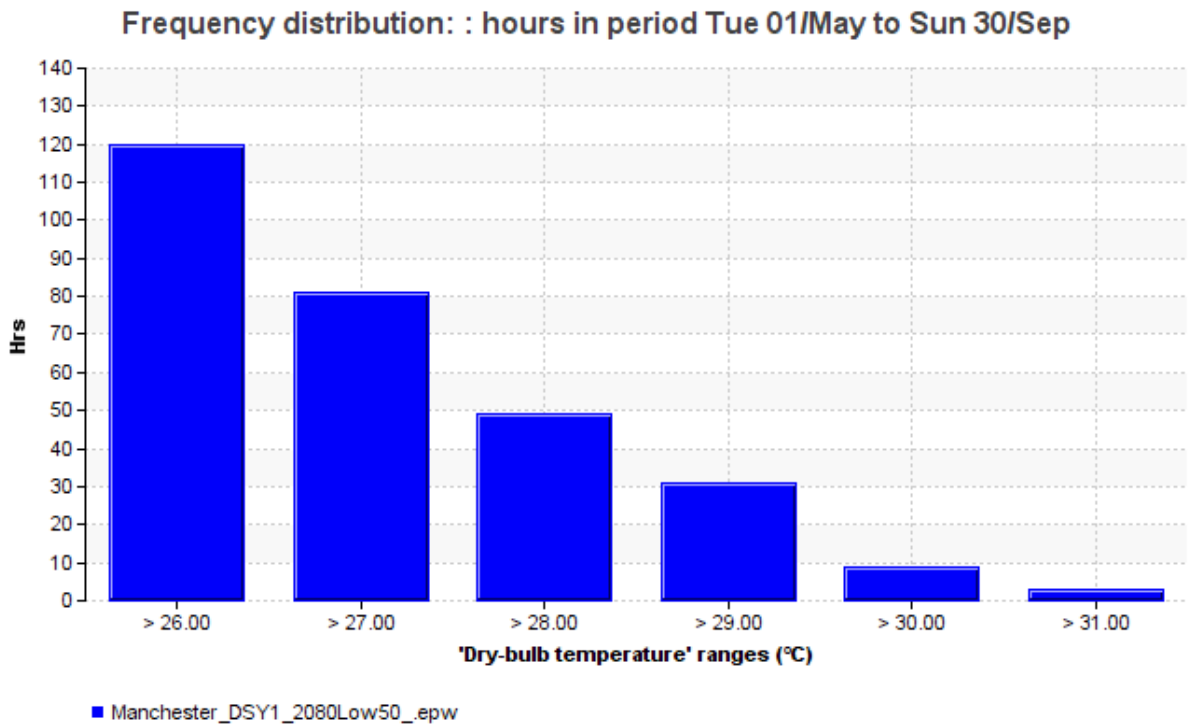


Figure 4: Dry-bulb temperature (Manchester_DSY1_2080Low50)

4.4 Building fabric

4.4.1 Opaque construction

The fabric for the development has been optimised by the architectural team, targeting high thermal performance levels whilst retaining heat within the building spaces.

The following U values have been modelled and are based on the current design specification:

Category	U value (W/m ² K)
External fabric	
External Wall (50 mm brickwork, 240 mm cast concrete with 250 mm insulation)	0.15
Ground/Exposed Floor	0.18
Roof (concrete roof with exposed concrete soffit)	0.10
Internal Fabric	
Internal Partitions (Lightweight plasterboard partition)	1.66
Internal Partitions (160 mm medium-weight concrete block)	1.83
Internal Floor/Ceiling (175 mm concrete ceiling/floor)	2.78

4.4.2 Glazed construction

Glazing with good levels of thermal performance appropriate to the proposed use of the building has been selected and optimised by the architectural team. The intention is to provide a balance between containing the thermal energy within the space, allowing a controlled and beneficial level of solar gain to enter the building spaces as well as preventing overheating and need for mechanical cooling.

The table below summarises performance details.

Category	U Value (W/m ² K)	Solar g-value (BS EN410)	Light Transmission Value (%)
North façade glazing	0.80	0.35	66
South façade glazing	0.80	0.35	66
East façade glazing	0.80	0.35	66
West façade glazing	0.80	0.35	66

Internal blinds

Internal blinds have not been modelled.

Internal doors

The internal doors have an average overall U value of 2.20 W/m²K.

Shading

There is no external shading in the model.

Fabric air permeability

Target air permeability = 1.09 m³/m².h (0.60 ach) at 50 Pa in accordance with Passivhaus standards.

4.5 Heating

Heating is applied to maintain a minimum setpoint of 20°C to all occupied bedrooms and kitchens. Generally, this means the heating is off throughout a design summer period. Heat recovery is also bypassed during the summer period.

4.6 Mechanical cooling

There is mechanical cooling provided to all bedrooms via peak lopping cooling control. Cooling is controlled to provide 160 W of sensible cooling per bedroom during sleeping hours from 11 pm to 8 am when windows are closed and when room operative temperature exceeds 26°C.

4.7 Ventilation strategies

In general terms, the modelled building ventilation strategy is as follows:

- Occupied rooms (bedrooms and kitchens) are provided with Centralised Mechanical Ventilation with Heat Recovery with 85% sensible heat recovery. Each cluster is served by a centralised unit.
- The MVHR systems provide:
 - Wintertime ventilation with heat recovery
 - Summer ventilation (with bypass of heat exchanger) with boost mode availability with room temperature control.
- Openable windows are provided all bedrooms and kitchens. When conditions permit, these can be opened by the users to provide free cooling via natural ventilation airflow.

In operation, these modes will be determined by the control setpoints defined by internal and external temperature conditions:

- At internal room temperatures less than 21°C, the MVHR system will operate continuously at the background (trickle) vent rate. Between internal room temperatures of 21°C and 23°C, the MVHR system will enable boost facility and modulate the flowrate from 6 l/s to 8 l/s. Modelling assumes MVHR systems operate in a balanced ventilation mode, neither pressurising nor depressurising the space. In this way natural ventilation via window opening is modelled as being 'additive' to the mech vent rate.
- There is a continuous extract rate of 17 l/s applied to the kitchens.
- MVHR assumes summer by-pass of the heat exchanger.
- When external ambient temperatures exceed 14°C and when internal room temperature exceed 22°C, then the heat exchanger element of the MVHR system is bypassed and system **only** operates in mechanical ventilation mode without heat recovery, supplying fresh air to the rooms at outdoor conditions.
- Openable windows are controlled to start opening when internal room temperature exceed 22°C and are fully open when temperatures reach 26°C. When windows are open, the system operates in mixed-mode operation.

There is no mechanical/natural ventilation provision to any other rooms in the building with the exception of the bedrooms and kitchens.

Continuous mechanical extract ventilation is provided to en-suite toilets at 8 l/s.

4.8 Limits on window opening due to site acoustics

Local noise levels do pose restrictions on the hours of window opening, all west-facing bedrooms in the S block and all west-facing and south-facing bedrooms in the L block are modelled as closed during the nighttime hours 11pm-8am.

4.9 Purpose Provided Openings (PPOs) for natural ventilation

Window design for bedrooms and kitchens has been incorporated into the model as per architect inform (Refer to Appendix B).

All window openings are modelled with a minimum clear opening area equivalent to 3% of the floor area.

