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North Stand Project Manchester

Sustainability Statement

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Revision P05

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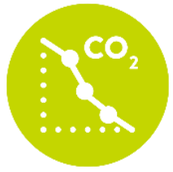
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1 Executive Summary

The Etihad Campus North Stand Project will promote sustainability and be at the forefront of energy efficiency and best practice low carbon design, aligning with the ambitious sustainability aspirations of the Club and Campus…

Climate & Nature Positive
The Campus is a beacon of Manchester's rapid transition to a zero carbon city, rich with wildlife and green infrastructure



Vibrant & Inclusive
The Campus works for everyone and provides unrivalled education, training and employment opportunities for local residents



Healthy & Active
The Campus is a world-class destination for sport, performance and leisure that inspires healthy lifestyles and workplaces



Open & Connected
The Campus is fully integrated into the fabric of the city, with excellent transport connections that support sustainable travel



…continuing the legacy of Manchester City Football Club sustainability journey…

Since 2004, Manchester City Football Club (Man City) have actively collaborated with the local community to measure its social, environmental, and economic impact. The Club has worked closely with city officials, residents, and businesses to transform its stadium into a positive landmark and symbol of regeneration in the area. the club has prioritised respecting local tradition and heritage while promoting enthusiasm for a better future through sustainable transport initiatives, promoting access to local services and amenities, supporting local economic development, and community involvement in local decision-making. The club's commitment to sustainability and community engagement has helped build a positive legacy for the club and the wider community.

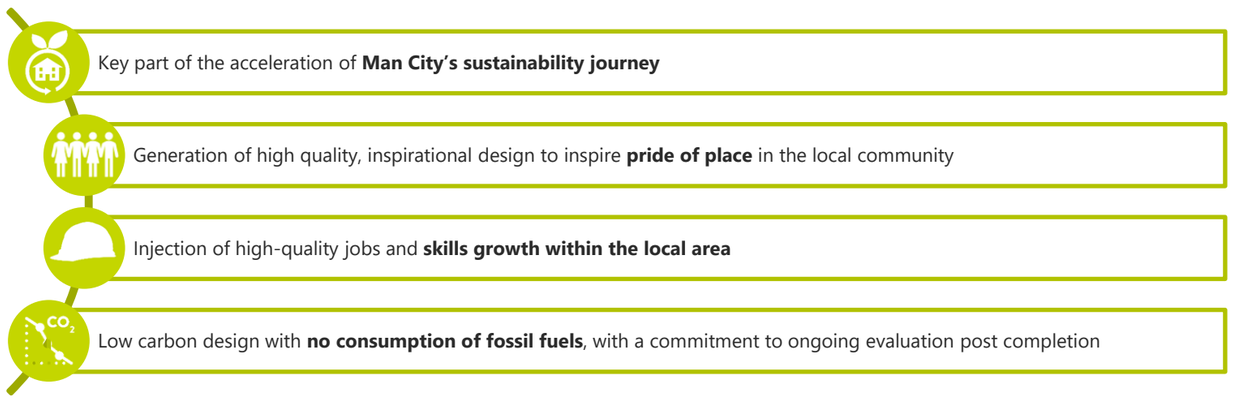
…and aligning with the Etihad Campus Strategic Sustainability Framework.

This proposed project continues that legacy and regeneration story by bringing further local economic and social value whilst playing its full part in delivering the Our Manchester 2025 vision and ambitious Manchester Zero Carbon 2038 commitments. The project aligns with and is fully supportive of the impressive sustainability initiatives already in place on the Etihad Campus, as underpinned by the Etihad Campus Strategic Sustainability Framework. Collectively, the club aspires to be a pioneer for the whole of Manchester in pursuing its twin objective of realising locally inclusive, globally competitive economic growth, whilst simultaneously transforming to a net zero-carbon campus.

Key sustainability initiatives integrated into the proposed development are summarised on the next page, framed by the four key themes of the Etihad Campus Strategic Sustainability Framework:

1. Climate & nature positive
2. Vibrant & inclusive
3. Healthy & active
4. Open & Connected

Key Messages demonstrating the proposed development's commitment to a sustainable future…



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2 Man City & Sustainability

2.1 The Man City sustainability legacy

Since its opening in 2002 hosting the XVII Commonwealth Games, the key legacy from those games was to ensure that Manchester continues to grow and that East Manchester would benefit from new and sustainable investment. Manchester City Football Club (Man City) began its local social, environmental and economic impact measurement in 2004. Working actively with the city, local residents and businesses ensuring that the club and the stadium become a positive landmark and symbol of regeneration.



2.3 Performance measurement and reporting

In April 2016, City Football Group (CFG) commissioned New Economy to evaluate the economic impact of a number of landmark investments in infrastructure and facilities made by Manchester City Football Club and Manchester City Council (MCC) in the vicinity of the Etihad Stadium

The investments included the Etihad Campus, a state-of-the-art training facility for Man City; the Etihad Stadium, Man City's home ground; and the National Cycling Centre, which includes the Manchester Velodrome, a world-class cycling track. The investments also included improvements to the surrounding area, such as developing a new tram line and creating new public spaces.

The evaluation found that these investments had a significant positive impact on the local and regional economies. The investments created jobs and increased economic activity, contributing to the regeneration of the area around the Etihad Stadium. Specifically, the evaluation found that:

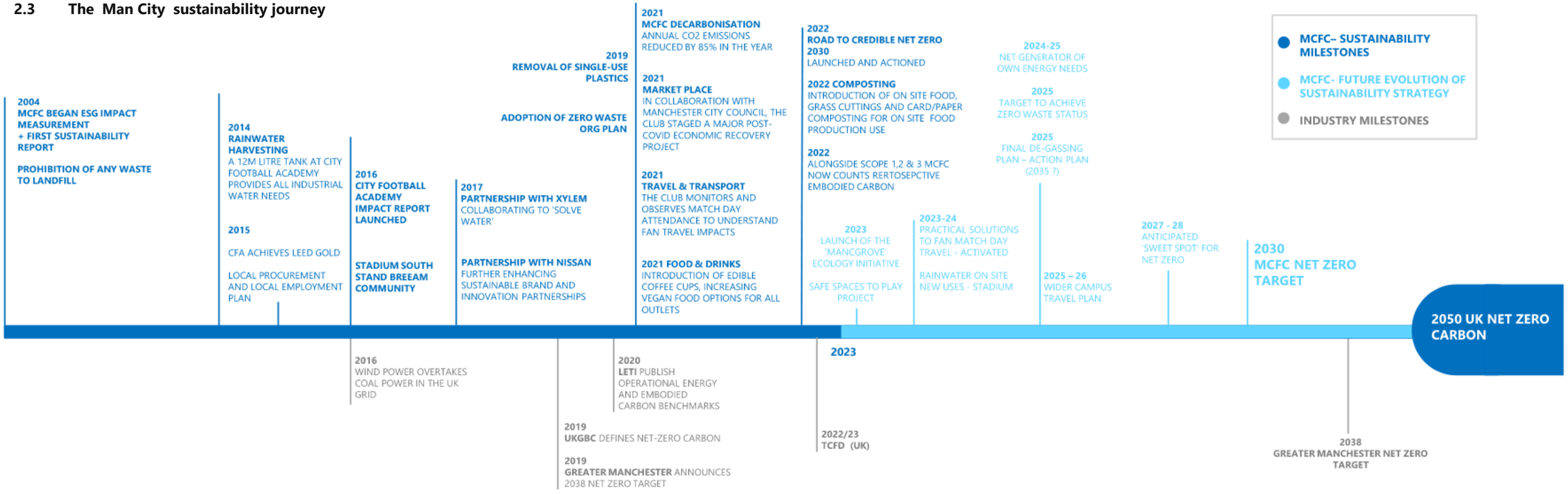
The investments created **over 5,000 jobs** during the construction of CFA and **2,000 jobs** on the construction of EMLC, the Connell Sixth Form College and the MIHP respectively.

Research by New Economy projects the public value benefits of the CFA, the EMLC, the Connell Sixth Form College and the MIHP to **reach £206 million** over the next ten years.

The combined health benefits of the CFA and the EMLC could be valued at approximately **£38.4 million** over the next ten years

The economic impact of the Connell Sixth Form College in terms of increased earnings for students gaining Level 3 qualifcations is projected to average **around £5 million** per annual cohort and **reach £51 million** over the next decade.

2.3 The Man City sustainability journey



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2.4 Examples Of Delivery Of The Sustainability Principles

Man City's sustainability initiatives demonstrate the club's commitment to environmental stewardship and social responsibility by taking action to reduce its carbon footprint, conserve resources, and engage with local communities,

Table 2—1 includes examples from the Game Plan and CFA Impact Report demonstrating how each of the sustainability principles is being delivered and how that manifests in real projects through sustainability metrics and achievements.





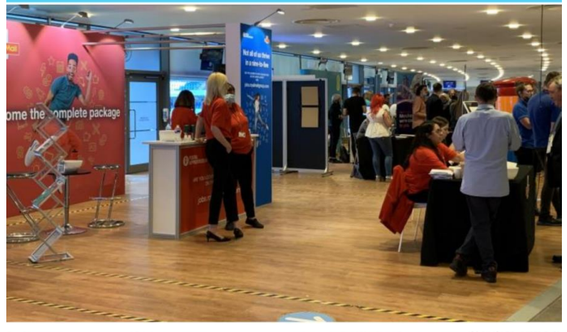




Table 2—1 Examples of Man City Sustainability Achievements

Sustainability Principle		Examples of key achievements to date
1. CO_2 Measurements		• The Club aims to be credibly **net zero by 2030** and has improved its measurement and reporting which helps understand the range of activities and their impacts. • Against the last full year (2019-20) **the CO2 trend remains downward overall by 31.8%** based on significant work in reducing waste and through energy management and investment. This also impacted the Club's scope 2 emissions which were reduced by 18%, an overall 26% reduction in gas consumption • Electricity purchased only from certified renewables.
2. Water		• The management of water – the Club's industrial use (e.g., irrigation) and potable water (for drinking) are priority considerations for the Club. • A 12m litre **rainwater harvesting** tank at City Football Academy provides all industrial water needs – and there is a similar provision under the main pitch at the Etihad Stadium – this provides for all the Club's irrigation
3. Waste		• Manchester City's facilities management teams across all properties have been targeting waste reduction as a major part of their work in recent years. One of the Club's key action groups has also focused on waste and has achieved a range of positive impacts, including **eradicating single-use plastics** from match day and general operations, added and monitored **re-use and recycling streams**.
4. Food		• Food provided on match days across the Etihad Stadium – in the general fan areas and concessions and the restaurants and suites are a major part of the experience of fans and visitors. The club collaborates with stadium catering contractor F3 to manage the food offering and ensure that they meet necessary standards. F3 is committed to providing employment to the local communities and paying the Manchester living wage –working only with agencies who offer this and investing in its own online training academy FLOW to ensure all staff get the training required for their roles. • The catering team has **replaced plastic water bottles** with recyclable cartons and encourages the use of reusable cups by Academy staff.
5. Transport & Travel		• The club has monitored and observed the match day attendance for each event to understand fan travel impacts and behaviours of local traffic volumes and numbers. The club is **working with the fans and community to reduce the negative impacts of travel** and help plan for the future. • Across 27 home matches Manchester City received almost **4,000 individual feedbacks from fans** about their match day travel. More than 200 Club staff also provided feedback about their commuting information This enables a greater understanding of actions and the relative CO2 footprint.
6. Ecology		• Staff from the Club have been engaged in creating new wildflower meadows within the Academy grounds and around roadside boundaries working with the Club's landscape team and contractor (IDVerde) • The Club is now **working with local schools** and **community groups** to promote new spaces and places for improved ecology and biodiversity. • The club has launched **The Mancgrove tree-planting programme**, to improve biodiversity, air quality and community engagement in East Manchester. Aiming to raise awareness of the importance of trees and their significant role in promoting sustainability and environmental health.
7. Sustainability In Our Community		• Since 1998, the Club has been meeting with **local residents' representatives** and key agencies to share and exchange information and knowledge, to understand and address issues and challenges, to promote best practice and **maximise participation amongst** local people –both in and with Manchester City, but also more widely across a range of community priorities and place-making. • In 2021, in collaboration with Manchester City Council, the Club staged a major **post-covid economic recovery project** –Market Place – matching vacancies for work, learning and training pathways for those impacted by the pandemic. • **Residents raised issues about litter** during the first quarterly Man City Neighbours meeting of 2023, including narrow 'ginnels' not included in post-match street cleaning and a lack of litter bins, **both of which were addressed through agreements and a joint inspection.**

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ETIHAD STADIUM IMPROVEMENT WORKS - KEY SUSTAINABILITY HEADLINES:

Climate & Nature Positive

Zero-Carbon 2038
Committed route map to be net zero in operational carbon no later than 2038 with a target for 2030

Efficient Building Services Systems
CO2 emissions reduction against Building Regulations Part L 2021 through intelligent energy-efficient building services systems: 15.32% in North stand, 12.85% in Hotel and 41.48% in Commercial Building

Renewable Technologies
PV area maximised on the roofs: 250m^2 for North stand, 250 m^2 for Commercial Building and 500 m^2 for Hotel with use of monocrystalline panels

Low Carbon Technologies
Air Source Heat Pumps for heating and cooling, MVHR ventilation throughout, point of use DWH in commercial building

High-Efficiency Envelope
Minimum 15% improvement in U-Values against Part L requirements (for floors, roof and walls)

District Heating
Fully electric system installed with no plans for future connection to district heating

Post Occupancy Evaluation
3-Year commitment to monitor, review and improve on building performance and user comfort

Sustainable Catering
Sustainable and responsible food policy delivered in conjunction with the Club's partners

Zero Waste to Landfill, No Single Use Plastic
Operational targets to be set in operation in collaboration with supply chain

Reduced Embodied Carbon
Circular economy principles to reduce impact of construction materials, measured through a whole life carbon assessment

Re-use of materials
Assessment of reuse of crushed aggregate where applicable in new construction

Sustainable Drainage
Over 50% reduction in surface water run-off rates from existing through an innovative attenuation system

Water Efficiency
Over 40% water reduction against BREEAM baseline through water-efficient sanitaryware and catering specifications

Biodiversity Net gain
The Alan Turing Way connection will act as a green corridor, resulting in a biodiversity net gain through the promotion of local wildlife and plant species

Vibrant & Inclusive

Pride of Place
Celebrating the local community and its history, bringing to life the unique civic spirit and character of the area in new and engaging ways

Local Economy
Estimated additional £71.7 million per year in direct annual local spending

Construction Opportunities
The construction project could support c.890 employed full time for 3 years, with up to 200 apprenticeships engaged

Job & Training Opportunities
Estimated 1,795 FTE jobs created which could increase to c.2,900 with part-time and casual workers

Everyone Is Welcome
Best in class inclusive design, disabled toilets, fully disabled accessible

Responsible Neighbour
Local residents attend quarterly meetings with the club since 1998 this ensures local views are always considered

Local Opportunities
Commitment to significant local employment, skills and opportunities

Healthy & Active

Eat well
Healthy eating options & free drinking water provision

Healthy environment
Optimised comfort in temperature, and indoor air quality with natural ventilation

Access to nature
Improvements to green infrastructure along sides of new access road. Working with Campus Stakeholders to activate and improve blue/green routes to/from the city centre through establishment of Campus Transport Improvement Fund

Climate Resilience
Resilience to future increases in temperature and flood resistance by using future weather file 2050

Active Travel
Working with Campus Stakeholders to activate and improve routes to/from the city centre.