The external PPOs in the model are identified in the following images. Red coloured entities remain closed. All other colours are openable. Minimum free areas (Equivalent areas) are as stated above. All opening window casements provide 'Minimum Free Area' requirements as follows:

Opening Type	
	XTRN0000 (Sealed)
	XTRN0001 (UoM Kitchen N/S/E/W openable windows (clear opening area equivalent to 3% of floor area))
	XTRN0003 (UoM Bedroom S/W openable windows 8am-11pm (clear opening area equivalent to 3% of floor area))
	XTRN0005 (UoM Kitchen LD N/S/E/W openable windows (clear opening area equivalent to 3% of floor area))
	XTRN0032 (UoM Bedroom N/E openable windows (clear opening area equivalent to 3% of floor area))

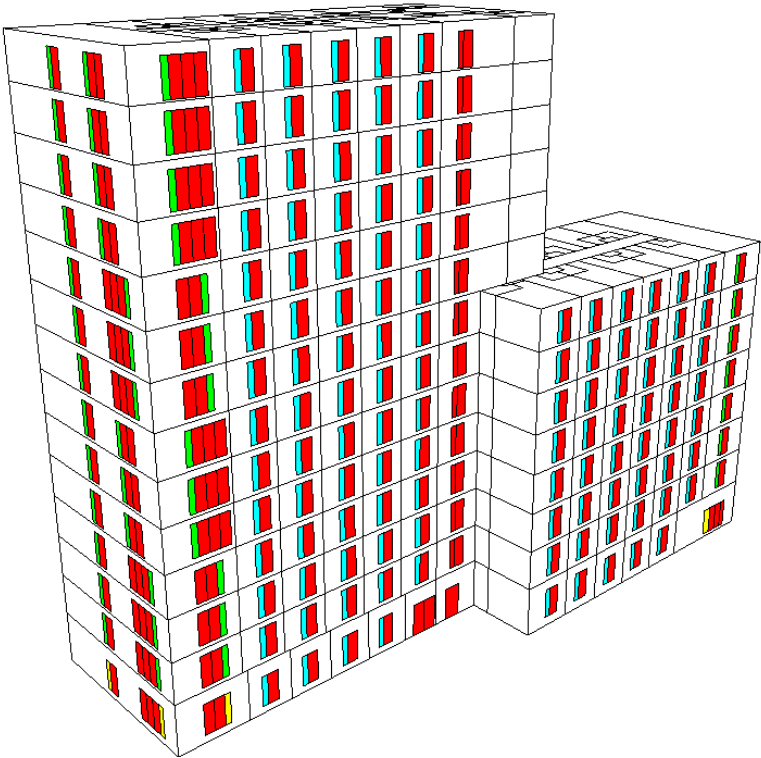


Figure 5: PPO View 1 (South-East Elevation) Typical S Block

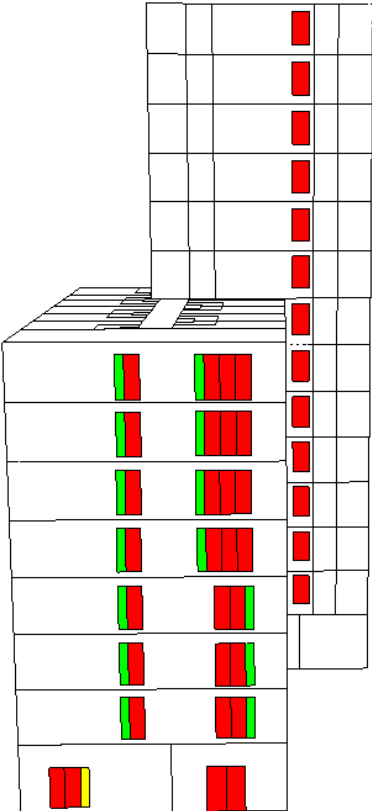


Figure 6: PPO View 2 (North Elevation) Typical S Block

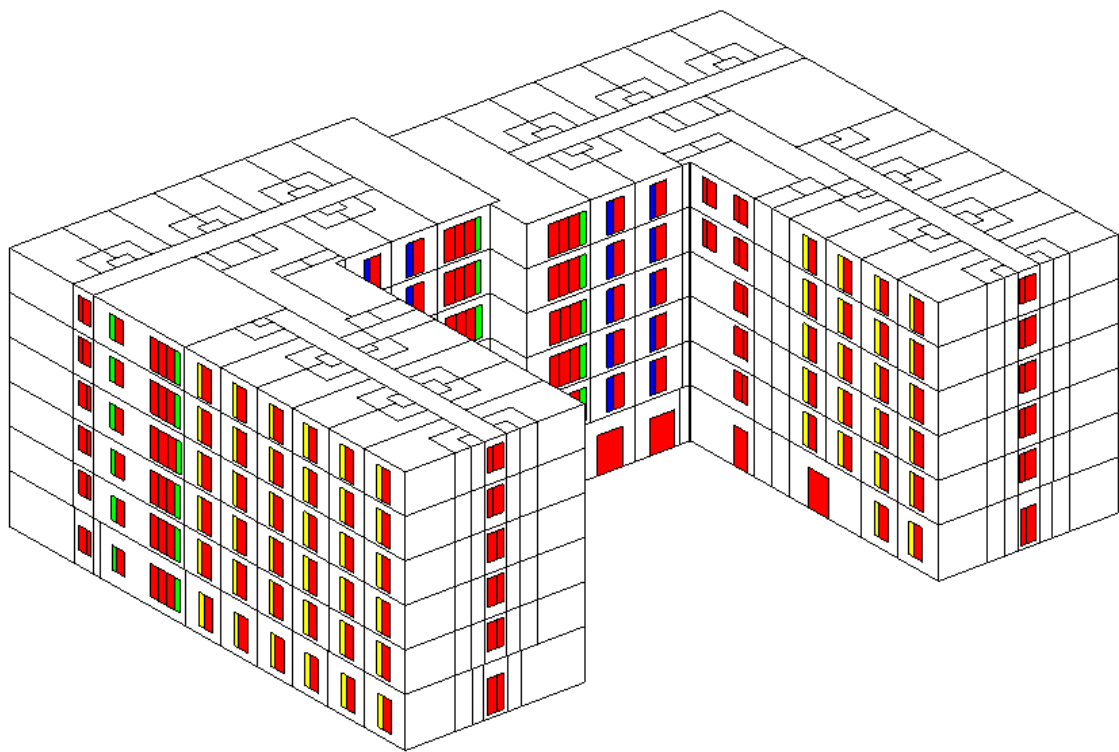


Figure 7: PPO View 3 (South-East Perspective) Typical L Block

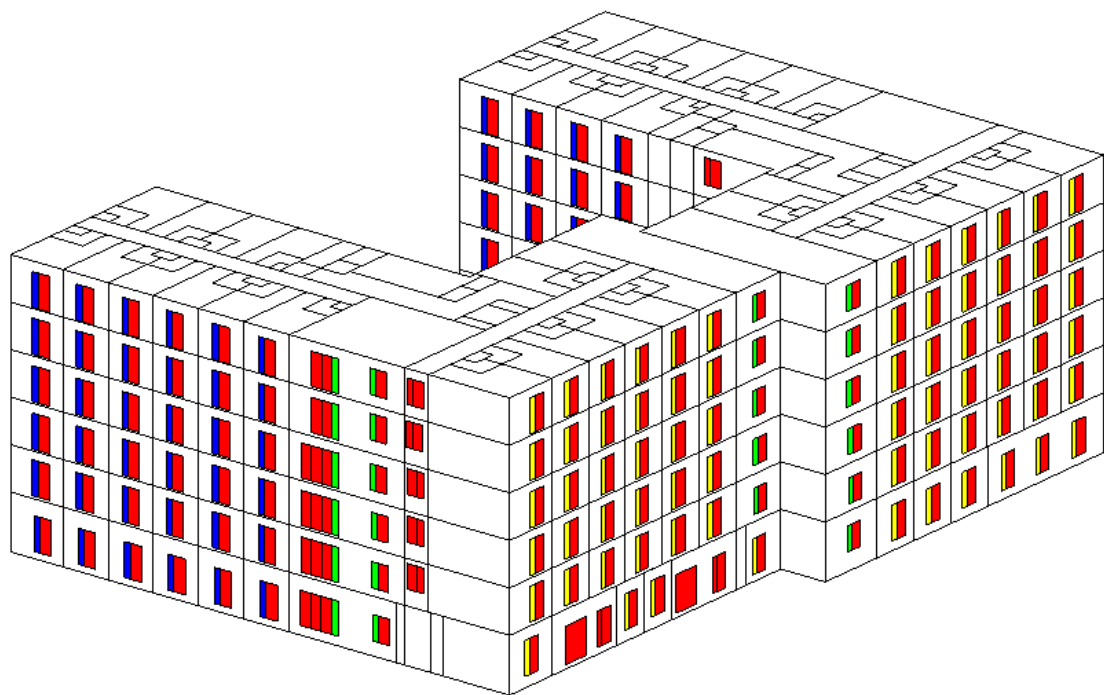


Figure 8: PPO View 3 (South-West Perspective) Typical L Block

4.10 Room data and load profiling

For dynamic modelling, time variation profiles are applied to represent the effects of the coming and going of people and the use of lights and equipment.

Room data and load profiles are detailed in Appendix A. The building remains empty outside of occupied hours and during the weekends, with all lighting and equipment 'off'.

Key points:

- Occupancy loads are applied at 75 W/person sensible and 55 W/person latent for occupied spaces.
- Lighting loads are applied at 2 W/m² and are based on TM59 recommendations and are taken to be proportional to the floor area and assumes that good daylighting is available.
- No allowances for daylight linking control (daylight dimming) have been made.
- TM 59 does not provide specific load profiling information for secondary spaces such as IT hubs, plant rooms, and stores. Instead, engineering judgment has been employed to assign appropriate dynamic loading profiles tailored to each activity zone within the building.
- Heat gains from domestic hot water pipe work which runs through corridors has been included within this assessment, with a hot water flow with a heat loss value of 9.94 W/m based on outside pipe diameter of 54 mm and a return heat loss value of 8.46 W/m based on an outside pipe diameter of 35 mm.

Appendix A denotes the profiling of various elements. The figure shown below is taken from the TM59 guidance document and forms the basis of the profiling analysis applied to the bedrooms and kitchens:

Number of people	Description	Peak load (W)		Period																											
		Sensible	Latent	Hour-ending																											
				00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24				
				1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00				
1	Single bedroom occupancy	75	55	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7				
2	Double bedroom occupancy	150	110	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.7			
2	Studio occupancy	150	110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
1	1-bed: living/kitchen occupancy	75	55	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0			
1	1-bed: living occupancy	75	55	0	0	0	0	0	0	0	0	0	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0		
1	1-bed: kitchen occupancy	75	55	0	0	0	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0	0		
2	2-bed: living/kitchen occupancy	150	110	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0		
2	2-bed: living occupancy	150	110	0	0	0	0	0	0	0	0	0	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0	
2	2-bed: kitchen occupancy	150	110	0	0	0	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0	0	
3	3-bed: living/kitchen occupancy	225	165	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0		
3	3-bed: living occupancy	225	165	0	0	0	0	0	0	0	0	0	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0	
3	3-bed: kitchen occupancy	225	165	0	0	0	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0	0	
	Single bedroom equipment	80		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.13			
	Double bedroom equipment	80		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.13			
	Studio equipment	450		0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24		
	Living/kitchen equipment	450		0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24		
	Living equipment	150		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4		
	Kitchen equipment	300		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17		
	Lighting profile	2 (W/m ²)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

5 RESULTS

Based on the design detailed within this report the results demonstrate compliance with the TM59 requirements. The results presented are based on:

- Category II standard for occupied bedrooms.
- Category II standard for occupied kitchens.

5.1 2020 High Emissions

Green text indicates a pass whereas RED text identifies a fail.

5.1.1 Bedrooms (Typical S Block)

5.1.1.1 East-facing bedrooms

East Façade (Bedrooms)	Criterion 1 (Hours of exceedance)		Night-time Overheating (TM59 section 4.2 (b) for homes predominantly naturally ventilated)		Compliant?
	% Hrs $T_{op} - T_{max} \geq 1K$	Max % Hrs	% Hrs $T_{op} > 26^{\circ}C$	Max Hrs	
L0 372 Standard Bedroom	0	3	8.5	32	✓
L0 373 Standard Bedroom	0	3	10.5	32	✓
L0 617 Standard Bedroom	0	3	8.5	32	✓
L0 620 Standard Bedroom	0	3	11	32	✓
L0 827 Standard Bedroom	0	3	7.5	32	✓
L0 828 Standard Bedroom	0	3	9	32	✓
L0 829 Standard Bedroom	0	3	9	32	✓
L0 830 Standard Bedroom	0	3	9	32	✓
L0 831 Standard Bedroom	0	3	9.5	32	✓
L1 647 Standard Bedroom	0	3	8	32	✓
L1 650 Standard Bedroom	0	3	11	32	✓
L1 661 Standard Bedroom	0	3	9	32	✓
L1 657 Standard Bedroom	0	3	9	32	✓
L1 658 Standard Bedroom	0	3	9	32	✓
L1 660 Standard Bedroom	0	3	9	32	✓
L1 672 Bedroom	0	3	13.5	32	✓
L1 673 Bedroom	0	3	9.5	32	✓
L1 674 Bedroom	0	3	8.5	32	✓
L1 675 Bedroom	0	3	8.5	32	✓
L1 676 Bedroom	0	3	10.5	32	✓
L2 683 Standard Bedroom	0	3	7.5	32	✓
L2 686 Standard Bedroom	0	3	9.5	32	✓
L2 693 Standard Bedroom	0	3	8.5	32	✓
L2 694 Standard Bedroom	0	3	8.5	32	✓
L2 696 Standard Bedroom	0	3	8.5	32	✓
L2 697 Standard Bedroom	0	3	8.5	32	✓
L2 709 Bedroom	0	3	10.5	32	✓
L2 710 Bedroom	0	3	9	32	✓

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L2 711 Bedroom	0	3	8.5	32	✓
L2 712 Bedroom	0	3	11.5	32	✓
L2 712 Bedroom	0	3	8.5	32	✓
L3 738 Standard Bedroom	0	3	7.5	32	✓
L3 741 Standard Bedroom	0	3	9.5	32	✓
L3 748 Standard Bedroom	0	3	8	32	✓
L3 749 Standard Bedroom	0	3	8.5	32	✓
L3 751 Standard Bedroom	0	3	8.5	32	✓
L3 752 Standard Bedroom	0	3	8.5	32	✓
L3 763 Bedroom	0	3	9.5	32	✓
L3 764 Bedroom	0	3	8.5	32	✓
L3 765 Bedroom	0	3	8	32	✓
L3 766 Bedroom	0	3	8.5	32	✓
L3 767 Bedroom	0	3	10	32	✓
L4 181 Standard Bedroom	0	3	7.5	32	✓
L4 184 Standard Bedroom	0	3	9.5	32	✓
L4 191 Standard Bedroom	0	3	8	32	✓
L4 192 Standard Bedroom	0	3	8	32	✓
L4 194 Standard Bedroom	0	3	8	32	✓
L4 195 Standard Bedroom	0	3	8.5	32	✓
L4 198 Standard Bedroom	0	3	9.5	32	✓
L4 201 Standard Bedroom	0	3	7.5	32	✓
L4 202 Standard Bedroom	0	3	8.5	32	✓
L4 204 Standard Bedroom	0	3	10	32	✓
L4 205 Standard Bedroom	0	3	8	32	✓
L5 225 Standard Bedroom	0	3	9.5	32	✓
L5 234 Standard Bedroom	0	3	7	32	✓
L5 244 Standard Bedroom	0	3	8	32	✓
L5 245 Standard Bedroom	0	3	7.5	32	✓
L5 247 Standard Bedroom	0	3	7.5	32	✓
L5 248 Standard Bedroom	0	3	8	32	✓
L5 251 Standard Bedroom	0	3	9.5	32	✓
L5 254 Standard Bedroom	0	3	7.5	32	✓
L5 255 Standard Bedroom	0	3	8	32	✓
L5 257 Standard Bedroom	0	3	9.5	32	✓
L5 258 Standard Bedroom	0	3	7.5	32	✓
L6 278 Standard Bedroom	0	3	9	32	✓
L6 287 Standard Bedroom	0	3	6.5	32	✓
L6 297 Standard Bedroom	0	3	7.5	32	✓
L6 298 Standard Bedroom	0	3	7.5	32	✓
L6 300 Standard Bedroom	0	3	7.5	32	✓
L6 301 Standard Bedroom	0	3	8	32	✓
L6 304 Standard Bedroom	0	3	9	32	✓
L6 307 Standard Bedroom	0	3	7.5	32	✓
L6 308 Standard Bedroom	0	3	8	32	✓
L6 310 Standard Bedroom	0	3	9.5	32	✓
L6 311 Standard Bedroom	0	3	7.5	32	✓