EV Charging
Expansion of charging points provided within the car park on the campus

Daylight
Maximising daylight use while avoiding solar overheating through the use of external shading and solar control glass

Open & Connected

Walking & cycling
Working with Campus Stakeholders to activate and improve routes to/from the city centre. Working with Bee Bikes programme to embed Campus into city centre network.

Enhanced connection
Man City trialling a bus shuttle services to improve connections to Etihad Campus

Cycle storage
Contributing 200 covered Campus spaces, to add to the 240 covered Campus spaces currently being installed by the Co-op Live project

Travel information
Large format LED screens on buildings can help with travel information.

Parking Zones
no additional parking spaces created within the proposed development to promote active travel

Community Participation
Working with local partners to reach out to the community to support and inspire

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3 Introduction

The Proposed Development comprises the redevelopment of the Etihad Stadium North Stand, which includes a number of interrelated and connected components (the "Proposed Development"), including:

- Expansion of the Etihad Stadium North Stand to provide an additional capacity of 7,910 and an increase in the overall capacity of the Etihad Stadium to 61,958, including the provision of a roofwalk attraction.
- Creation of City Square, a covered outdoor fan zone area, with year-round Ground and First Floor F&B provision;
- An nine-storey hotel;
- A eight storey new commercial building comprising a Club Shop, Museum and interactive football experience venue, and circa 4,000 sq.m. of workspace.
- A new site vehicular access route and drop-off point via an existing junction with Alan Turing Way; and
- Landscaping and other associated works

The formal description of the proposed development and further detail on the proposals can be found in the planning statement and planning application form, both of which accompany the planning application.

Appended in support of the Sustainability Statement	Additional Planning Documents	Environmental Statement
A. Blue Green Infrastructure B. BREEAM Pre-Assessment C. Energy Statement D. Whole Life Carbon Assessment E. Local Benefits Statement F. Social Value Toolkit G. Economic Impact Assessment	• Planning Statement • Design and Access Statement (including Landscape and Public Realm Strategy and Signage Strategy) • Archaeological Desktop Report • Crime Impact Statement • Statement of Consultation • Daylight / Sunlight Assessment • Heritage Statement • Operating Schedule / Event Management Strategy • Preliminary Ecological Assessment • TV Reception Survey • Ventilation, Extraction and Odour • Waste Management Strategy	• Construction Management • Air Quality and Dust • Climate Change • Ground Conditions • Human Health • Noise and vibration • Townscape and Visual Impact • Traffic and Transport • Water Quality, Drainage and Flood Risk • Wind microclimate • Lighting • Socio Economic

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4 Policy Context

4.1 Local

The **Guide to Development in Manchester (2007)** is effectively a hybrid document bringing together all the development principles that assist in creating a city in 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.

The **Manchester Local Plan (2012)** provides the planning policy framework, with the Core Strategy at its heart. Covering a period of 15 years from 2012 to 2027, it sets out the long-term strategic policies for Manchester's future development. Sustainability cuts across the objectives set out within the Core Strategy.

Our Manchester 2016-25 resulted from a city-wide consultation in 2015 to define the vision for Manchester. Over one-third of responses focused on climate action, leading to the establishment of the Manchester Climate Change Board (MCCB). 2018 became a significant milestone for climate change action in Manchester. Science-based targets were proposed for Manchester and adopted by Manchester City Council on 14th November 2018, committing to be zero carbon by 2038. This was further reinforced by the Council declaring a Climate Emergency on 10th July 2019.

The Manchester Climate Change Framework For 2020-25 (2020) Manchester City Football Club, has taken the lead in committing to this ambitious project, setting an ambitious tone for the Etihad Campus and beyond.

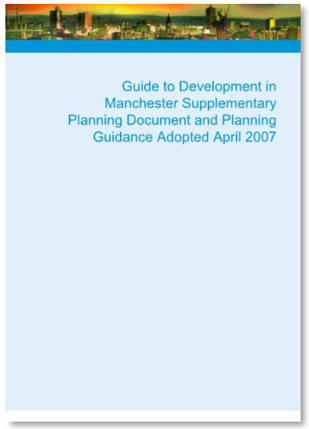
4.2 National

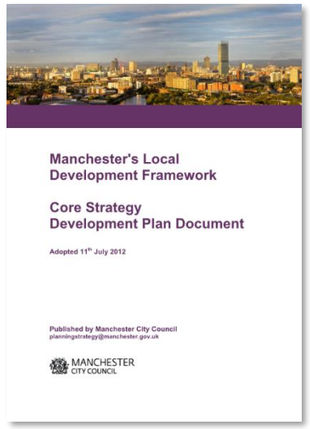
The presumption in favour of sustainable development is at the heart of the National Planning Policy Framework (updated Feb 2019), cascading through to local plans and the approval process for planning applications.

On 27th June 2019, the UK Government increased the ambition of the Climate Change Act 2008 to become net zero carbon by 2050. In addition, a 25 Year Plan to Improve the Environment was published to set the level of ambition.

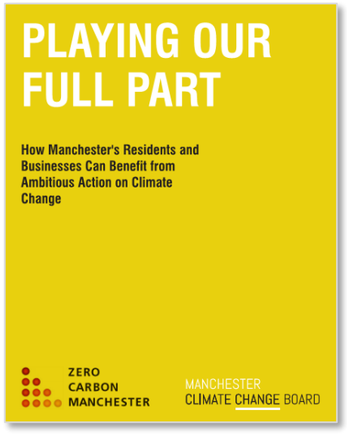
4.3 Global

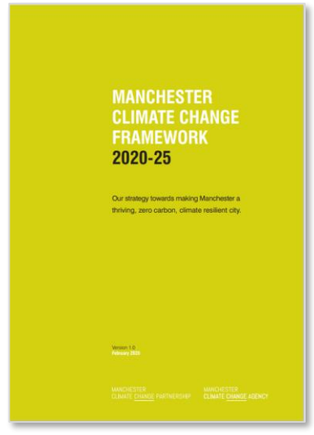
Climate Change is recognised as one of the biggest threats facing our planet. In 2015, the Paris Agreement was adopted by countries around the world, forming a global consensus on the need to limit the global temperature rise to well below 2 degrees Celsius through greenhouse gas mitigation measures. Annual UN Climate Change Conferences have taken place to develop a detailed action plan. Complementary to this in 2015, countries worldwide adopted seventeen Sustainable Development Goals to end poverty, protect the planet and ensure prosperity for all by 2030 through collective action.

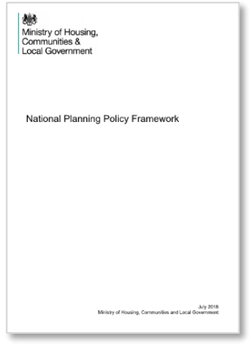
















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5 Sustainability strategy overview

5.1 Man City Sustainability Vision

Manchester City Football Club has a clear sustainability vision that guides its sustainability efforts. The club's vision is to become "a sustainable and environmentally responsible leader in world football." To achieve this vision, the club has set a number of sustainability targets, including:

- **Reducing its carbon footprint**: Committed to reducing its operational carbon by 2030; The club is working to achieve this through investments in renewable energy, and energy efficiency measures.
- **Conserving resources**: The club has implemented a range of measures to reduce water consumption, minimise waste, and promote sustainable resource use.
- **Promoting sustainable transport:** the club is promoting sustainable transport options for fans and staff, including cycling and public transport.
- **Engaging with local communities:** the club is committed to engaging with local communities on sustainability issues, including hosting educational events and providing opportunities for local people.

5.2 Etihad Campus Strategic Sustainability Framework

The Etihad Stadium and City Football Academy have already been catalysts for the transformation of Eastlands. As the Campus embarks on the next key phase of its transformation to a world-class destination amidst increasing public awareness of the climate and biodiversity crisis, it recognises the opportunity for it to play its full part in exemplifying sustainable development.

The Etihad Campus aspires to be a pioneer for the whole of Manchester in pursuing its twin objective of realising locally inclusive, globally competitive economic growth, whilst simultaneously transforming to a net zero-carbon campus. Four key themes underpin the delivery of this vision:

Climate & Nature Positive	Vibrant & Inclusive	Healthy & Active	Open & Connected
The Campus is a beacon of Manchester's rapid transition to a zero-carbon city, rich with wildlife and green infrastructure.	The Campus works for everyone and provides unrivalled education, training and employment opportunities for local residents.	The Campus is a world-class destination for sport, performance and leisure that inspires healthy lifestyles and workplaces.	The Campus is fully integrated into the fabric of the City, with excellent transport connections that support sustainable travel.

A periodic Review of Progress recently undertaken has evaluated the progress made by all stakeholders at the Etihad Campus in achieving sustainability goals outlines in the Etihad Campus Strategic Sustainability Framework. This framework provides an overarching vision for different partners and future plot developments to harmonise in articulating and delivering the Campus sustainability ambitions. The new scheme will play its part in delivering this vision.

5.3 Sustainability Approach

Sustainability will be inherent in the design and construction documentation to ensure it is a collective responsibility with targets owned by project team members best placed to influence and deliver these.

To deliver the scheme's aspiration for sustainability, the Etihad Campus Strategic Sustainability Framework and Man City's vision will be used to drive sustainability issues most pertinent to the development's design, construction and operation, namely energy, transport, waste and social value.

In line with current planning policy, a BREEAM pre-assessment has been undertaken, setting out a route to achieve BREEAM Very Good, but with an aspiration to continue to achieve betterment during detailed design. (see Appendix B).

The Etihad Campus sustainability themes are broadly complemented by BREEAM. The Etihad Campus goes beyond just focusing on environmental sustainability to putting people at the heart of the development through incorporating social sustainability.

Table 5—1 Comparison of ESS, Etihad Campus and BREEAM sustainability themes

ESS Themes (Guide to Development in Manchester SPD, 2007)	Etihad Campus Sustainability Themes	BREEAM NC 2018 Categories
Energy efficiency and renewable energy	Climate & Nature Positive	Energy
Environmental design	Climate & Nature Positive	Materials
	Healthy & Active	Health & Wellbeing
	Open and Connected	Transport
Water management and weather resilience	Climate & Nature Positive	Water Pollution
Waste management	Climate & Nature Positive	Waste
Construction management	Climate & Nature Positive	Management
	Healthy & Active	Pollution
Biodiversity	Climate & Nature Positive	Land use & Ecology
Adaptation to climate change	Healthy & Active	Health & Wellbeing, Waste
Not covered	Vibrant and Inclusive	Management (Consultation)

The following chapters unpack each Etihad Campus sustainability theme to demonstrate how the proposed development is playing its full part in delivering the net zero carbon 2038 vision. Each section comprises:

- Headlines outlining the key sustainability outcomes
- Details of sustainability commitments
- Summary of link documents for further technical details
- Summary of relevant local planning policies
- Contributions to the global UN Sustainable Development Goals

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6 Climate & Nature Positive

'A shining example of Manchester's swift transition to a zero-carbon city, abundant with biodiversity and green infrastructure'

Climate & Nature Positive Headlines	
	Zero-Carbon 2038 Committed route map to be net zero in operational carbon
	Efficient Building Services Systems CO2 emissions reduction against Building Regulations Part L 2021 through intelligent energy-efficient building services systems: 15.32% in North stand, 12.85% in Hotel and 41.48% in Commercial Building
	Renewable Technologies PV area maximised on the roof: 250 m^2 on North stand, 250 m^2 for commercial building and 500 m^2 for hotel with use of monocrystalline panels
	Low Carbon Technologies Air Source Heat Pumps for heating and cooling, MVHR ventilation throughout, point of use DHW in commercial building.
	High-Efficiency Envelope Minimum 15% improvement in U-Values against Part L requirements (for floors, roof and walls)
	District Heating Fully electric system installed with no plans for future connection to district heating
	Sustainable Catering Sustainable and responsible food policy delivered in conjunction with the Club's partners
	Zero Waste to Landfill, No Single Use Plastic Operational targets to be set in operation in collaboration with supply chain.
	Reduced Embodied Carbon Circular economy principles to reduce impact of construction materials, measured through a whole life carbon assessment
	Re-use of materials Assessment of reuse of crushed aggregate where applicable in new construction
	Sustainable Drainage Over 50% reduction in surface water run-off rates from existing through an innovative attenuation active system
	Water Efficiency Over 40% water reduction against BREEAM baseline through water-efficient sanitaryware and catering specifications
	Biodiversity Net gain The Alan Turing Way connection acts as a green corridor, resulting in a biodiversity net gain through the promotion of local wildlife and plant species

6.1 Energy

Zero Carbon 2038 Definition

Manchester is committed to playing its full part in limiting the impacts of climate change by adopting science-based targets aligned with the Paris Agreement carbon budgets for limiting global temperature rise below 2 degrees Celsius. Analysis by the Tyndall Centre for Climate Change Research at the University of Manchester has identified the Manchester proportion of this budget and the emissions pathway to support the Paris Agreement. By 2038, Manchester is committed to being net zero carbon relating to the total energy used in buildings and transport.

It should be noted that, as an organisation, Man City have an aspiration to achieve net zero carbon by 2030, 8 years ahead of the Manchester target.

Part L Compliance

Prior to the revised planning policy on carbon reductions to deliver a net zero Manchester by 2038, the current policy based on Building Regulation Approved Document Part L 2021 have been used to demonstrate how the proposed development has actively reduced carbon emissions through design. Part L sets out the minimum energy efficiency standards and targets for regulated carbon emissions, i.e., those associated with fixed building systems, which a design team can influence. Manchester City Council's planning policy requires a minimum 6% betterment of this carbon emissions target.

An Energy Statement has been prepared (see Appendix C) to demonstrate how the proposed development has surpassed this through best practice design following the 'Lean-Clean-Green' energy hierarchy (as summarised in Figure 6—1), a minimum saving of 13% is predicted, surpassing the planning requirement.

Low And Zero Carbon Technologies

A number of low and zero carbon technologies have been appraised within the Energy Statement as means of reducing the carbon emissions from the proposed development. This appraisal shows air source heat pumps (ASHP) and solar PV as the most feasible and these technologies have been incorporated into the proposals.

Additional technologies considered but discounted as not possible or viable were wind, hydrogen fuel cells, ground source heat pumps, biomass boilers, solar hot water and CHP.

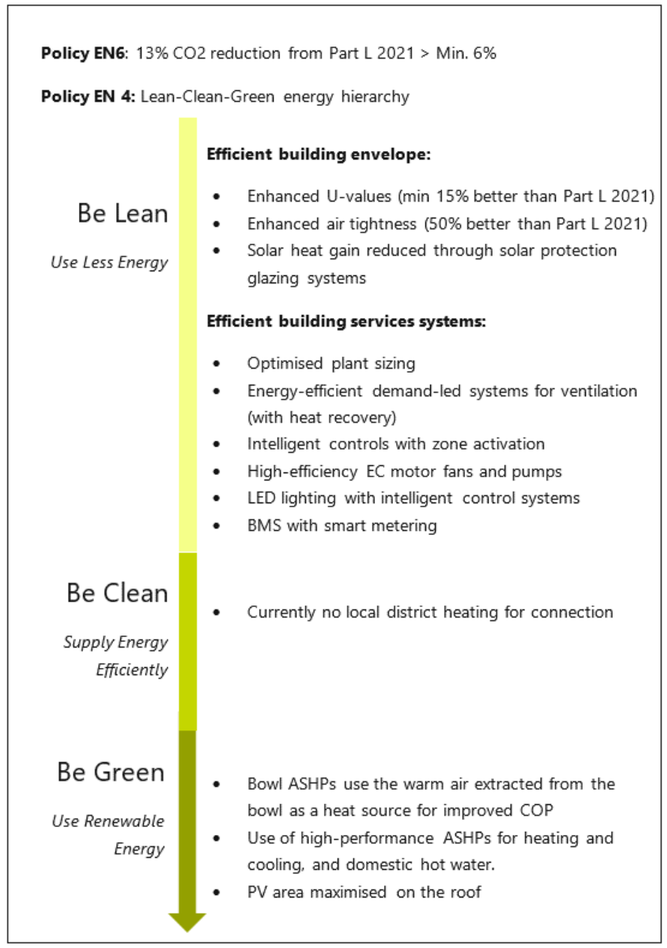


Figure 6—1 Part L Compliance Strategy

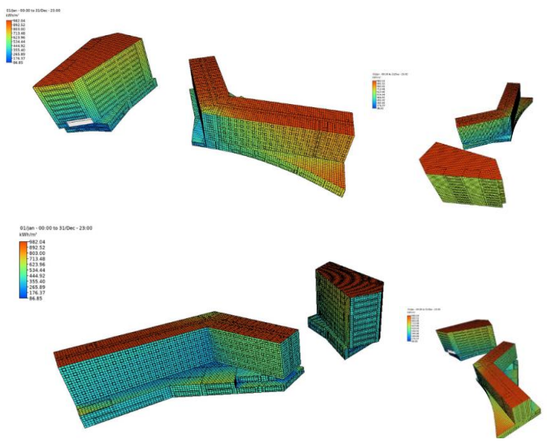


Figure 6—2 Proposed development solar analysis

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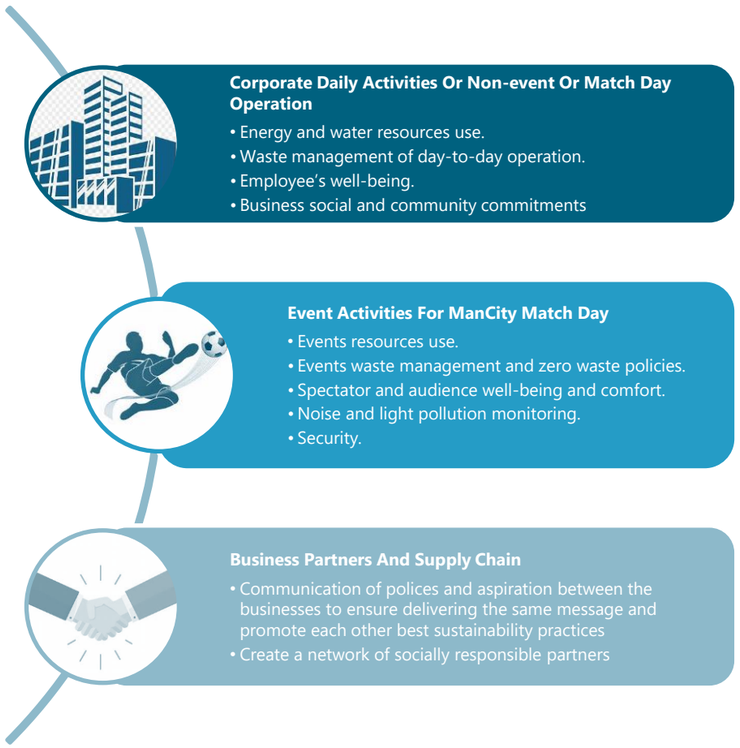


Figure 6-3 Sustainability Levels of Measurement

6.2 Future District Heating Connection

The North Stand Project is situated outside of any existing District Heating Network zones and is also sited beyond any planned heat network extensions that are underway. As such, a district heating network connection is not currently being provided for the North Stand Project.

6.3 Total Operational Energy Measurement

The zero carbon 2038 commitment relates to the total actual energy used by a building in operation. This includes:

A. **Regulated energy** relating to fixed building services systems (e.g., heating, cooling, ventilation, lighting) which the design team can influence through best practice design and the building operator can influence through sustainable building management procedures; and
B. **Unregulated energy** relating to other energy uses specific to a building's function (e.g., office equipment, catering) which are linked to building user behaviour.

Unregulated energy typically accounts for over half of the total energy used in a building, with this proportion increasing as building design becomes more energy efficient. With a better understanding of total energy use, an action plan can be put in place to focus on key leverage points for carbon reduction and inform a collaborative approach with future partners and building users to collectively deliver the zero carbon 2038 vision.

Existing processes around post occupancy evaluation (POE) and energy monitoring are already deployed at the Etihad Stadium and City Football Academy and the club has been producing annual POE reports. Lessons learnt will be shared to ensure consistency in reporting across the Campus, ensuring an integrated approach to carbon reduction for maximum impact.

As part of the strategy for the North Stand Project, it is important to define sustainability monitoring levels for the management to have a better understanding of the overall sustainability performance of the development and use it as part of the club sustainability leadership attracting more partners who share the same aspirations. The levels of monitoring can be broken down as shown in Figure 6—2.

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Towards Zero Carbon 2038

The Energy Statement (Appendix C) sets out how the proposed development has actively sought to minimise energy requirements in the first instance through an energy-efficient envelope (high-performing insulation and detailing for good air tightness) and high-efficiency building services systems. This ensures the building has an inherent low operational energy baseline.

To ensure the proposed development can continue to transition towards net zero carbon in operation by 2038, the building services systems have been designed to operate on entirely electricity to minimise on-site fossil fuel combustion and benefit from long-term grid decarbonisation.

Future zero carbon retrofits and carbon offsetting will be explored as new technology and policies emerge to reach net zero carbon by 2038.

Figure 6—4 provides an illustrative route map to net zero carbon by 2038 reflecting the club's aspirations to be net zero by 2030.

Reference should be made to the Climate Change chapter within the Environmental Statement for details and preliminary carbon estimates associated with operational energy.

Route Map to Net Zero Carbon Energy by 2038

Regulated – Energy directly associated with fixed building system e.g., heating, cooling, ventilation, hot water and lighting.

Unregulated – All other energy associated with equipment and user behaviour e.g., specialist equipment associated with matchday, catering and ICT.

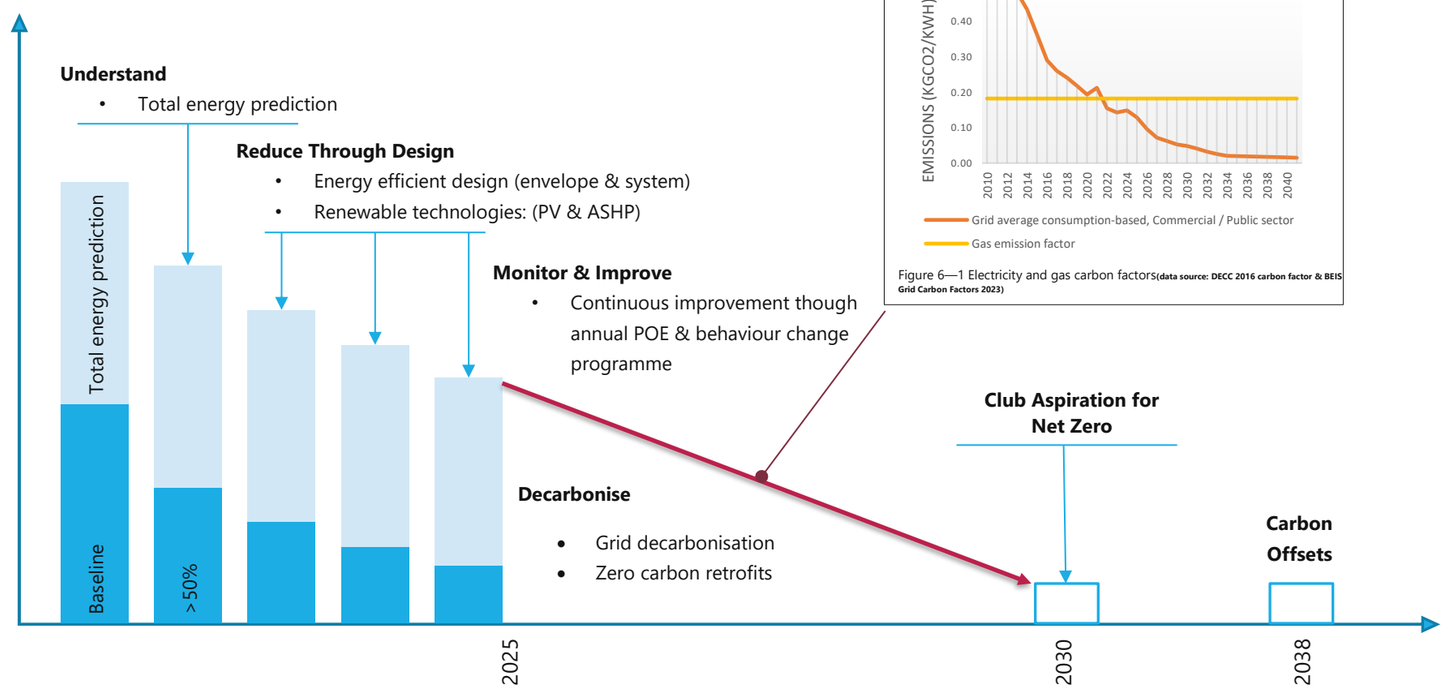


Figure 6—1 Electricity and gas carbon factors(data source: DECC 2016 carbon factor & BEIS Grid Carbon Factors 2023)

Figure 6—4 Transition To Net Zero Carbon 2038

FURTHER INFORMATION

Link Documents (Appended)	Link Documents (Other Supporting Documents)	Planning Policy Reference	Contributions to the UN SDGs
• BREEAM Pre-assessment (Appendix B) • Energy Strategy (Appendix C)	• Design and Access Statement • Environmental Statement • Climate Change Chapter	Core Strategy (MCC, 2012): • Policy EN4 LZC development • Policy EN5 CO2 reductions Manchester Zero Carbon Framework 2020-2038	7 AFFORDABLE AND CLEAN ENERGY 13 CLIMATE ACTION

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6.4 Water

A changing climate will result in hotter, drier summers and more extreme weather events. This section includes strategies regarding water conservation for drought tolerance and sustainable rainwater management for flood resilience during extreme storms in the Proposed development. A summary of the strategies is included in Table 6—1.

Table 6—1 Water Efficiency and Sustainable Drainage Strategies

Water efficiency	Sustainable Drainage
• Over 40% improvement over notional BREEAM building (BREEAM Wat 01) through water-efficient sanitaryware and catering specifications • Water efficient sanitary ware and catering equipment	• Over 50% betterment on existing runoff rates through use of attenuation tanks • Above-ground rainwater system to collect surface water runoff, collected water will drop by gravity through the building in designated risers. • Drainage strategy includes 45% allowance for climate change

FURTHER INFORMATION

Link Documents (Appended)	Link Documents (Other Supporting Documents)	Planning Policy Reference	Contributions to the UN SDGs
Blue Green Infrastructure (Appendix A)	Environmental Statement • Water Quality, Drainage and Flood Risk	Core Strategy (MCC, 2012): • Policy EN14 Flood Risk • Policy EN17 Water Quality • Policy EN8 Adaptation to Climate Change	

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6.5 Biodiversity

Man City Ecology Plan

Manchester City Football Club has taken several steps to implement its long-term ecology plan for the wider area of East Manchester. Some of the key initiatives include:

1. Eco-friendly stadium: The Etihad Stadium, home to Man City, has been designed to be eco-friendly. It has a unique rainwater harvesting system that collects water and uses it for irrigation and flushing.
2. Manchester City Football Club will plant trees, hedgerows, wild grasses and wildflower meadows, alongside a range of ecologically sound initiatives relative to its annual reported (all scopes) CO2 Footprint each year in line with its published Game Plan Agenda. This will have a local focus and work in parallel with the City Council's Biodiversity Strategy
3. Education programmes: the club has developed a range of educational programmes for schools and young people in East Manchester. The programmes focus on topics such as sustainability, climate change, and biodiversity, and aim to raise awareness and encourage action.
4. Manchester City's Mancgrove initiative: Manchester City's Mancgrove initiative is a tree-planting programme that aims to improve biodiversity, air quality, and community engagement in the East Manchester area. The trees in the Mancgrove initiative are a mix of species that are native to the UK and provide a variety of benefits to the local ecosystem. The initiative also aims to raise awareness of the importance of trees in promoting sustainability and environmental health. Manchester City Football Club expects to launch its 'Mancgrove' initiative and action plan later in 2023, driving the Club's engaged biodiversity priorities until the end of the decade

Pre-development

An ecological appraisal, including a site survey, was undertaken. The survey did identify areas of the site as unimproved neutral grassland, scrub encroachment and broadleaved trees. Despite being mainly gravel and hard standing, the site has naturally colonised over time and is typical of a site with ongoing disturbance. No protected species have been identified on the site.

Existing Etihad Campus

The proposed development is consistent with the Etihad Campus Sustainability Framework, which aims to ensure that each forthcoming development:

- Ties into existing green corridors to maximise connectivity and value to both wildlife and pedestrians
- Lessons learnt from successful plant species and habitat establishment within the Campus inform future landscaping proposals
- Green-blue infrastructure and biodiversity initiatives which unlock wider social value and co-benefits are prioritised

Post Development

Whilst the building footprint and supporting hard landscaping for access takes up the majority of the site, the proposed development has sought to creatively maximise biodiversity creating a tree lined avenue to the development from Alan Turing Way. The addition of external swift and bat boxes aligns with MCFC's efforts to protect local bird and bat populations.

Landscape And Habitat Management

It is recognised that biodiversity is not simply delivered at the end of construction but is something that is nurtured over time to ensure wildlife can flourish. At the Etihad Campus, the management team is actively involved in several initiatives to monitor and enhance different habitats on the site. These initiatives are aimed at testing sustainable land management practices that can optimise habitat creation and carbon storage. Furthermore, the staff will be encouraged to volunteer their time to support the Campus' ongoing efforts to promote biodiversity awareness among local schools and community groups.