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L7 331 Standard Bedroom	0	3	7	32	✓
L7 340 Standard Bedroom	0	3	5.5	32	✓
L7 350 Standard Bedroom	0	3	6	32	✓
L7 351 Standard Bedroom	0	3	6	32	✓
L7 353 Standard Bedroom	0	3	6	32	✓
L7 354 Standard Bedroom	0	3	6	32	✓
L7 357 Standard Bedroom	0	3	9	32	✓
L7 360 Standard Bedroom	0	3	7.5	32	✓
L7 361 Standard Bedroom	0	3	8	32	✓
L7 363 Standard Bedroom	0	3	9.5	32	✓
L7 364 Standard Bedroom	0	3	7.5	32	✓
L8 438 Standard Bedroom	0	3	9.5	32	✓
L8 439 Standard Bedroom	0	3	9.5	32	✓
L8 447 Standard Bedroom	0	3	7.5	32	✓
L8 448 Standard Bedroom	0	3	8	32	✓
L8 451 Standard Bedroom	0	3	7.5	32	✓
L9 472 Standard Bedroom	0	3	9.5	32	✓
L9 473 Standard Bedroom	0	3	9.5	32	✓
L9 481 Standard Bedroom	0	3	7.5	32	✓
L9 482 Standard Bedroom	0	3	8	32	✓
L9 485 Standard Bedroom	0	3	7.5	32	✓
L10 506 Standard Bedroom	0	3	9.5	32	✓
L10 507 Standard Bedroom	0	3	9.5	32	✓
L10 515 Standard Bedroom	0	3	7.5	32	✓
L10 516 Standard Bedroom	0	3	8	32	✓
L10 519 Standard Bedroom	0	3	7.5	32	✓
L11 540 Standard Bedroom	0	3	9.5	32	✓
L11 541 Standard Bedroom	0	3	9.5	32	✓
L11 549 Standard Bedroom	0	3	7.5	32	✓
L11 550 Standard Bedroom	0	3	8	32	✓
L11 553 Standard Bedroom	0	3	7.5	32	✓
L12 574 Standard Bedroom	0	3	9.5	32	✓
L12 583 Standard Bedroom	0	3	8	32	✓
L12 584 Standard Bedroom	0	3	8.5	32	✓
L12 586 Standard Bedroom	0	3	9.5	32	✓
L12 587 Standard Bedroom	0	3	8	32	✓
L13 753 Standard Bedroom	0	3	8.5	32	✓
L13 755 Standard Bedroom	0	3	7	32	✓
L13 756 Standard Bedroom	0	3	6.5	32	✓
L13 758 Standard Bedroom	0	3	7	32	✓
L13 759 Standard Bedroom	0	3	8.5	32	✓

5.1.1.2 West-facing bedrooms

West Façade (Bedrooms)	Criterion 1 (Hours of exceedance)		Night-time Overheating (TM59 section 4.3 for homes predominantly mechanically ventilated)		Compliant?
	% Hrs $T_{op} - T_{max} \geq 1K$	Max % Hrs	% Hrs $T_{op} > 26^{\circ}C$	Max Hrs	
L0 610 M2 Acc Bedroom	0.1	3	94	110	✓
L0 611 Standard Bedroom	0.3	3	84.5	110	✓
L0 614 Standard Bedroom	0.3	3	89.5	110	✓
L1 641 M2 Acc Bedroom	0.1	3	102	110	✓
L1 654 Standard Bedroom	0.2	3	88.5	110	✓
L1 652 Standard Bedroom	0.2	3	90	110	✓
L1 651 Standard Bedroom	0.4	3	101.5	110	✓
L1 655 Standard Bedroom	0.2	3	97.5	110	✓
L1 664 Bedroom	0.5	3	98.5	110	✓
L1 668 Bedroom	0.5	3	98.5	110	✓
L1 669 Bedroom	0.4	3	91	110	✓
L2 578 M2 Acc Bedroom	0.1	3	101.5	110	✓
L2 687 Standard Bedroom	0.3	3	90.5	110	✓
L2 688 Standard Bedroom	0.3	3	91	110	✓
L2 690 Standard Bedroom	0.3	3	89.5	110	✓
L2 691 Standard Bedroom	0.2	3	92.5	110	✓
L2 700 Bedroom	0.5	3	99.5	110	✓
L2 704 Bedroom	0.5	3	99.5	110	✓
L2 705 Bedroom	0.3	3	92	110	✓
L3 732 M2 Acc Bedroom	0.1	3	97	110	✓
L3 742 Standard Bedroom	0.3	3	88	110	✓
L3 743 Standard Bedroom	0.3	3	89.5	110	✓
L3 745 Standard Bedroom	0.2	3	87.5	110	✓
L3 746 Standard Bedroom	0.2	3	82.5	110	✓
L3 755 Bedroom	0.7	3	98.5	110	✓
L3 759 Bedroom	0.5	3	98.5	110	✓
L3 760 Bedroom	0.3	3	90.5	110	✓
L4 185 Standard Bedroom	0.3	3	83	110	✓
L4 186 Standard Bedroom	0.3	3	88.5	110	✓
L4 188 Standard Bedroom	0.2	3	86	110	✓
L4 189 Standard Bedroom	0.1	3	73.5	110	✓
L4 199 Standard Bedroom	0.6	3	90.5	110	✓
L4 207 Standard Bedroom	0.4	3	90.5	110	✓
L4 208 Standard Bedroom	0.4	3	85.5	110	✓
L4 210 Standard Bedroom	0.4	3	97	110	✓
L4 211 Standard Bedroom	0.4	3	91	110	✓
L5 238 Standard Bedroom	0.2	3	80.5	110	✓
L5 239 Standard Bedroom	0.3	3	85.5	110	✓
L5 241 Standard Bedroom	0.2	3	82.5	110	✓
L5 242 Standard Bedroom	0.1	3	62.5	110	✓