FURTHER INFORMATION:

Link Documents (Appended)	Link Documents (Other Supporting Documents)	Planning Policy Reference	Contributions to the UN SDGs
• Blue Green Infrastructure (Appendix A)	• Design and Access Statement • Landscape & Public Realm Strategy	Core Strategy (MCC, 2012): • Policy EN9 Green Infrastructure • Policy EN8 Adaptation to Climate Change	

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Figure 6—2 Example of potential behaviour change programmes implemented by a potential catering contractor

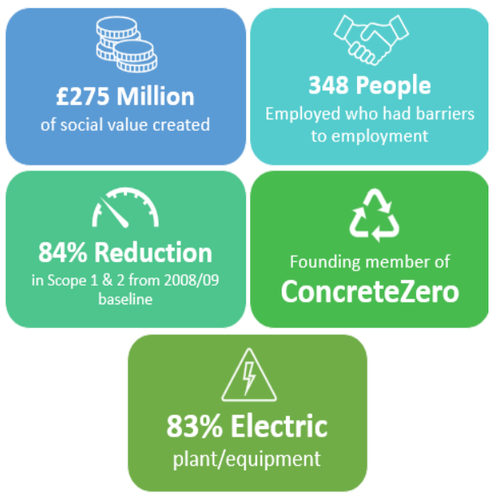


Figure 6—3 Site Sustainability highlights from the preferred contractor

6.6 Circular Economy

With increasing recognition that a shift away from the current linear 'take-use-dispose' resource model is required to stay within the ecological footprint of the planet, an alternative circular economy model is emerging. The emphasis is shifted to reuse where possible to lessen the ecological burden of building on greenbelt land and new resource extraction for construction. The proposed development has considered circular economy principles for the whole life cycle of the building, as summarised below

Table 6—2 Circular Economy Design Principles

	IMPACTS	KEY ACTIONS
DESIGN	Embodied carbon, emissions associated with the production, transportation and installation of construction materials, typically account for over half of the whole life carbon of a building. With an increase in building energy efficiency, this share will continue to increase. However, historically this is overlooked due to a lack of consistent measuring and reporting mechanisms.	▪ Use less – material optimisation to minimise the use of new materials ▪ Use less new – explore opportunities for increasing recycled content and materials to reduce the embodied carbon. The supply chain should be participating in industry sustainability initiatives such as Cement Zero and Steel Zero where possible. ▪ Responsible and locally sourced materials (BREEAM Mat 03)
CONSTRUCTION	As above, embodied carbon is associated with the delivery and installation of material. Significant construction waste can also arise from packaging, off-cuts and over-ordering.	▪ Require energy and waste to be monitored and reduced on-site (BREEAM Man 03 and Wst 01, Construction Management Plan). As standard, the club's preferred contractor installs automatic meter readers connected to an online reporting system to identify and eliminate unnecessary energy use. ▪ Energy and water-efficient site accommodation and establishment of a temporary grid connection where possible to minimise the need for on-site generators, beneficial for both carbon reduction and local air quality. ▪ Encourage modular and off-site construction to benefit from more material and energy-efficient modern methods of construction ▪ Supply chain engagement to harness knowledge and innovation around minimising embodied impacts and waste diversion from landfill, e.g., minimising or taking back packaging, product leasing models, donating timber offcuts to local community goods such as Emerge and Men's' Sheds ▪ Green travel plan for site activities to minimise vehicle movements, with benefits to carbon reduction, local air quality and reduced traffic disturbance to neighbouring communities.
OPERATION	Efforts are made to minimise waste and extract maximum value from materials throughout their lifecycle.	▪ Source 100% of single-use packaging products from recyclable, renewable post-consumer content, compostable or credible certifications ▪ Collaboration with local social enterprises that take and redistribute edible food that would otherwise be thrown away ▪ Free drinking water refill points to reduce reliance on disposable plastic bottles ▪ In-use waste audits, e.g., food waste tracking systems to avoid over-ordering, recycling rates ▪ Commit waste contractors to monitor and inspect the final destination of sorted materials
END-OF-LIFE	Demolition results in significant waste, with contamination often hindering efficient resource recovery. Considering ease of deconstruction can support recovery, refurbishment and reuse elsewhere. Designing for future flexibility can help the proposed development stay relevant and mitigate the risk of redundancy before the end of its useful design life, minimising the replacement cycle which puts pressure on virgin resources.	▪ Adaptability of the buildings to be flexible for future changes of use ▪ Spatial and technical allowance for future servicing retrofits to maintain comfortable internal temperatures in the context of climate change

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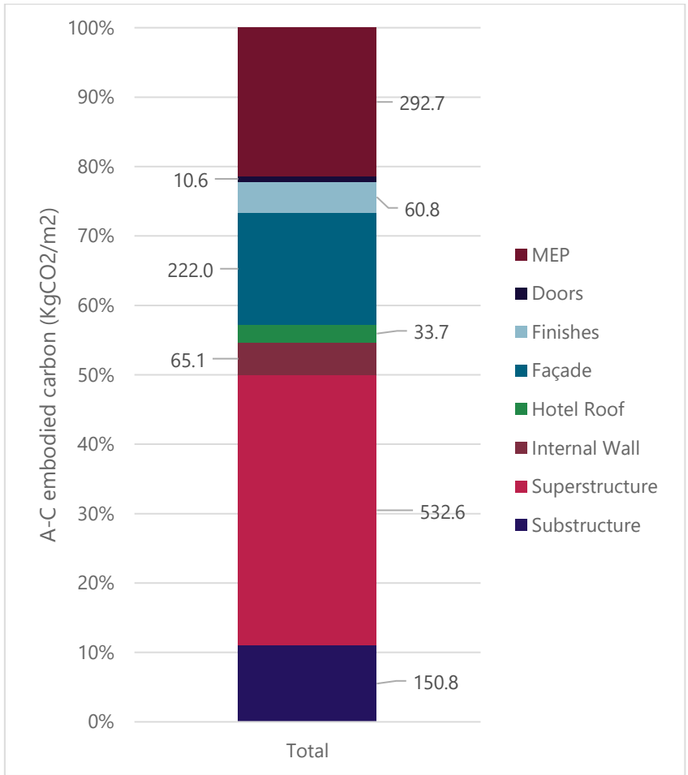
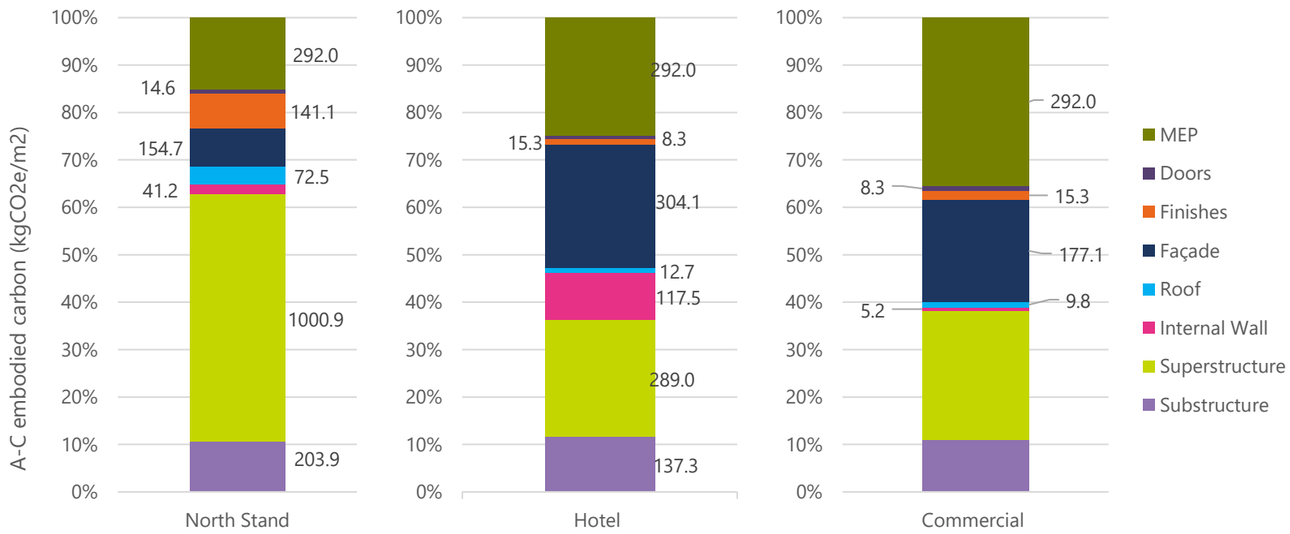


Figure 6—4 Embodied Carbon of the whole scheme

6.7 Embodied Carbon

A preliminary whole life carbon assessment has been undertaken as part of the planning application for the proposed development (see Appendix D) and to inform the Environmental Impact Assessment process. Opportunities to reduce this will be actively explored during detailed design in collaboration with the construction supply chain through early contractor engagement.



6.8 Earthworks

Extensive appraisal of the site levels took place at concept design to minimise excavation and the need for removal of soil from the site. Contaminated soil is classed as hazardous waste with standard disposal routes sending this to landfill, however following the results of the Ground Investigation, no remediation is required.

The result from these studies is that there is minimal soil removal required and site level changes are minor.

FURTHER INFORMATION

Link Documents (Appended)	Link Documents (Other Supporting Documents)	Planning Policy Reference	Contributions to the UN SDGs
• Whole Life Carbon Assessment (Appendix D)	• Design and Access Statement (Section 8: Sustainable Construction) • Environmental Statement • Climate Change Chapter • Construction Management	Core Strategy (MCC, 2012): • Policy DM1 Development Management • Policy EN19 Waste	

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Figure 6—5 Flood Risk from Surface Water Mapping Extract

6.9 Climate Resilience

The proposed development is taking into account future climate weather data and considering the expected climate change scenario within the lifecycle of the project. Specifically, the Manchester Weather file 2050 Medium 90 has been chosen as the best representative for the expected climate change scenario. This demonstrates a commitment to designing the project with climate resilience in mind and taking proactive measures to adapt to the changing climate.

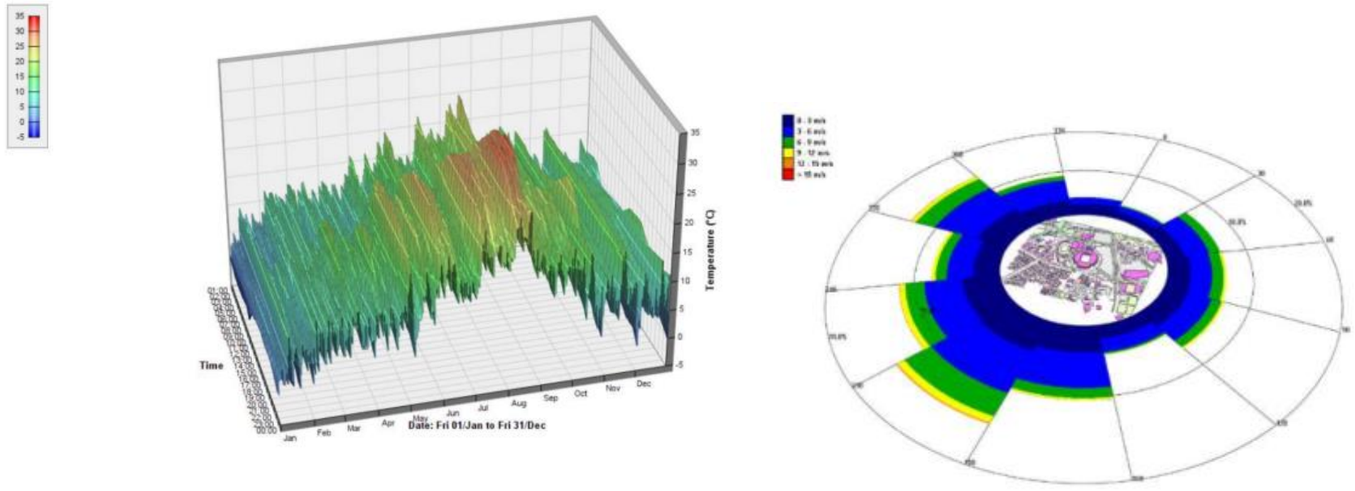


Figure 6—6 Manchester Future Weather file 2050 and Annual wind analysis for site

According to the Environmental Impact Assessment, several parts of the site are at risk of surface water flooding, nonetheless, the majority of the flooding is classified as low risk with minimum likelihood of occurring, the handle the surface water flooding installation of adequate surface water drainage systems and surface grading will be deployed.

In addition to climate resilience, the proposed development is focused on enhancing indoor air quality through air filtration systems and mechanical ventilation systems shall adopt a "full outdoor" philosophy with no recirculation in line with current CIBSE COVID-19 ventilation guidance. By not recirculating air and implementing effective air filtration systems, the development can help to reduce the transmission of airborne viruses and improve overall indoor air quality for occupants.

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7 Vibrant & Inclusive

'A hub of education, training, and employment opportunities open to all, designed to cater to the needs of the local community'

Vibrant & Inclusive Headlines

Pride of Place
Celebrating the local community and its history, bringing to life the unique spirit and character of the area in new and engaging ways.

Local Opportunities
Commitment to significant local employment, skills and opportunities

Local Economy
Estimated additional £71.7 million per year in direct annual local spending

Construction Opportunities
Construction project could support c.890 employed full time for 3 years, with up to 200 apprenticeships engaged

Job & Training Opportunities
Estimated 1,795 FTE jobs created which could increase to c.2,900 with part-time and casual workers

Everyone is Welcome
Best in class inclusive design, disabled toilets, fully disabled accessible

Responsible Neighbour
Local residents attending quarterly meetings with the club since 1998. This ensures local views are always considered

7.1 Social Value

Regeneration offers tremendous opportunities for delivering social value to local communities. It is recognised that Manchester City Council are pioneer in maximising public benefit for local benefit through its Social Value Policy and Social Value Toolkit for Suppliers (2017). Whilst this toolkit is voluntary for non-public procurements, it will be adopted to drive best practice into the proposed development. Aspirations for maximising social value are summarised below.

CONSTRUCTION

- **Local engagement:** Maximize links with local charities and youth organizations to drive social and economic benefits for local people during construction phase.

Workforce development: Engage people of all ages, including those with specific support requirements, in professional construction service careers through bespoke programs, aligned with 'Our Manchester Strategy'.

Local procurement: Seek to maximize local procurement of goods, equipment, and services to positively impact the regional economy.

City building: Contribute to Manchester's economic development plan and build talent, flair, and community through investment in the proposed development to help the city thrive.

OPERATION

- Manchester City Football Club is committed to ensuring as many jobs as possible in the Proposed Development go **to local people** and will look to implement strategies which support the hiring of people who live within walking distance.
- Create **permanent employment** opportunities targeted at local people, leveraging the consistency of use of the Etihad Campus.
- Explore plans for a '**Service Sector Training and Skills Academy**' in partnership with Manchester City Council and an education provider to develop skilled and qualified local people to manage the entertainment destination.
- Offer distinctive **learning and training** opportunities connected to Manchester City Football Club and City Football Group to encourage and inspire people of all ages, including retraining opportunities.