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L5 252 Standard Bedroom	0.5	3	90.5	110	✓
L5 260 Standard Bedroom	0.3	3	90	110	✓
L5 261 Standard Bedroom	0.4	3	85.5	110	✓
L5 263 Standard Bedroom	0.4	3	96	110	✓
L5 264 Standard Bedroom	0.3	3	90.5	110	✓
L6 291 Standard Bedroom	0.2	3	76.5	110	✓
L6 292 Standard Bedroom	0.2	3	82.5	110	✓
L6 294 Standard Bedroom	0.2	3	78	110	✓
L6 295 Standard Bedroom	0	3	55	110	✓
L6 305 Standard Bedroom	0.6	3	107.5	110	✓
L6 313 Standard Bedroom	0.3	3	89.5	110	✓
L6 314 Standard Bedroom	0.3	3	84	110	✓
L6 316 Standard Bedroom	0.4	3	95	110	✓
L6 317 Standard Bedroom	0.3	3	90	110	✓
L7 344 Standard Bedroom	0.1	3	59	110	✓
L7 345 Standard Bedroom	0.1	3	70	110	✓
L7 347 Standard Bedroom	0.1	3	60.5	110	✓
L7 348 Standard Bedroom	0	3	36	110	✓
L7 358 Standard Bedroom	0.5	3	105.5	110	✓
L7 366 Standard Bedroom	0.3	3	88	110	✓
L7 367 Standard Bedroom	0.3	3	83	110	✓
L7 369 Standard Bedroom	0.4	3	94.5	110	✓
L7 370 Standard Bedroom	0.3	3	89	110	✓
L8 445 Standard Bedroom	0.5	3	103.5	110	✓
L8 453 Standard Bedroom	0.3	3	88	110	✓
L8 454 Standard Bedroom	0.3	3	82	110	✓
L8 456 Standard Bedroom	0.3	3	93.5	110	✓
L8 457 Standard Bedroom	0.3	3	88.5	110	✓
L9 479 Standard Bedroom	0.4	3	103	110	✓
L9 487 Standard Bedroom	0.3	3	88	110	✓
L9 488 Standard Bedroom	0.3	3	82	110	✓
L9 490 Standard Bedroom	0.3	3	93	110	✓
L9 491 Standard Bedroom	0.3	3	88.5	110	✓
L10 513 Standard Bedroom	0.4	3	102	110	✓
L10 521 Standard Bedroom	0.3	3	86.5	110	✓
L10 522 Standard Bedroom	0.3	3	81.5	110	✓
L10 524 Standard Bedroom	0.3	3	93	110	✓
L10 525 Standard Bedroom	0.3	3	88.5	110	✓
L11 547 Standard Bedroom	0.4	3	102.5	110	✓
L11 555 Standard Bedroom	0.3	3	87.5	110	✓
L11 556 Standard Bedroom	0.3	3	81.5	110	✓
L11 558 Standard Bedroom	0.3	3	93.5	110	✓
L11 559 Standard Bedroom	0.3	3	88.5	110	✓
L12 581 Standard Bedroom	0.4	3	103	110	✓
L12 589 Standard Bedroom	0.3	3	88	110	✓
L12 590 Standard Bedroom	0.3	3	81	110	✓
L12 592 Standard Bedroom	0.3	3	94	110	✓

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L12 593 Standard Bedroom	0.3	3	89.5	110	✓
L13 744 Standard Bedroom	0.3	3	83.5	110	✓
L13 745 Standard Bedroom	0.3	3	75	110	✓
L13 747 Standard Bedroom	0.3	3	88	110	✓
L13 748 Standard Bedroom	0.3	3	84.5	110	✓
L13 750 Standard Bedroom	0.3	3	97	110	✓

5.1.2 Kitchens (Typical S Block)

Kitchens	Criterion 1 (Hours of exceedance)		Compliant?
	% Hrs $T_{op} - T_{max} \geq 1K$	Max % Hrs	
L0 606 Standard Kitchen Living and Dining	0.1	3	✓
L0 832 Standard Kitchen Living and Dining	0	3	✓
L1 646 Standard Kitchen Living and Dining	1	3	✓
L1 678 Standard Kitchen Living and Dining	0.7	3	✓
L2 682 Standard Kitchen Living and Dining	1	3	✓
L2 714 Standard Kitchen Living and Dining	0.9	3	✓
L3 737 Standard Kitchen Living and Dining	1	3	✓
L3 769 Standard Kitchen Living and Dining	0.9	3	✓
L4 175 Standard Kitchen Living and Dining	0.8	3	✓
L4 180 Standard Kitchen Living and Dining	0.7	3	✓
L5 227 Standard Kitchen Living and Dining	0.8	3	✓
L5 648 Standard Kitchen Living and Dining	0.7	3	✓
L6 28 Standard Kitchen Living and Dining	0.6	3	✓
L6 280 Standard Kitchen Living and Dining	0.8	3	✓
L7 29 Standard Kitchen Living and Dining	0.3	3	✓
L7 333 Standard Kitchen Living and Dining	0.8	3	✓
L8 440 Standard Kitchen Living and Dining	0.8	3	✓
L9 474 Standard Kitchen Living and Dining	0.7	3	✓
L10 508 Standard Kitchen Living and Dining	0.7	3	✓
L11 542 Standard Kitchen Living and Dining	0.7	3	✓
L12 576 Standard Kitchen Living and Dining	0.7	3	✓
L13 743 Standard Kitchen Living and Dining	0.4	3	✓

5.1.3 Circulation/Corridors (Typical S Block)

The following spaces have domestic hot water pipework gains running through them. Whilst there is no mandatory target to meet, as per TM59, if an **operative temperature of 28 °C is exceeded for more than 3% of the total annual hours**, then this should be identified as a significant risk within the assessment.

Corridors			Compliant?
	Hrs T _{op} >28°C	Max Hrs	
L0 615 Circulation	0	110	✓
L0 817 Circulation	253.5	110	✗
L0 825 Circulation	0	110	✓
L13 752 Circulation	0	110	✓
L13 766 Circulation	135	110	✗
L13 769 Circulation	274.5	110	✗

5.1.4 Bedrooms (Typical L Block)

5.1.4.1 East-facing bedrooms

East Façade (Bedrooms)	Criterion 1 (Hours of exceedance)		Night-time Overheating (TM59 section 4.2 (b) for homes predominantly naturally ventilated)		Compliant?
	% Hrs $T_{op} - T_{max} \geq 1K$	Max % Hrs	% Hrs $T_{op} > 26^{\circ}C$	Max Hrs	
L1 074 Premium Bedroom	0	3	5.5	32	✓
L1 073 Premium Bedroom	0	3	6.5	32	✓
L1 721 Premium Bedroom	0	3	9	32	✓
L1 722 Premium Bedroom	0	3	12.5	32	✓
L2 940 Premium Bedroom	0	3	5.5	32	✓
L2 939 Premium Bedroom	0	3	8	32	✓
L2 982 Premium Bedroom	0	3	9.5	32	✓
L2 983 Premium Bedroom	0	3	9.5	32	✓
L3 503 Premium Bedroom	0	3	7.5	32	✓
L3 502 Premium Bedroom	0	3	9.5	32	✓
L3 813 Premium Bedroom	0	3	9.5	32	✓
L3 814 Premium Bedroom	0	3	9.5	32	✓
L4 566 Premium Bedroom	0	3	9.5	32	✓
L4 565 Premium Bedroom	0	3	9.5	32	✓
L4 859 Premium Bedroom	0	3	9.5	32	✓
L4 860 Premium Bedroom	0	3	10.5	32	✓
L5 Standard Bedroom	0	3	10.5	32	✓
L5 Standard Bedroom	0	3	9	32	✓
L5 Standard Bedroom	0	3	9	32	✓
L5 Standard Bedroom	0	3	12	32	✓

5.1.4.2 West-facing bedrooms

West Façade (Bedrooms)	Criterion 1 (Hours of exceedance)		Night-time Overheating (TM59 section 4.3 for homes predominantly mechanically ventilated)		Compliant?
	% Hrs $T_{op} - T_{max} \geq 1K$	Max % Hrs	% Hrs $T_{op} > 26^{\circ}C$	Max Hrs	
00 1092 M3 Acc Bedroom	0	3	92	110	✓
00 1021 Premium Bedroom	0.1	3	85	110	✓
00 925 Res Life Bedroom	0	3	65.5	110	✓
00 929 Res Life Bedroom	0.4	3	98	110	✓
00 930 Res Life Bedroom	0.5	3	101	110	✓
L1 095 Premium Bedroom	0.1	3	88.5	110	✓
L1 355 Premium Bedroom	0.2	3	91.5	110	✓
L1 067 Premium Bedroom	0.2	3	92.5	110	✓
L1 357 Premium Bedroom	0.3	3	94.5	110	✓
L1 069 Premium Bedroom	0.3	3	91.5	110	✓
L1 070 Premium Bedroom	0.1	3	73	110	✓
L1 718 Premium Bedroom	0	3	83	110	✓
L1 719 Premium Bedroom	0.2	3	97	110	✓
L1 715 Premium Bedroom	0.3	3	98	110	✓
L1 716 Premium Bedroom	0.3	3	99.5	110	✓
L1 712 Premium Bedroom	0.3	3	97.5	110	✓
L1 713 Premium Bedroom	0.2	3	84.5	110	✓
00 931 Res Life Bedroom	0	3	23	110	✓
00 1019 Premium Bedroom	0.1	3	83	110	✓
00 1018 Premium Bedroom	0	3	56.5	110	✓
L2 949 Premium Bedroom	0.1	3	88.5	110	✓
L2 066 Premium Bedroom	0.3	3	95.5	110	✓
L2 936 Premium Bedroom	0.3	3	96.5	110	✓
L2 068 Premium Bedroom	0.3	3	96.5	110	✓
L2 997 Premium Bedroom	0.3	3	94.5	110	✓
L2 938 Premium Bedroom	0.2	3	77	110	✓
L2 975 Premium Bedroom	0.1	3	83.5	110	✓
L2 977 Premium Bedroom	0.3	3	95	110	✓
L2 968 Premium Bedroom	0.3	3	96	110	✓
L2 969 Premium Bedroom	0.3	3	97	110	✓
L2 965 Premium Bedroom	0.3	3	94.5	110	✓
L2 966 Premium Bedroom	0.2	3	77	110	✓
L3 523 Standard Bedroom	0.1	3	89	110	✓
L3 447 Premium Bedroom	0.3	3	96	110	✓
L3 488 Premium Bedroom	0.3	3	97	110	✓
L3 452 Premium Bedroom	0.3	3	97.5	110	✓
L3 495 Premium Bedroom	0.3	3	95	110	✓
L3 500 Premium Bedroom	0.2	3	79	110	✓
L3 810 Premium Bedroom	0.1	3	83.5	110	✓
L3 811 Premium Bedroom	0.3	3	94	110	✓

REPORT

L3 807 Premium Bedroom	0.3	3	96	110	✓
L3 808 Premium Bedroom	0.3	3	95.5	110	✓
L3 804 Premium Bedroom	0.3	3	93.5	110	✓
L3 805 Premium Bedroom	0.2	3	76	110	✓
L4 575 Premium Bedroom	0.1	3	89	110	✓
L4 546 Premium Bedroom	0.3	3	97.5	110	✓
L4 562 Premium Bedroom	0.3	3	98.5	110	✓
L4 547 Premium Bedroom	0.3	3	98.5	110	✓
L4 Standard Bedroom	0.3	3	97	110	✓
L4 Standard Bedroom	0.2	3	81	110	✓
L4 856 Premium Bedroom	0.1	3	84	110	✓
L4 857 Premium Bedroom	0.3	3	95	110	✓
L4 853 Premium Bedroom	0.3	3	96	110	✓
L4 854 Premium Bedroom	0.3	3	96	110	✓
L4 850 Premium Bedroom	0.3	3	95	110	✓
L4 851 Premium Bedroom	0.2	3	76.5	110	✓
L5 Standard Bedroom	0.1	3	90	110	✓
L5 Standard Bedroom	0.2	3	91	110	✓
L5 Standard Bedroom	0.3	3	92	110	✓
L5 Standard Bedroom	0.3	3	92	110	✓
L5 Standard Bedroom	0.3	3	90.5	110	✓
L5 Standard Bedroom	0.1	3	74	110	✓
L5 Standard Bedroom	0	3	81	110	✓
L5 Standard Bedroom	0.2	3	88	110	✓
L5 Standard Bedroom	0.2	3	89.5	110	✓
L5 Standard Bedroom	0.2	3	89.5	110	✓
L5 Standard Bedroom	0.2	3	88.5	110	✓
L5 Standard Bedroom	0.1	3	70.5	110	✓

5.1.4.3 South-facing bedrooms

South Façade (Bedrooms)	Criterion 1 (Hours of exceedance)		Night-time Overheating (TM59 section 4.3 for homes predominantly mechanically ventilated)		Overall Compliant?
	% Hrs $T_{op} - T_{max} \geq 1K$	Max % Hrs	% Hrs $T_{op} > 26^{\circ}C$	Max Hrs	
00 1092 M3 Acc Bedroom	0	3	92	110	✓
00 1021 Premium Bedroom	0.1	3	85	110	✓
00 925 Res Life Bedroom	0	3	65.5	110	✓
00 929 Res Life Bedroom	0.4	3	98	110	✓
00 930 Res Life Bedroom	0.5	3	101	110	✓
L1 095 Premium Bedroom	0.1	3	88.5	110	✓
L1 355 Premium Bedroom	0.2	3	91.5	110	✓
L1 067 Premium Bedroom	0.2	3	92.5	110	✓
L1 357 Premium Bedroom	0.3	3	94.5	110	✓
L1 069 Premium Bedroom	0.3	3	91.5	110	✓
L1 070 Premium Bedroom	0.1	3	73	110	✓
L1 718 Premium Bedroom	0	3	83	110	✓
L1 719 Premium Bedroom	0.2	3	97	110	✓
L1 715 Premium Bedroom	0.3	3	98	110	✓
L1 716 Premium Bedroom	0.3	3	99.5	110	✓
L1 712 Premium Bedroom	0.3	3	97.5	110	✓
L1 713 Premium Bedroom	0.2	3	84.5	110	✓
00 931 Res Life Bedroom	0	3	23	110	✓
00 1019 Premium Bedroom	0.1	3	83	110	✓
00 1018 Premium Bedroom	0	3	56.5	110	✓
L2 949 Premium Bedroom	0.1	3	88.5	110	✓
L2 066 Premium Bedroom	0.3	3	95.5	110	✓
L2 936 Premium Bedroom	0.3	3	96.5	110	✓
L2 068 Premium Bedroom	0.3	3	96.5	110	✓
L2 997 Premium Bedroom	0.3	3	94.5	110	✓
L2 938 Premium Bedroom	0.2	3	77	110	✓
L2 975 Premium Bedroom	0.1	3	83.5	110	✓
L2 977 Premium Bedroom	0.3	3	95	110	✓
L2 968 Premium Bedroom	0.3	3	96	110	✓
L2 969 Premium Bedroom	0.3	3	97	110	✓
L2 965 Premium Bedroom	0.3	3	94.5	110	✓
L2 966 Premium Bedroom	0.2	3	77	110	✓
L3 523 Standard Bedroom	0.1	3	89	110	✓
L3 447 Premium Bedroom	0.3	3	96	110	✓
L3 488 Premium Bedroom	0.3	3	97	110	✓
L3 452 Premium Bedroom	0.3	3	97.5	110	✓
L3 495 Premium Bedroom	0.3	3	95	110	✓
L3 500 Premium Bedroom	0.2	3	79	110	✓
L3 810 Premium Bedroom	0.1	3	83.5	110	✓
L3 811 Premium Bedroom	0.3	3	94	110	✓