7.2 Inclusive Design

The proposed development is designed to be welcoming and accommodating to everyone, regardless of their background, abilities or circumstances. Incorporating various features that cater to the needs of users, creating an inclusive environment that is accessible to everyone.

Figure 7—1 representation of inclusive design

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7.3 Pride Of Place

The proposed development aims to implement pride of place for its local community through the following measures:

- Creating a high quality and inspirational environment to engender a sense of pride and ownership within the local community.
- Offer unique fan experiences and prioritize sustainable and community-focused initiatives that reflect the values of Manchester and its people, thereby influencing visitors to return and invest in the city.
- Designing the space with the local community in mind, incorporating elements that reflect the area's history, culture, and identity.
- Using sustainable materials and environmentally friendly practices to show the city's commitment to a greener future.
- Encouraging local businesses and artists to contribute to the development, showcasing the talents and diversity of the community.
- Reaching out to the community to facilitate events and initiatives that promote a sense of belonging and inclusivity.
- Fostering partnerships with local organizations and charities to support social initiatives and community-driven projects that benefit the area.

It should be noted that the club already host regular community engagement meetings to allow the community to express their opinions and shape future development in and around the campus. These will continue beyond the completion of this project, demonstrating the club's commitment to inclusivity and the local community.

FURTHER INFORMATION

Link Documents (Appended)	**Link Documents** (Other Supporting Documents)	**Planning Policy Reference**	**Contributions to the UN SDGs**
• Local Benefits Statement (Appendix E) • Social Value Toolkit (Appendix F) • Economic Impact Assessment (Appendix G)	• Design and Access Statement • Landscape and public realm strategy • Community Involvement Statement • Environmental Impact Assessment:	**Core Strategy (MCC, 2012):** • Policy EC1 Employment and Economic Growth • Policy EC7 Eastlands Strategic Employment Location	

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8 Healthy & Active

'A premier global destination for sports, leisure, and wellness, promoting healthy lifestyles and workplaces through cutting-edge facilities and amenities'

Healthy & Active Headlines

Eat well
Healthy eating options & free drinking water provision

Healthy environment
Optimised comfort in temperature, and indoor air quality with natural ventilation.

Daylight
Maximising daylight use while avoiding solar overheating through the use of external shading and solar control glass.

Access to nature
Access to green and blue infrastructure enhancements across the campus

Climate Resilience
Resilience to future increases in temperature and flood resistance by using future weather file 2050

Active Travel
Working with Campus Stakeholders to activate and improve routes to/from the city centre.

EV Charging
Expansion of charging points provided within the car park within the campus

8.1 Healthy Eating

To align with Manchester City Football Club's existing catering and food plan, the proposed development will prioritise collaborating with local suppliers to source high-quality, sustainable ingredients. The development will also align with the club's policy of not serving any food or drinks in single-use plastics, opting for more environmentally friendly options. To cater to a range of dietary preferences and needs, the proposed development will provide various food options, including vegetarian and vegan options.

8.2 Healthy Interiors

It is recognised that the internal environmental quality of a building/internal space can have a significant impact on the health and wellbeing of people interacting with the building. Best practice design standards have been adopted from BREEAM to create a comfortable internal environment in terms of lighting, temperature, acoustics and air quality.

8.3 Access to Nature

The canal and The Alan Turing Way connection together form a green corridor, providing an ideal opportunity for comfort breaks amongst nature for all building users and visitors.

FURTHER INFORMATION

Link Documents (Appended)	Link Documents (Other Supporting Documents)	Key Planning Policy Reference	Contributions to the UN SDGs
• Blue Green Infrastructure (Appendix A) • BREEAM Pre-assessment (Appendix B)	• Design and Access Statement • Landscaping and Public Realm Strategy • Daylight / Sunlight Assessment • Construction Environmental Management Plan • Environmental Impact Assessment • Air quality and Dust • Lighting • Noise and Vibration • Townscape & Visual Impact Assessment • Wind microclimate	**Core Strategy (MCC, 2012):** • Policy EN16 Air Quality • Policy EN7 Energy Infrastructure opportunities • Policy EN8 Adaptation to Climate Change • Policy DM1 Development Management GMCA Air Quality Action Plan	3 GOOD HEALTH AND WELL-BEING

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9 Open & Connected

'Seamlessly woven into the fabric of the city, with excellent transport connections that support sustainable travel'

Open & Connected Headlines

Walking & cycling
Working with Campus Stakeholders to activate and improve routes to/from the city centre. Working with Bee Bikes programme to embed Campus into city centre network.

Enhanced connection
MCFC trialling a bus shuttle services to improve connections to Etihad Campus

Cycle storage
Investment in improved campus-wide cycle facilities

Travel information
Large format LED screens on buildings can help with travel information.

Parking Zones
No additional parking spaces created within the new proposed development to promote active travel.

Community Participation
Working with local partners to reach out into the community to support and inspire

9.1 Sustainable Travel

The proposed development benefits from excellent public transport links inherent in the Etihad Campus and will continue to support initiatives that make public transport, walking and cycling the preferred options. Existing site connections are summarised in Figure 9—1

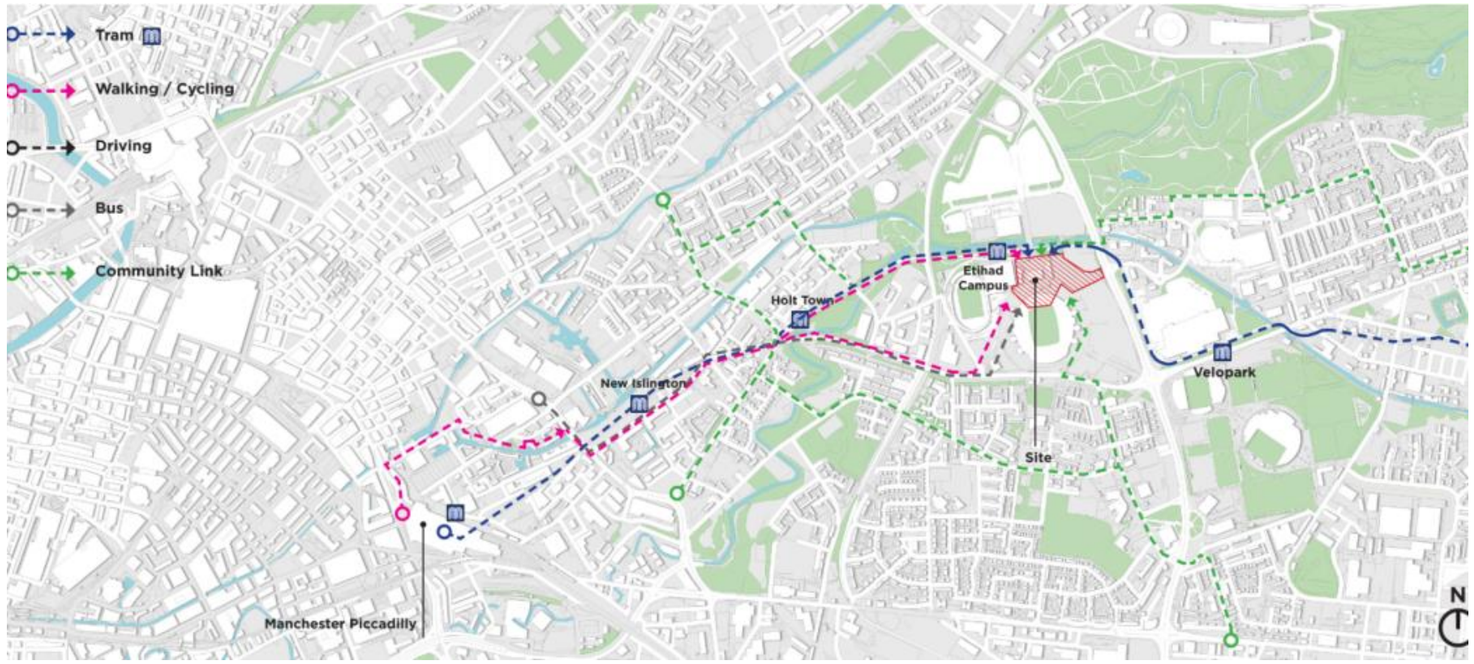


Figure 9—1 Existing Site Connections

Sustainable travel will be encouraged through a range of physical interventions and operational transport measures, as outlined in Table 9—1

Table 9—1 Sustainable Transport Interventions

Active Travel	Low Carbon Travel
• Extensive provision and promotion of safe pedestrian footways within and around the site, connecting to the Metrolink station (less than a 5-minute walk) and Manchester Piccadilly Station (less than a 35-minute walk) • Two National Cycle Network routes within the vicinity of the site (Route 60 Alan Turing Way, Route 86 Ashton Canal) • Surrounding routes form part of the proposed Manchester Beelines network, a new plan to create a city-region-wide cycling and walking network • 284 existing cycle parking spaces across the Etihad Campus, currently under-utilised, which will be promoted to the new development users • Commitment to install 200 covered cycle spaces to supplement the existing spaces across the Campus. In line with the Campus strategy, these cycle parking facilities are expected to be installed in locations where cycle routes enter the campus.	• Proximity to three main bus corridors with frequent and well-connected services • Served by the Metrolink Tram (blue line) which connects to Manchester Piccadilly and the City Centre to the west and Ashton-under-Lyne station to the east • Integrated event communication to ensure sustainable travel options are promoted and encouraged at the point of ticket purchase • Public transport incentives for staff • Long term campus electrical vehicle charging strategy • No additional parking on site, increased protection for residents close to the site and sustainable travel promoted • Promotion of further park and ride opportunities

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9.2 Local Residents

The Proposed Development will align with the Etihad Campus' ethos of being a good neighbour by promoting alternative sustainable modes of travel. Resident Parking Schemes currently operate on Etihad Stadium event days. An extended Resident Parking Scheme, which will operate every day is currently being delivered to provide a better service to local residents, maintaining accessibility and quality of life.

9.3 Community Participation

Continuing Etihad Campus' and Manchester City Football Club's journey of supporting the community, the proposed development will prioritise community engagement, partnership, and employment opportunities. These initiatives help to foster a sense of belonging and pride in the local community while providing resources and support to those in need.

FURTHER INFORMATION

Link Documents (Appended)	**Link Documents** (Other Supporting Documents)	**Planning Policy Reference**	**Contributions to the UN SDGs**
	• Travel plan • Transport assessment • Design and access statement • Environmental Impact Assessment: o Landscape and public realm strategy o Traffic and transport	Core Strategy (MCC, 2012): • Policy T1 sustainable transport • Policy T2 accessible areas of opportunity and need GM Transport strategy 2040 (GMCA,2019) Transport for sustainable communities (TfGM, 2013)	

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10 Conclusion

This Sustainability Statement seeks to demonstrate how the proposed development responds to the emerging Manchester City Council Zero Carbon 2038 framework, existing planning policies relating to sustainability and alignment with Man City sustainability policies.

The sustainability strategy has been structured around four sustainability themes taken from the wider Etihad Campus strategy:

1. Climate & Nature Positive
2. Vibrant & Inclusive
3. Healthy & Active
4. Open & Connected

This statement has been issued to fulfil the environmental sustainability standards requirement for the proposed development, which aims to prioritise sustainability and people's well-being.

The proposed development incorporates sustainability best practices to ensure that the development and its operations are sustainable in the long term. The club acknowledges that sustainability is an ongoing journey and is committed to continuously evaluating and improving sustainability practices.

The proposed development aims to understand and minimise the impacts associated with operational energy, staff, and travel, as well as operational waste.

The proposed development also strives to be a good neighbour through continuous community and city-wide engagement to maximise social value.

Based on the above It can be concluded that the proposed development aligns with Manchester City Council's goal of becoming a zero-carbon city by 2038 and a thriving sustainable city.

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Appendix A Blue Green Infrastructure

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Appendix B BREEAM Pre-Assessment

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Appendix C Energy Statement

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Appendix D Whole Life Carbon Assessment

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Appendix E Local Benefits Statement

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Appendix F Social Value Toolkit

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Appendix G Economic Impact Assessment

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North Stand Project, Manchester

Response to the Green and Blue Infrastructure Strategy for Manchester

April 2023

Contents

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2. Assessment of the Proposed Development 4
3. Summary 7

1. Introduction

1.1. This 'Response to the Green and Blue Infrastructure Strategy for Manchester' ("the Statement") accompanies an application for Full Planning Permission submitted to Manchester City Council (MCC) in respect of a Site at the Etihad Campus ("the Site") for the extension of the Etihad Stadium North Stand, alongside an expanded and covered 'City Square' and associated development components (comprising food and drink facilities, workspace, a new club shop and club museum plus a hotel) to support activity levels and the wider amenity offer of the Etihad Campus (the "Proposed Development"). The Applicant is Manchester City Football Club Ltd (the "Applicant").

1.2. The Statement sets out how the Proposed Development responds to the vision and objectives set out in the Manchester Green and Blue Infrastructure Strategy 2015 (and in turn, Core Strategy Policies EN9 Green Infrastructure and EN15 Biodiversity and Geological Conservation). It should be read in conjunction with the Design and Access Statement (prepared by Populous) and Sustainability Statement (prepared by BuroHappold) submitted in support of the application.

A Green and Blue Infrastructure Strategy for Manchester

1.3. Manchester's Great Outdoors: A Green and Blue Infrastructure Strategy for Manchester 2015-25 was adopted by MCC in July 2015 and subsequently updated in 2022, highlighting approaches, challenges and projects that will help bring the Strategy to life over the coming years.

1.4. MCC recognises that green and blue infrastructure is an essential part of creating a successful, liveable city. Parks, river valleys, gardens, street trees, green roofs, canals and many other components all form part of a rich network that is integrated with the built environment in the world's most popular cities.

1.5. The overarching vision for the Strategy remains as follows:

"By 2025, climate-resilient well-maintained green and blue spaces remains an integral part of all neighbourhoods. The city's communities will be living healthy, fulfilled lives, enjoying access to parks and green spaces, and safe green routes for walking, cycling and exercise throughout the city. Green and blue infrastructure will be supporting Manchester's growth."

1.6. Four objectives have been established to enable the vision to be achieved:

- Improve the quality and function of existing green and blue infrastructure;
- Use appropriate green and blue infrastructure as a key component of new developments to help create successful neighbourhoods and support the city's growth;
- Improve connectivity and accessibility to green and blue infrastructure within the city and beyond; and,
- Improve and promote a wider understanding and awareness of the benefits that green and blue infrastructure provides for residents, the economy and the local environment.

1.7. Section 3 of the updated Strategy outlines the progress to date and noted that the Strategy has acted as catalysts for some of the most groundbreaking environmental projects Manchester has ever taken. The Strategy has encouraged collaboration, bringing together organisations in order to deliver bold, innovative action that will benefit Manchester for many years to come.

1.8. Section 3.4 of the Strategy recognises that Manchester is a growing city, with plans for significant growth and development over the coming decade. High quality, green and open space that is appropriate to its location, well designed and well maintained will be an important and integral part of creating successful developments and supporting the city's growth.