REPORT

L3 807 Premium Bedroom	0.3	3	96	110	✓
L3 808 Premium Bedroom	0.3	3	95.5	110	✓
L3 804 Premium Bedroom	0.3	3	93.5	110	✓
L3 805 Premium Bedroom	0.2	3	76	110	✓
L4 575 Premium Bedroom	0.1	3	89	110	✓
L4 546 Premium Bedroom	0.3	3	97.5	110	✓
L4 562 Premium Bedroom	0.3	3	98.5	110	✓
L4 547 Premium Bedroom	0.3	3	98.5	110	✓
L4 Standard Bedroom	0.3	3	97	110	✓
L4 Standard Bedroom	0.2	3	81	110	✓
L4 856 Premium Bedroom	0.1	3	84	110	✓
L4 857 Premium Bedroom	0.3	3	95	110	✓
L4 853 Premium Bedroom	0.3	3	96	110	✓
L4 854 Premium Bedroom	0.3	3	96	110	✓
L4 850 Premium Bedroom	0.3	3	95	110	✓
L4 851 Premium Bedroom	0.2	3	76.5	110	✓
L5 Standard Bedroom	0.1	3	90	110	✓
L5 Standard Bedroom	0.2	3	91	110	✓
L5 Standard Bedroom	0.3	3	92	110	✓
L5 Standard Bedroom	0.3	3	92	110	✓
L5 Standard Bedroom	0.3	3	90.5	110	✓
L5 Standard Bedroom	0.1	3	74	110	✓
L5 Standard Bedroom	0	3	81	110	✓
L5 Standard Bedroom	0.2	3	88	110	✓
L5 Standard Bedroom	0.2	3	89.5	110	✓
L5 Standard Bedroom	0.2	3	89.5	110	✓
L5 Standard Bedroom	0.2	3	88.5	110	✓
L5 Standard Bedroom	0.1	3	70.5	110	✓

5.1.4.4 North-facing bedrooms

North Façade (Bedrooms)	Criterion 1 (Hours of exceedance)		Night-time Overheating (TM59 section 4.2 (b) for homes predominantly naturally ventilated)		Overall Compliant?
	% Hrs $T_{op} - T_{max} \geq 1K$	Max % Hrs	% Hrs $T_{op} > 26^{\circ}C$	Max Hrs	
00 1067 Res Life Bedroom	0	3	4	32	✓
00 1064 Res Life Bedroom	0	3	5.5	32	✓
00 1062 Res Life Bedroom	0	3	6.5	32	✓
00 1061 Res Life Bedroom	0	3	6.5	32	✓
00 1059 Res Life Bedroom	0	3	6.5	32	✓
00 1058 Res Life Bedroom	0	3	6.5	32	✓
L1 371 Standard Bedroom	0	3	5	32	✓
L1 370 Standard Bedroom	0	3	6.5	32	✓
L1 080 Standard Bedroom	0	3	10.5	32	✓
L1 368 Standard Bedroom	0	3	10.5	32	✓
L1 735 Standard Bedroom	0	3	5	32	✓
L1 724 Standard Bedroom	0	3	6.5	32	✓
L1 725 Standard Bedroom	0	3	6.5	32	✓
L1 730 Standard Bedroom	0	3	6.5	32	✓
L1 731 Standard Bedroom	0	3	6.5	32	✓
L1 740 Standard Bedroom	0	3	7.5	32	✓
L2 082 Standard Bedroom	0	3	5	32	✓
L2 081 Standard Bedroom	0	3	6	32	✓
L2 943 Standard Bedroom	0	3	6.5	32	✓
L2 079 Standard Bedroom	0	3	6	32	✓
L2 998 Standard Bedroom	0	3	5	32	✓
L2 987 Standard Bedroom	0	3	6.5	32	✓
L2 988 Standard Bedroom	0	3	6.5	32	✓
L2 993 Standard Bedroom	0	3	6.5	32	✓
L2 994 Standard Bedroom	0	3	6.5	32	✓
L2 1073 Standard Bedroom	0	3	7	32	✓
L3 465 Standard Bedroom	0	3	5	32	✓
L3 462 Standard Bedroom	0	3	6	32	✓
L3 509 Standard Bedroom	0	3	6.5	32	✓
L3 461 Standard Bedroom	0	3	5	32	✓
L3 827 Standard Bedroom	0	3	5	32	✓
L3 816 Standard Bedroom	0	3	6.5	32	✓
L3 817 Standard Bedroom	0	3	6.5	32	✓
L3 822 Standard Bedroom	0	3	6.5	32	✓
L3 823 Standard Bedroom	0	3	6.5	32	✓
L3 832 Standard Bedroom	0	3	7	32	✓
L4 554 Standard Bedroom	0	3	5	32	✓
L4 553 Standard Bedroom	0	3	6.5	32	✓
L4 569 Standard Bedroom	0	3	6.5	32	✓
L4 552 Standard Bedroom	0	3	6	32	✓

REPORT

L4 873 Standard Bedroom	0	3	5	32	✓
L4 862 Standard Bedroom	0	3	6.5	32	✓
L4 863 Standard Bedroom	0	3	6.5	32	✓
L4 868 Standard Bedroom	0	3	6.5	32	✓
L4 869 Standard Bedroom	0	3	6.5	32	✓
L4 878 Standard Bedroom	0	3	7.5	32	✓
L5 Standard Bedroom	0	3	4.5	32	✓
L5 Standard Bedroom	0	3	6.5	32	✓
L5 Standard Bedroom	0	3	6.5	32	✓
L5 Standard Bedroom	0	3	5.5	32	✓
L5 Standard Bedroom	0	3	5	32	✓
L5 Standard Bedroom	0	3	6.5	32	✓
L5 Standard Bedroom	0	3	6.5	32	✓
L5 Standard Bedroom	0	3	6.5	32	✓
L5 Standard Bedroom	0	3	6.5	32	✓
L5 Standard Bedroom	0	3	7	32	✓

5.1.5 Kitchens (Typical L Block)

Kitchens	Criterion 1 (Hours of exceedance)		Compliant?
	% Hrs $T_{op} - T_{max} \geq 1K$	Max % Hrs	
L1 092 Standard Kitchen Living and Dining	0	3	✓
L1 704 Standard Kitchen Living and Dining	0	3	✓
00 1013 Premium Kitchen Living and Dining	0	3	✓
00 981 Standard Kitchen Living and Dining	0	3	✓
00 1010 Standard Kitchen Living and Dining	0	3	✓
L1 702 Premium Kitchen Living and Dining	0	3	✓
L1 361 Premium Kitchen Living and Dining	0	3	✓
L2 948 Standard Kitchen Living and Dining	0	3	✓
L2 957 Standard Kitchen Living and Dining	0	3	✓
L2 955 Premium Kitchen Living and Dining	0	3	✓
L2 072 Premium Kitchen Living and Dining	0	3	✓
L3 521 Standard Kitchen Living and Dining	0	3	✓
L3 796 Standard Kitchen Living and Dining	0	3	✓
L3 794 Premium Kitchen Living and Dining	0	3	✓
L3 455 Premium Kitchen Living and Dining	0	3	✓
L4 574 Standard Kitchen Living and Dining	0	3	✓
L4 842 Standard Kitchen Living and Dining	0	3	✓
L4 840 Premium Kitchen Living and Dining	0	3	✓
L4 549 Premium Kitchen Living and Dining	0	3	✓
L5 Standard Kitchen Living and Dining	0	3	✓
L5 Standard Kitchen Living and Dining	0	3	✓
L5 Kitchen Living and Dining	0	3	✓
L5 Kitchen Living and Dining	0	3	✓

5.1.6 Circulation/Corridors (Typical L Block)

The following spaces have domestic hot water pipework gains running through them. Whilst there is no mandatory target to meet, as per TM59, if an **operative temperature of 28 °C is exceeded for more than 3% of the total annual hours**, then this should be identified as a significant risk within the assessment.