1.9. The Strategy provides initial guidance on how developers can achieve this and recognises that different approaches will be required for different types of development and that different solutions, appropriate to the location, will be needed on each scheme. By considering green infrastructure from the beginning

of the design process, developers will be able to understand the surrounding landscape, opportunities to enhance and link to it, and the types of green and open space that could be incorporated within and add value to the development itself.

The Application Site

1.10. The Proposed Development is situated at the heart of the Etihad Campus in East Manchester, amounting to approximately 3.6 hectares. It comprises a large section of the North Stand of the Etihad Stadium and also includes land immediately to the north – comprising structural supports for the Etihad Stadium, a fan zone with canopies and F&B provision, a club shop, hardstanding, and surface car parking to the east.

1.11. As the Site is currently in use as part of the Etihad Stadium and ancillary commercial and F&B uses, it comprises mostly of hardstanding with very sparce planting.

1.12. Therefore, whilst the Site does provide some ad-hoc green infrastructure, it does not currently contribute to the wider network of spaces which can be enjoyed and experienced by members of the public and the local community. It does not include any areas where people can meaningfully experience high-quality green and blue infrastructure and as such makes little to no contribution to the Vision of the Manchester's Great Outdoors: A Green and Blue Infrastructure Strategy for Manchester 2015-25.

1.13. To the north of the Site is the Etihad Campus Metrolink stop, separating the Etihad Stadium and the Ashton Canal – which benefits from a pedestrianised and well-lit towpath. The towpath provides onward linkages to the City Centre and Clayton and is often used when events or matches are held at the Etihad Stadium. However, despite the proximity of the Site to the Ashton Canal, there is not a relationship between the two and the Site does not currently enhance the overall amenity of the towpath and Ashton Canal.

1.14. Within a wider context, the Site is located in close proximity to key pieces of green infrastructures including Philip Park within a 500 metres buffer zone as shown in Figure 1.1 below and listed underneath

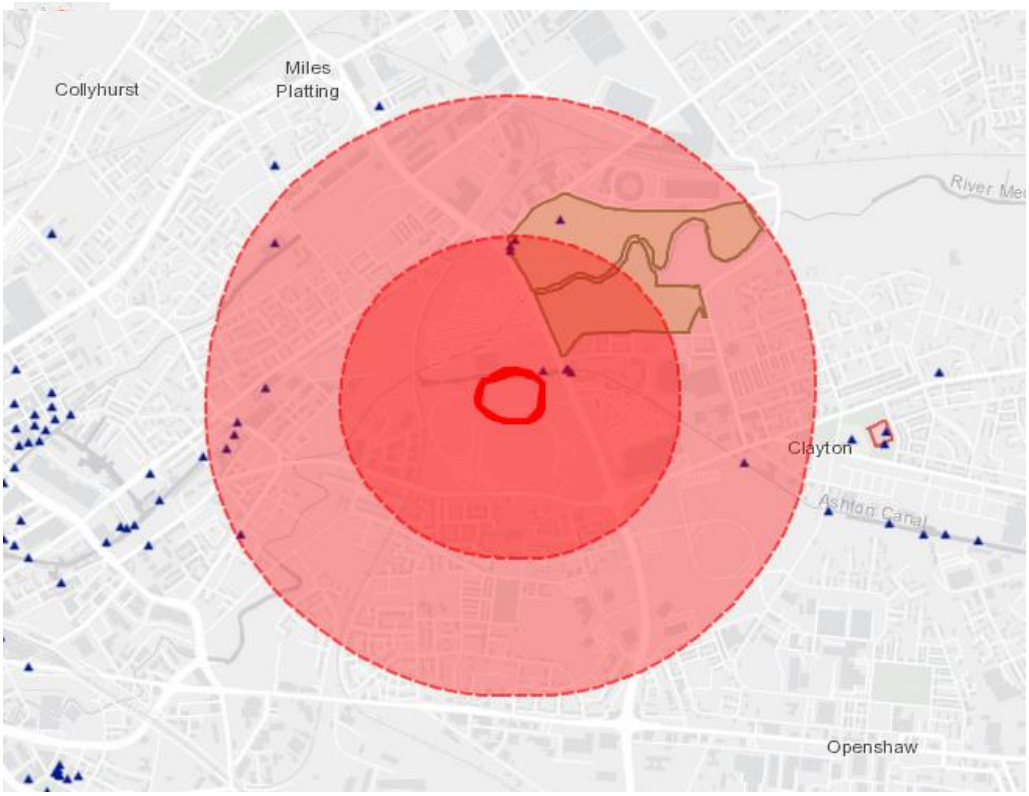
Listed Buildings:

- Ashton Canal Lock Keepers Cottage on Southside of Lock Number 7 of Ashton Canal – Grade II;
- Ashton Canal Lock Number 7 with Roving Bridge Immediately East of Mill Street Bridge – Grade II;
- Ashton Canal Lock Number 6 Immediately East of Forge Lane – Grade II;
- Victoria Mill – Grade II*;
- Entrance Lodge to Main Entrances of Phillips Park Cemetery – Grade II;
- Cemetery Office at Phillips Park Cemetery – Grade II;
- Gates and Railings to the Main Entrance of Philips Park Cemetery – Grade II;
- Cemetery Chapel at Phillips Park Cemetery – Grade II;
- Ashton Canal Bridge Number 9 Over Ashton Canal (Mill Street Bridge) at West End of Lock Number 7 – Grade II;
- Ashton Canal Lock Number 8 – Grade II;

Registered Parks and Gardens:

- Phillips Park – Grade II; and
- Phillips Park Cemetery – Grade II.

Figure 1.1 Search the List - Map Search (Source: Historic England, 2023) of both 1km and 500m radii shown



1.15. The Site is part of the Etihad Campus and therefore will contribute to the wider Green and Blue Infrastructure vision for the Etihad Campus. The Etihad Campus aspires to be a pioneer for the whole of Manchester in pursuing its twin objective of realising locally-inclusive, globally-competitive economic growth, whilst simultaneously transforming to a zero-carbon campus. A key theme that underpins the delivery of this vision is for the campus to be a beacon of Manchester's rapid transition to a zero-carbon city, rich with wildlife and green infrastructure.

1.16. Therefore, the Proposed Development sits within a wider landscape masterplan for the Etihad Campus, which aims to ensure that for each forthcoming plot development:

- The proposals are tied into existing green corridors to maximise connectivity and value to both wildlife and pedestrians;
- Lessons are learnt from successful plant species and habitat establishment within the Campus inform future landscaping proposals; and,
- Blue and green infrastructures and biodiversity initiatives which unlock wider social value and co-benefits are prioritied.

1.17. This vision and wider masterplan for the Etihad Campus has underpinned the public realm and landscaping design for the Proposed Development, which aims to deliver a landmark design which will provide a sense of place where people spend time together and transform the Etihad Campus into a visitor destination. It introduces a well-designed place that enhances the local character and makes a positive contribution to the health, safety and wellbeing of the community by connecting with its history.

2. Assessment of the Proposed Development

2.1. This section outlines the vision and objectives of the Manchester Green and Blue Infrastructure Strategy 2022 and details how the Proposed Development responds to these and, in turn, Core Strategy Policies EN9 'Green Infrastructure' and EN15 'Biodiversity and Geological Conservation'.

Green and Blue Infrastructure Objectives

2.2. As set out in Section 1, the Strategy establishes four objectives to enable the vision to be achieved. Table 2.1 below considers the Proposed Development against these objectives.

Table 2.1 Proposed Response to Green and Blue Infrastructure Objectives

Objective:	Responses:
1. Improve the quality and function of existing Green and Blue Infrastructure to maximise the benefits it delivers.	As set out in Section 1, the Site does not currently contribute to Manchester's existing green and blue infrastructure given it mostly comprises of hardstanding. Therefore, the Proposed Development provides the opportunity to enhance the Site and its surrounding area. The landscaping and public realm proposals will link with the existing surroundings to enhance the Site's green infrastructure provision. The soft landscape strategy includes a range of enhancement measures including understory plantings, SUDS planters, wildflower areas, raised planters, tree planting and green screens. The Site is known for its industrial and trading heritage, made possible through the usage of ships through the Ashton Canal. These characteristics of Manchester are portrayed in the design of City Square, having the green spaces infiltrating and breaking down the rigid pattern that mimics the ship decking. As a result, City Square becomes a green space between buildings, in a main hub of the city of Manchester.
2. Use appropriate green and blue infrastructure as a key component of new developments to help create successful neighbourhoods and support the city's growth.	Whilst the building footprint and supporting hard-landscaping for access takes up the majority of the Site, the Proposed Development has sought to creatively maximise biodiversity in the proposals. The integration of external swifts and bat boxes into the Proposed Development aligns with the Applicant's efforts to protect local bird and bat populations. Additionally, the promotion of local wildlife and plant species through the green corridor created by the Alan Turing Way connection further supports the goals of the Campus Sustainability Framework. In turn, this will improve the attractiveness of the environment and encourage access to the green and blue infrastructure

Objective:	Responses:
	networks by visitors to the Etihad Campus, as well as local residents and businesses. The expansion of the North Stand of Etihad Campus and the other elements of the Proposed Development will act to further develop East Manchester as a 'destination' and will act as a catalyst for further investment within this area. In doing so, the Proposed Development aligns to the vision of the Greater Manchester Strategy 2013 – 2020, maximising the sustainability potential of the Site and the Etihad Campus, through capturing new opportunities for growth in the visitor economy, creating jobs across the City Region, as well as being a place at the forefront of action on climate change with clean air and a flourishing natural environment.
3. Improve connectivity and accessibility to Green and Blue Infrastructure within the City and beyond.	The Proposed Development will ensure connectivity and accessibility to Green and Blue Infrastructure are improved whilst assimilating sustainably into the existing landscape at the Etihad Campus. Through improving the immediate environment and public realm through the inclusion of the wildflower planting, green screens, raised planters and tree planting, the Proposed Development will encourage connectivity between the Ashton Canal and Philips Park and other green spaces at the Etihad Campus as the public realm is a more attractive environment for pedestrians. Due to the increased footfall and activity that it creates, the Proposed Development will also act to improve awareness of and subsequently increase access to the Ashton Canal and other green spaces at the Etihad Campus.
4. Improve and promote a wider understanding and awareness of the benefits that Green and Blue Infrastructure provides to residents, the economy and the local environment.	The Proposed Development will facilitate ecological and biodiversity improvement by promoting new spaces and places with residents, local schools and community groups.

Relevant Core Strategy Policies

EN9 Green Infrastructure

2.3. Core Strategy Policy EN9 sets out that new development will be expected to maintain existing green infrastructure in terms of its quantity, quality and multiple function. Where the opportunity arises and in accordance with current Green Infrastructure Strategies the Council will encourage developers to enhance the quality and quantity of green infrastructure, improve the performance of its functions and create and improve linkages to and between areas of green infrastructure.

2.4. As set out in Table 2.1, the Proposed Development has taken the opportunity to enhance the green infrastructure of the Site through the provision of high-quality landscaping which provides opportunity for biodiversity, the formation of habitats and also a place in which people can enjoy and relax in.

2.5. In particular, it is envisioned that the landscaping and public realm proposals will link with the existing surroundings to enhance the Site's green infrastructure provision. The soft landscape strategy includes a

range of enhancement measures including understory plantings, artificial turfs, SUDS planters, wildflower areas, raised planters, tree planting, and green screens.

2.6. The provision of amenity facilities within the Proposed Development (which will be open both on event days and non-event days) will contribute to creating a destination in which to dwell and relax in. The benefit of these amenities extends to providing further leisure opportunity to those who are visiting the area such as through the provision of a range of food and beverage facilities only minutes away and open throughout the year.

EN15 Biodiversity and Geological Conservation

2.7. Core Strategy Policy EN15 states the Council will seek to maintain or enhance sites of biodiversity and geological value throughout the City and that developers will be expected to identify and implement reasonable opportunities to enhance, restore or create new biodiversity, either on-site or adjacent to the site, contributing to linkages between valuable or potentially valuable habitat areas where appropriate.

2.8. The Landscaping Section of the Design and Access Statement and the Sustainability Statement prepared by Buro Happold set out a number of ways in which the Proposed Development contributes to biodiversity. In summary, the proposed landscaping on site will provide:

- Understory plantings;
- SUDS planters;
- Wildflower areas;
- Raised planters;
- Trees planting; and,
- Green screens.

3. Summary

3.1. As described in this Statement, the provision of an improved environment and green infrastructure onsite (and adjacent within the wider campus) have been integral to the Proposed Development and will contribute to the delivery of the campus vision to be a beacon of Manchester's rapid transition to a zero-carbon city, rich with wildlife and green infrastructure.

3.2. The Proposed Development will contribute to biodiversity and enhance wildlife habitats at the Site as part of the wider campus landscaping masterplan, with the aim for the green and blue infrastructure to link into established wildlife corridors. Opportunities to enhance and create new biodiversity within the Proposed Development, such as tree planting, raised planters and native wildflower planting, are designed into the scheme which will upgrade the quality of nearby green infrastructure, improving the act of its functions and creating connections with them.

3.3. The Proposed Development therefore accords with the vision and objectives of the Green and Blue Infrastructure Strategy for Manchester.

Deloitte.

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22045	MCFC North Stand Project	BREEAM Pre-Assessment

Date:	13/04/2023	
Subject:	**BREEAM Pre-Assessment**	
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00	06/04/2023	Final for Planning	K.M.	M.M

BREEAM Planning Compliance

In line with Manchester City Council planning requirements, the BREEAM pre-assessment checklist and report has been prepared to present all relevant credits and prerequisites that the MCFC North Stand Project is intending to target. The targeted certification rating is BREEAM Very Good which aligns with the requirements of the Environmental Standards Statement which is to be submitted for planning.

Each discipline has been engaged to confirm the feasibility of achieving the BREEAM credits that are presented within their scope in each of the checklists.
The pre-assessment presents the intent of the BREEAM issues targeted, the credit requirements for each BREEAM issue targeted and the current status or anticipation of the targeted credits.

Coordination of the registration for the BREEAM assessment has commenced. The latest advice from the BRE is to carry out the BREEAM assessment for the MCFC North Stand Project as follows:

- Residential Institution Fully Fitted Assessment for the Hotel.
- Shell and Core Assessment for the Food and Beverage zones of the Hotel.
- Bespoke Assessment for the Commercial and North Stand Project.

The BREEAM pre-assessment defines the targeted credits of each of these assessments to achieve a 'Very Good' Rating for all aspects of the MCFC North Stand Project. The scorecards have been prepared to target sufficient credits which are deemed feasible with an appropriate buffer to safeguard the Very Good Rating achievement.

The BREEAM Pre-assessment scorecards are presented in the BREEAM appendix. These scorecards demonstrate the targeted Very Good Rating and provide an issue-by-issue breakdown of the credits being targeted and the evidence requirements for credit achievement.
The distribution of each category within the targeted score proportional to the BREEAM category weightings is presented. The targeted and not targeted credits in each category are presented separately.