Corridors			Compliant?
	Hrs T _{op} >28°C	Max Hrs	
00 Entrance Circulation	0	110	✓
00 Circulation	0	110	✓
00 1000 Circulation	0	110	✓
00 1053 Circulation	1	110	✓
L5 Circulation	61	110	✓
L5 Circulation	156	110	✗
L5 Circulation	1	110	✓
L5 Circulation	288	110	✗
L5 Circulation	0	110	✓
L5 Circulation	0	110	✓

6 CONCLUSIONS

The assessments models and reports thermal comfort of a typical S and L block within the development on the University of Manchester Fallowfield Campus. The risk of overheating assessment has been assessed against a projected climate change scenario by utilising weather file in line with the TM59 methodology.

This report accounts for all relevant design features and includes for anticipated building usage. Should the final design and/or use of the building differ from that described, or should the actual weather be warmer than the accredited weather file, then overheating may occur beyond that predicted.

The following detail, as declared in this report, is important.

1. Weather data.
2. Room load data, including the detailed profiling.
3. Glazing g-values.
4. Mechanical ventilation flow rates and controls.
5. Peak Lopping Cooling is provided to all bedrooms.
6. Provision of PPOs for natural ventilation.
7. Equivalent opening areas for PPOs (clear opening area).
8. Mechanical ventilation is provided to ground floor and top floor corridors only.
9. DHW pipework heat gains have only been modelled for ground floor and top floor corridors.

6.1 Current weather file (2020 High Emissions)

This assessment includes an analysis of overheating in typical S and L student accommodation blocks. The proposed mitigation strategy demonstrates that the measures are sufficient to ensure compliance for all bedrooms and kitchens under the DSY1 2020 High 50th percentile weather conditions.

Communal corridors with domestic hot water pipework gains **do not meet** the targets with respect to the TM59 requirements, **however it is worth noting that there are no mandatory targets for communal corridors to meet. These have been reported solely for information purposes.**

6.2 Future weather file (2080 Low Emissions)

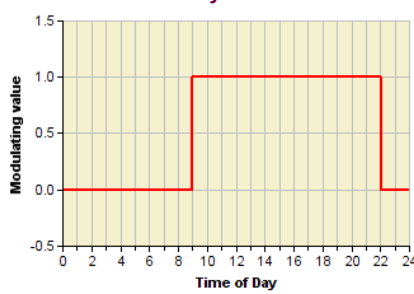
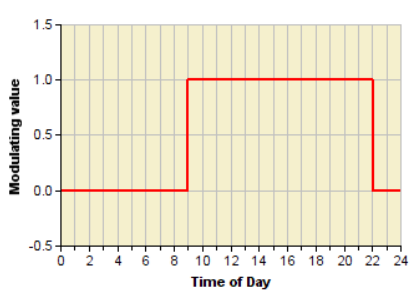
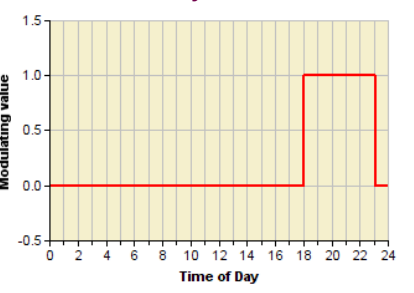
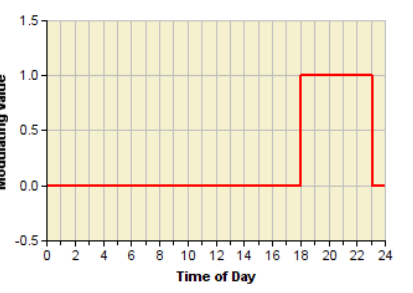
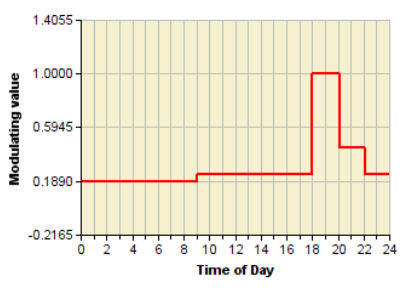
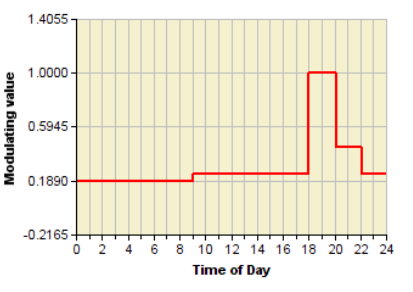
For the future weather file scenario with DSY 1 2080 Low 50th percentile, the overheating analysis demonstrates that bedrooms fail to achieve compliance with the overheating requirements. It should however be noted that **compliance with a future weather file is not required and is only reported for information purposes.**

A.1 Room Load Data

A.1.1.1 Bedrooms

People Gains			
Occupancy (People)	1.00	Weekday Profile Weekend Profile	
Max. Sensible Gain (W/person)	75.0		
Max. Latent Gain (W/person)	55.0		
Diversity Factor	1.00		
General Lighting Loads			
Power Consumption (W/m²)	2.00	Weekday Profile Weekend Profile	
Sensible Heat Gain (W/m²)	2.00		
Radiant Fraction	0.45		
Diversity Factor	1.00		
Miscellaneous Loads			
Power consumption (W)	80.0	Weekday Profile Weekend Profile	
Sensible Heat Gain (W)	80.0		
Latent Heat Gain (W)	0.00		
Diversity Factor	1.00		

A.1.1.2 Kitchens

People Gains		
Occupancy (People)	10.0	Weekday Profile  Weekend Profile 
Max. Sensible Gain (W/person)	75.0	
Max. Latent Gain (W/person)	55.0	
Diversity Factor	1.00	
General Lighting Loads		
Power Consumption (W/m²)	2.00	Weekday Profile  Weekend Profile 
Sensible Heat Gain (W/m²)	2.00	
Radiant Fraction	0.45	
Diversity Factor	1.00	
Miscellaneous Loads (Cooking)		
Power consumption (W)	450	Weekday Profile  Weekend Profile 
Sensible Heat Gain (W)	450	
Radiant Fraction	0.60	
Diversity Factor	1.00	

A.1.1.3 Circulation/Corridors



Appendix C
Site Plan

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NOTES

REVISIONS

REV.	DATE
P01	04/11/12
P02	15/11/24

AMENDMENT

First issue for comment
Refuse, MEP and Block Position update

KEYPLAN

PROJECT

UoM Residences DBFO

SCALE@A1

DATE

As indicated 15/11/24

ORIGINATOR

PA

CHECKED

MM

AUTHORISED

MM

DESCRIPTION

GF M&E markup Plan

CLIENT

Graham

STAGE

Stage 2

SR NO.

7172

SHEPPARD
ROBSON

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STATUS PURPOSE FOR ISSUE

S2 For Information

DRAWING NO.

UMRF-SRA-ZZ-00-DR-A-SK405

REV.

P02

Colour Legend

- Cold water plantroom
- Hot water plantroom
- Comms room
- HV switch room
- LV switch room
- Refuse
- Riser
- Plantroom (Unidentified)

Icon Legend

- Standard Bedroom
- Premium Bedroom
- Accessible Bedroom
- Kitchen
- Refuse

Neighbourhood 1

Block 01

Block 03

Block 04 (Satellite Hub 1)

Block 06

Block 3 to be moved 1m west

Block 05

Block 10 (Central Amenity Hub)

TBC

Neighbourhood 2

Block 07

Block 09

Block 11

Block 08 - Hub 02

(TBC)

Neighbourhood 4

Block 18

Neighbourhood 3

Block 12

Block 13

Neighbourhood 5

Block 24

Block 19

Block 21

Block 14

Block 15 (Satellite Hub 03)

Block 20 (Satellite Hub 04)

Block 22

Block 23

Block 26

Block 27

Block 28

Block 29

41.8m

Site Plan - Ground Floor M&E Plan

1 : 500

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