The BREEAM pre-assessment scorecard for the Bespoke assessment is presented in the BREEAM Appendix. The targeted score for this assessment is 60.1% which achieves a BREEAM Very Good Target Rating. A summary of the pre-assessment rating for the Bespoke Assessment is presented in the following table.

Bespoke (North Stand & Commercial Building) Very Good Rating Summary

Available	153
Targeted	95
Base score	67.7%
STATUS	Very Good

The BREEAM pre-assessment scorecard for the Hotel Fully Fitted assessment is presented in the BREEAM Appendix. The targeted score for this assessment is 57.8% which achieves a BREEAM Very Good Target Rating. A summary of the pre-assessment rating for the Bespoke Assessment is presented in the following table.

Hotel (Residential Institution) Fully Fitted Very Good Rating Summary

Available	153
Targeted	92
Base score	65.4%
Status	Very Good

The BREEAM pre-assessment scorecard for the Hotel Food and Beverage Shell & Core assessment is presented in the Appendix. The targeted score for this assessment is 58.2% which achieves a BREEAM Very Good Target Rating. A summary of the pre-assessment rating for the Bespoke Assessment is presented in the following table.

Hotel (Food and Beverage) Shell and Core Very Good Rating Summary

Available	140
Targeted	84
Base score	66.1%
Status	Very Good

Management

This category encourages embedding sustainable design through sustainable management practices. Issues in this section focus on embedding robust sustainability objectives in the design and construction processes.

Man 01 Project Brief and Design
Intent
Man 01 issue recognises and encourages an integrated design process that optimises building performance.

Requirements
Project delivery planning including a sustainability brief is developed. The client requirements, target BREEAM rating, timescales, budget, consultees required and constraints (technical, legal, physical, environmental) are defined. Stakeholder consultation covering project delivery and relevant third parties is undertaken to highlight how the Concept stage was influenced by stakeholder contribution.

The BREEAM AP is appointed at Concept Stage and assists project team with maximizing the overall project's performance against the BREEAM rating system and monitors progress through to developed design stage.
Anticipation
There are 4 out of 4 credits targeted in this issue. The credit requirements have been communicated with Gardiner & Theobald and the feasibility of credit achievement has been confirmed.

Man 02 Life Cycle Cost and Service Life Planning
Intent
This issue recognises and encourages the use of life cycle costing and service life planning and the sharing of data to improve design, specification, through-life maintenance and operation and promote economic sustainability.

Requirements
The credits targeted in this issue require the Capital cost to be reported via BREEAM Assessment Scoring and Reporting tool. The capital cost of the building is reported in pounds per square metre of gross internal floor area (£k/m2). Predicted values for the construction including preparatory works, materials, equipment and labour is sufficient for the Interim Design rating.

The known or best estimate capital cost information is required for final assessment stage. Capital cost reporting is intended to inform future BREEAM performance benchmarking and will be anonymised. Costing information is collected to assist research into the cost and savings of developing BREEAM assessed buildings.

Anticipation
There is 1 out of 4 credits targeted for this issue. The credit requirements have been communicated with Turner and Townsend cost consultant and the feasibility of credit achievement has been confirmed.

BREEAM Planning Compliance

In line with Manchester City Council planning requirements, the BREEAM pre-assessment checklist and report has been prepared to present all relevant credits and prerequisites that the MCFC North Stand Expansion is intending to target. The targeted certification rating is BREEAM Very Good which aligns with the requirements of the Environmental Standards Statement which is to be submitted for planning.

Each discipline has been engaged to confirm the feasibility of achieving the BREEAM credits that are presented within their scope in each of the checklists. The pre-assessment presents the intent of the BREEAM issues targeted, the credit requirements for each BREEAM issue targeted and the current status or anticipation of the targeted credits.

Coordination of the registration for the BREEAM assessment has commenced. The latest advice from the BRE is to carry out the BREEAM assessment for the MCFC North Stand Expansion as follows:

- Residential Institution Fully Fitted Assessment for the Hotel.
- Shell and Core Assessment for the Food and Beverage zones of the Hotel.
- Bespoke Assessment for the Commercial and North Stand Expansion.

The BREEAM pre-assessment defines the targeted credits of each of these assessments to achieve a 'Very Good' Rating for all aspects of the MCFC North Stand Expansion. The scorecards have been prepared to target sufficient credits which are deemed feasible with an appropriate buffer to safeguard the Very Good Rating achievement.

The BREEAM Pre-assessment scorecards are presented in the BREEAM appendix. These scorecards demonstrate the targeted Very Good Rating and provide an issue-by-issue breakdown of the credits being targeted and the evidence requirements for credit achievement. The distribution of each category within the targeted score proportional to the BREEAM category weightings is presented. The targeted and not targeted credits in each category are presented separately.

The BREEAM pre-assessment scorecard for the Bespoke assessment is presented in the BREEAM Appendix. The targeted score for this assessment is 60.1% which achieves a BREEAM Very Good Target Rating. A summary of the pre-assessment rating for the Bespoke Assessment is presented in the following table.

Bespoke (North Stand & Commercial Building) Very Good Rating Summary

Available	153
Targeted	86
Base score	60.1%
STATUS	Very Good

The BREEAM pre-assessment scorecard for the Hotel Fully Fitted assessment is presented in the BREEAM Appendix. The targeted score for this assessment is 57.8% which achieves a BREEAM Very Good Target Rating. A summary of the pre-assessment rating for the Bespoke Assessment is presented in the following table.

Hotel (Residential Institution) Fully Fitted Very Good Rating Summary

Available	153
Targeted	83
Base score	57.8%
Status	Very Good

The BREEAM pre-assessment scorecard for the Hotel Food and Beverage Shell & Core assessment is presented in the Appendix. The targeted score for this assessment is 58.2% which achieves a BREEAM Very Good Target Rating. A summary of the pre-assessment rating for the Bespoke Assessment is presented in the following table.

Hotel (Food and Beverage) Shell and Core Very Good Rating Summary

Available	140
Targeted	75
Base score	58.2%
Status	Very Good

Management

This category encourages embedding sustainable design through sustainable management practices. Issues in this section focus on embedding robust sustainability objectives in the design and construction processes.

Man 01 Project Brief and Design
Intent
Man 01 issue recognises and encourages an integrated design process that optimises building performance.

Requirements
Project delivery planning including a sustainability brief is developed. The client requirements, target BREEAM rating, timescales, budget, consultees required and constraints (technical, legal, physical, environmental) are defined. Stakeholder consultation covering project delivery and relevant third parties is undertaken to highlight how the Concept stage was influenced by stakeholder contribution.

The BREEAM AP is appointed at Concept Stage and assists project team with maximizing the overall project's performance against the BREEAM rating system and monitors progress through to developed design stage.
Anticipation
There are 4 out of 4 credits targeted in this issue. The credit requirements have been communicated with Gardiner & Theobald and the feasibility of credit achievement has been confirmed.

Man 02 Life Cycle Cost and Service Life Planning
Intent
This issue recognises and encourages the use of life cycle costing and service life planning and the sharing of data to improve design, specification, through-life maintenance and operation and promote economic sustainability.

Requirements
The credits targeted in this issue require the Capital cost to be reported via BREEAM Assessment Scoring and Reporting tool. The capital cost of the building is reported in pounds per square metre of gross internal floor area (£k/m2). Predicted values for the construction including preparatory works, materials, equipment and labour is sufficient for the Interim Design rating.

The known or best estimate capital cost information is required for final assessment stage. Capital cost reporting is intended to inform future BREEAM performance benchmarking and will be anonymised. Costing information is collected to assist research into the cost and savings of developing BREEAM assessed buildings.

Anticipation
There is 1 out of 4 credits targeted for this issue. The credit requirements have been communicated with Turner and Townsend cost consultant and the feasibility of credit achievement has been confirmed.

Man 03 Responsible Construction Practices
Intent

Man 03 issue encourages construction sites which are managed in an environmentally and socially considerate, responsible and accountable manner.

Requirements
Prerequisites for achieving the targeted credits for this issue include the sustainable sourcing of timber which is legally harvested and traded. The client and contractor must also formally agree performance targets.
The principal contractor demonstrates sound environmental management practices and consideration for neighbours throughout their activities on site.

A Sustainability champion is appointed to continue to ensure ongoing compliance of BREEAM performance targets throughout construction, handover and close out stages.

Considerate construction is demonstrated and verified through independent assessment and verification of the Checklist A1. Principal contractor must achieve 6 items in four sections of BREEAM Checklist A1.

Site related energy consumption (kWh), potable water consumption (m3) and transport related carbon emissions (kgCO2-eq) are monitored, recorded and reported to ensure ongoing compliance during the Construction, Handover and Close Out stages and to improve awareness and understanding for future projects. The utility consumption arising from construction plant, equipment (mobile and fixed) and site accommodation is required to be submitted.

Anticipation
There are 6 out of 6 credits targeted for this issue. The credit requirements have been communicated with Laing O'Rourke and Sisk and confirmation of the feasibility of credit achievement is outstanding.

Man 04 Commissioning and Handover
Intent
Man 04 issue encourages thoughtful planning of commissioning and handover process which reflects the needs of the building occupants.

Requirements
Credit achievement requires the appointment of a commissioning specialist manager at design stage. Requirements for credit achievement in Man 04 include the schedule of commissioning which presents, optimal timescales and appropriate testing. For the Interim Design Rating, evidence can be provided in the form of the project budget, programme of works and commissioning manager specialist appointment. For the Final post-construction the commissioning report or the main contractor's programme is submitted.

The commissioning specialist manages the commissioning of all building services systems and building fabric in line with best practice.

Defects are identified through inspection and testing. The defects are rectified via an appropriate method.

Provision of a non-technical building user guide and user training or operator training are timed appropriately around handover and proposed occupation.

Shell and Core elements of the assessment of the commissioning testing schedule, responsibilities, design and preparation are applicable according to the scope of services being specified or installed.

Shell and Core elements of the assessment require the guides and training schedules to include as far as possible, the relevant sections regarding services and fabric installed. The output materials are handed over to the fit-out contractor, who completes the relevant sections based on the fit-out strategy.

Anticipation
There are 3 out of 4 credits targeted based on the assumption that a specialist commissioning manager is to be engaged during the Design Stage. Enquiries have been lodged with Laing O'Rourke and Sisk to confirm specialist commissioning manager will be appointed during Design Stage. Confirmation of the feasibility of credit achievement of this issue is outstanding.

Man 05 Aftercare
Intent
Man 05 encourages a post-handover aftercare to building owner and occupants during first year of occupation to be provided. This issue recognises efforts to ensure the building operates and adapts in accordance with design intent and operational demands.
Man 05 issue is not applicable to Shell and Core elements of assessment.

Requirements
Provisions are made for the necessary infrastructure and resources to provide aftercare support to the building occupiers. Seasonal commissioning activities will be completed over a minimum 12 month period, once the building becomes substantially occupied. The client or building occupier commits to carrying out a post occupancy evaluation (POE) exercise one year after initial building occupation and to disseminate the findings in terms of the building's post occupancy performance.

This issue is not applicable to the Shell and Core elements of the BREEAM assessment.

Anticipation
There are 3 out of 3 credits targeted for this issue.
This issue is not applicable to the Shell and Core elements of the assessment.

The credit requirements have been communicated with MCFC and Gardiner and Theobald. Confirmation of the feasibility of achieving this credit has been received.

Health & Wellbeing

The Health and Wellbeing category encourages the increased comfort and, health and safety of building occupants. The quality of life in buildings is enhanced when a healthy and safe internal/external environment for occupants is encouraged.

Hea 01 Visual Comfort
Intent
Hea 01 issue recognises efforts to ensure daylighting, artificial lighting and occupant controls are considered at design stage.

Requirements
There is a pre-requisite for this issue which requires all fluorescent and compact fluorescent lamps to be fitted with high frequency ballasts. The proposed development is designed to ensure the following:

- The potential for disabling glare has been designed out of all relevant building areas.
- Good practice daylighting levels have been met.
- Floor space in the relevant building areas has an adequate view out to reduce eye strain and provide a link to the outside.
- Internal and external lighting systems are designed to avoid flicker and provide appropriate illuminance (lux) levels. Internal lighting is zoned to allow for occupant control.

Shell and Core elements of the assessment do not include credits available for consideration of view out.

Anticipation
There are currently 1 out of 5 credits being targeted for this issue for the Fully fitted elements and 1 out of 4 credits targeted for the Shell and Core elements of the assessment.

This credit is intended to be targeted with confirmation that internal lighting and external lighting meet the relevant illuminance level standards and the lighting controls will be appropriately zoned and occupant controlled. Feasibility of credit achievement has been confirmed by ME Engineers. Additional credits in this issue (Glare Control, Daylight, View out) are to be considered for targeting as façade design develops. The credit requirements for these issues have been communicated with Buro Happold Façades. Commitment to targeting will be assessed based on the feasibility of credit achievement when façade design is sufficiently developed.

Hea 02 indoor Air Quality
Intent
Hea 02 issue encourages a healthy internal environment through specifications and installation of appropriate ventilation, equipment and finishes.

Requirements
A pre-requisite for credit achievement of this issue is the development of an Indoor Air Quality (IAQ) plan in accordance with GN06.

Credit achievement requires the building to be designed to minimise indoor concentration and recirculation of pollutants and provides fresh air in accordance with National Best Practice (NBP). Additionally, ventilation pathways are designed to minimise the ingress and build-up of air pollutants inside the building. Filtration in HVAC to minimise external air pollution and is compliant with BS EN 16798-3:2017. Air Quality sensors are specified for unpredictable occupancy patterns. Mechanically ventilated buildings and the internal space sensors are linked to the mechanical ventilation system and provide demand-controlled vent to the space. For the proposed development, the GA concourses are currently designed as mixed-mode ventilation spaces which will need to comply with the following requirements:

- Sensors which alert the building owner when CO2 levels exceed set point, or are linked to controls with the ability to adjust quantity of fresh air (e.g. automatic window opening, roof vents) are provided.
- The total number of sensors, and the net coverage of the sensors is reported.
- A vent strategy which provides adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates in accordance with CIBSE AM13.

This issue also encourages considering the emissions from construction products. Product types considered in this issue include:

- Interior paints and coatings
- Wood-based products(including wood flooring)
- Flooring materials (including floor levelling compounds and resin flooring).
- Ceiling, wall and acoustic and thermal insulation materials
- Interior adhesives and sealants (including flooring adhesives).

Credit achievement requires 3 out of 5 of the aforementioned product types to meet emissions limit, testing requirements and any additional requirements listed in Table 5.11 presented in BREEAM UK NC V6 SD5079 V6. To achieve maximum credits in this issue , all product types meet the emission limits, testing requirements and any additional requirements listed in Table 5.11.

Finally, a post-construction pre-occupancy) IAQ measurement is undertaken to measure the formaldehyde levels through sampling and analysis in line with ISO 16000-2&3. The total volatile organic compounds (TVOC) is measured post construction and is confirmed that the TVOC levels does not exceed 500ug/m3 over 8 hours and where limits are exceeded, measures to reduce concentrations are presented in IAQ. The formaldehyde and TVOC concentrations are reported in BREEAM scoring and reporting tool.

Shell and Core elements of the assessment only recognizes the completion of a BREEAM compliant Indoor Air Quality Plan (IAQ) and efforts to provide fresh air into the building in accordance with the criteria of relevant standards for ventilation.

Anticipation
There are 3 out of the 4 credits targeted for the fully fitted elements of the assessments.

There is 1 out of 1 credit targeted for the Shell & Core elements of the assessments.

A BREEAM Compliant Indoor Air Quality (IAQ) plan is required as a pre-requisite for this issue. The engagement of an Indoor Air Quality consultant is an item within the contractor scope. This has been communicated with Laing O'Rourke and SISK and confirmation of the feasibility of credit achievement is outstanding.

The ventilation requirements have been communicated with ME Engineers as a minimum distance of 10m between the AHUs exhaust and intake which will be attempted for all cases. For instances where the minimum distance is not achieved, an air quality study based on CFD simulation will be conducted to verify that the intent of the credit is satisfied.

It is targeted to specify all of the assessed construction product types in accordance with the emission limits, testing requirements and any additional requirements listed in Table 5.11 to facilitate achievement of 2 Credits and exemplary performance. The requirements for credit achievement have been communicated with Populous. Confirmation of the feasibility of credit achievement for this issue is outstanding.

Hea 04 Thermal Comfort
Intent
Hea 04 encourages satisfactory thermal comforts are achieved through design, and controls are selected to maintain a thermally comfortable environment for occupants within the building.

Requirements
Thermal modelling carried out in accordance with CIBSE AM11 considering seasonal variations and local thermal comfort criteria. For air conditioned spaces the Predicted mean vote (PMV) and predicted percentage of dissatisfied (PPD) indices are calculated. PMV and PPD reported in BREEAM Assessment Scoring and Reporting tool.

Projected climate change scenarios considered as part of the thermal model and demonstrates compliance with CIBSE Guide A.
The thermal modelling analysis has informed the thermal zoning and control strategy for the building and its users.

For Shell and Core elements of the assessment, the thermal modelling assumptions must be reasonable and represent typical use patterns and loads given the parameters and functions of the building. Thermal zoning and controls is omitted from the scope of the Shell and Core assessment. The PMV and PPD indices are not required to be reported on the BREEAM assessment scoring and reporting tool.

Anticipation
There are 3 out of 3 credits targeted for this issue, with 2 out of 2 credits targeted for the Shell and Core elements. The evidence requirements have been communicated with ME Engineers. The feasibility of credit achievement has been confirmed by ME Engineers.

Hea 05 Acoustic Performance
Intent
Hea 05 issue encourages designers to ensure the building's acoustic performance, including sound insulation meets appropriate standards for its purpose.

Requirements
A pre-requisite to achieve credits in this issue is to appoint a Suitably Qualified Acoustician (SQA). The qualifications, experience & membership of the Suitably Qualified Acoustician are provided as part of the evidence for this issue.

An acoustic report confirming the building will meet the appropriate acoustic performance standards (Section 7 of BS 8233:2014) for sound insulation, indoor ambient noise level and reverberation times is produced.

For the workspace, a programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the acoustic testing and measurement procedures.

For the hotel up to 4 credits are available, with up to 2 for sound insulation, 1 credit for indoor ambient noise levels and 1 credit for room acoustics. 1 credit is achieved if the airborne sound insulation is at least 3dB higher and the impact sound insulation value is at least 3dB lower than the performance standards in the relevant building regulations or standards. An additional credit can be achieved if the airborne sound insulation is at least 5dB higher and the impact sound insulation value is at least 5dB lower than the performance standards. The Shell and Core elements of the assessment will only consider the indoor ambient noise level for the acoustic report.

Any remediations works identified by the SQA in the acoustic report are addressed and implemented into the design.

Anticipation
There are 3 out of 3 credits targeted for the Bespoke assessment.

There are 3 out of 4 credits targeted for the Hotel Non-residential Assessment.

For the Shell and Core elements of the assessment, 1 out of 1 credit is targeted.

The credit requirements have been communicated with Buro Happold and confirmation of the feasibility of credit achievement is outstanding.

For the hotel, 3 out of 4 credits are targeted. For the hotel, only one credit is targeted for sound insulation which requires higher performing airborne and impact noise insulation by 3 dB. Confirmation of the feasibility of credit achievement is outstanding.

Hea 06 Security
Intent
Hea 06 issue encourages the planning and implementation of effective measures that provide an appropriate level of security to the building and site.

Requirements
The appointment of a suitably qualified security specialist (SQSS) to conduct an evidence-based Security Needs Assessment (SNA) during concept stage facilitates credit achievement for this issue.

SQSS develops a set of security controls and recommendations for incorporation into the proposals, directly related to the threats and assets identified in the SNA. Controls and recommendations incorporated into as-built development. Deviations from these controls and recommendations shall be justified.

Anticipation
There is 1 out of 1 credit targeted for this issue. RS Security Consultants Ltd have been appointed and an evidence-based SNA has been produced. A responsibilities matrix of the security controls and recommendations has been developed and circulated. Confirmation of credit achievement is awaiting input from Populous on the feasibility of incorporating the security controls presented in the SNA into the design of the MCFC North Stand Project.

Hea 07 Safe and Healthy Surroundings
Intent
Hea 07 issue encourages the provision for safe access around the site and outdoor space that enhances the wellbeing of building users.

Requirements
Inclusive and accessible design is presented with security needs taken into account in the design and specification. The building designed is fit for purpose, appropriate and accessible by all potential users. An Access strategy is developed to address disable users, diverse age groups, ethnicity and fitness, and future building occupants. A site plan demonstrating outside amenity space accessible to all building occupants is produced. The space must:

- be an outdoor landscaped area (garden / terrace open to the sky)
- have appropriate seating
- be designated as non-smoking
- be away from areas that will be subject to noise disturbance (e.g. building services, car parks, busy roads, delivery areas, etc.

Anticipation
There are 1 out of 2 credits targeted for this issue. The credit requirements have been communicated with Populous and the feasibility of credit achievement has been confirmed. It has been communicated that the City Square will form the basis of the evidence submission.

Energy

The Energy category encourages the specification and design of energy efficient building solutions, systems and equipment that support the sustainable use and management of energy during the building's operation. The aim of this category is to improve the inherent energy efficiency of the building, encourage the reduction of CO2 emissions and support efficient management throughout the operational phase of the building's life.

Ene 01 Reduction of Energy use and Carbon Emissions
Intent
Ene 01 issue is intended to reduce and negate the impact of natural hazard on the building. The aim is to minimized operational energy demand, primary energy consumption and CO2 emissions.

Requirements
The improvements in the energy performance of the building above national building regulations in relation to heating and cooling energy demand, primary energy consumption and carbon dioxide emissions are presented through the Energy Performance Ratio for New Construction (EPRnc).

The EPR metrics are compared against the national building regulations standard (Part L baselines) and expressed as a percentage improvement. The percentage improvements are then compared against modelled building stock and translated into a ratio of performance. The ratios are weighted for each metric and added together to determine overall EPRnc. EPRnc calculation requires building floor area as well as the predicted and actual values for each of the metrics. The predicted values of the metrics are acquired from performance data which is extracted from annual energy modelling of the building's specified or designed regulated fixed building services and fabric. The energy modelling data is sourced from the BREEAM compliant energy modelling software. Credits are achieved through comparison of the

EPRnc with the BREEAM benchmarks.

Required evidence for submission include a copy of the 2021 Part L Approved Document checks (BRUKL Output Document), confirmation of suitably qualified energy modeller's qualifications and experience and a TM54 assessment to predict operational energy. Details of the outcomes and recommendations of the assessment are required to be provided.

Encourages steps taken to reduce energy demand through building design and systems specification. Predict operational energy consumption by end use and promote monitoring and management of risks through construction and commissioning. This issue requires achievement criteria in Ene 04 Low carbon design to consider opportunities to incorporate passive design measures into the development during the concept design stage. The occupancy hours and profiles of the building, management practices and unregulated energy loads are defined through structured interview. Detailed energy modelling to predict the building energy consumption is undertaken as well as a sensitivity analysis to determine factors that can significantly impact building energy consumption. The sensitivity analysis is used to devise scenarios with the wider project team to explore high impact factors of building energy consumption. Scenario modelling and use findings is developed to inform improvements to building design and operational, maintenance and handover strategies. An energy target is determined for building, based on results of scenario modelling. At-post-construction stage, the scenario modelling is repeated to reflect the post-construction building spec, and if necessary, adjust the energy target.

Anticipation
There are 7 out of the 13 credits targeted for this issue in the Bespoke Assessment. There are 6 out of 13 credits targeted for the Hotel, both the Residential Institution (fully fitted) and Food and Beverage (Shell and Core) assessments.

All criteria for this issue are applied to the Shell and Core elements of the assessment. However, if building services efficiencies and performance specifications are not known, services complying with the minimum energy efficiency standards required by Part L is used. Where a green fit-out agreement is in place, the performance specifications confirmed within this agreement can be applied to the energy modelling.

ME Engineers have been engaged as the suitably qualified energy modeler and will carry out an appropriate energy assessment to produce the BRUKL output document which is Part L approved. A TM54 assessment has been undertaken to predict the operational energy of the Hotel, Commercial and North Stand. Scenario modelling presented in the Stage 2 report has informed the energy strategy. Option 2 has been taken forward to Stage 3. This option specifies space cooling and heating to be served by decentralized heat pump, domestic hot water served by heat pump with the exception of toilets which are served by electric heaters. The GA concourses will be naturally ventilated with provisions for mechanical ventilation when necessary.

Ene 02 Energy Monitoring
Intent
Ene 02 issue encourages the installation of energy sub-metering to facilitate the monitoring of operational energy consumption. The evidence submitted for this issue should demonstrate that managers and consultants post-handover are able to compare actual performance with the targets in order to inform ongoing management and help in reducing the performance gap.

Requirements
Energy metering systems are installed to enable 90% of the energy consumption of each fuel is assigned according to end use categories.

Meter energy consumption according to total useful floor area:

- For areas >1000m2 meter by end use
- For areas <1000m2 separate accessible energy sub-meters with pulsed or other open protocol communication outputs for future connection.

The end-use included in the BREEAM scope of assessment are presented as follows:

- Space heating
- Domestic hot water heating
- Humidification
- Cooling
- Ventilation, i.e. fans (major)
- Pumps
- Lighting
- Small power
- Renewable or low carbon systems (separately)
- Controls
- Other major energy consuming systems or plant, where appropriate. Depending on the building type, this might include: plant used for swimming or hydrotherapy pools; other sports and leisure facilities; kitchen plant or catering equipment; office equipment; cold storage plant; laboratory plant; sterile services equipment; transportation systems (e.g. lifts and escalators); drama studios and theatres with large lighting rigs; telecommunications; dedicated computer room or suite; server rooms; dealing rooms; covered car parks; ovens or furnaces; and floodlighting. See also CIBSE TM39: Building energy metering for further information.

The metering systems needs to enable building users to identify energy consuming end-uses through labelling or data outputs. Sub-meters are provided for areas with high or variable energy load.

For Shell and Core elements of the assessment, meters must be installed to the energy supply to each tenanted unit or floor plate.

For the hotel, the end-categories are required to be sub-metered per floor plate in large single occupancy or single-tenancy buildings with one homogeneous function.

Anticipation
There are currently 2 out of 2 credits being targeted for this issue. The credit requirements have been communicated and confirmed for feasibility with ME Engineers. Given the area under assessment is greater than 1000m2, metering is to be provided by end-use categories. Meters are intended to be provided for the main incoming electrical supply, on all main panels, all sub panels and every distribution at each level across the North Stand, Commercial and Hotel buildings. Meters will be pulsed and labelled.

Ene 03 External Lighting
Intent
Ene 03 issue recognises efforts to reduce consumption through the specification of energy efficient light fittings for external areas of development.

Requirements
This issue requires the specification of energy efficient light fittings for external areas of the development and controls to prevent use during daylight hours or when not needed. External lighting within the construction zone is specified to be within average initial luminous efficacy of >70 luminaire lumens per circuit Watt. Systems are designed to enable automatic control to prevent operation during daylight hours and presence of detection in areas of intermittent pedestrian traffic.

Anticipation
There is 1 out of 1 credits targeted for this issue. The credit requirements have been communicated with ME Engineers and confirmation has been received for feasibility of credit achievement.
Ene 04 Low Carbon Design
Intent
Ene 04 issue encourages the adoption of

design measures, which reduce building energy consumption and associated carbon emissions and minimise reliance on active building service systems.

Requirements
Credit achievement in this issue requires Hea 04 Thermal Comfort (Thermal Modelling) to demonstrate that the building meets satisfactory thermal comfort levels in occupied spaces to be produced. A Passive Design Analysis Report is produced. Opportunities to incorporate passive design into the development during concept design stages should be identified and where feasible implemented into the design to reduce total heating, cooling, mechanical ventilation, lighting loads and energy consumption. The reduced total energy demand and CO2-eq resulting from passive design strategy is required to be quantified . A free cooling assessment report is completed which includes an analysis of night time cooling, ground coupled air conditioning, displacement cooling, ground water, surface water, evaporative cooling, desiccant dehumidification and absorption cooling (waste heat). Opportunities to implement free cooling solutions are evaluated for inclusion in design. An energy specialist completes a feasibility study by the end of Concept Design which is intended to establish the most appropriate recognised local (on-site or near site) Low-Zero Carbon energy sources for the building based on feasibility study. The appropriate LZC technology is specified and the total reduced regulated CO2 emissions is quantified.

Anticipation
There are 3 out of 3 credits targeted for this issue. The credit requirements have been communicated with ME Engineers and confirmed for their feasibility. A BREEAM compliant passive design analysis and free cooling assessment have been completed and are ready for submission.
Ene 06 Energy Efficient Transportation systems
Intent

Ene 06 issue encourages the specification of energy efficient transportation systems within buildings.

Requirements
This issue requires the commissioning of a transport lift analysis to determine lift demand and usage patterns for the building. The analysis must determine the optimum number and size of lifts (including counter-balancing ratio), and the estimated energy consumption for one of the following:

- at least two type of systems
- an arrangement of systems
- a strategy which is fit for purpose

The lift analysis should consider the use of regenerative drive, and demonstrate that the lift with the lowest energy consumption has been specified.
The lift specification or manufacturer literature is submitted as evidence to confirm the energy-efficient features specified include:

Standby condition for off-peak periods
Car lighting and display lighting provided has an average luminous efficacy of > 70 luminaire lumens per circuit watt
Drive controller capable of variable speed, variable-voltage and variable frequency (VVVF)

Anticipation
There are 3 out of 3 credits targeted for this issue. The credit requirements have been communicated with ME Engineers and confirmed for feasibility. A BREEAM compliant transport lift analysis report has been produced and is ready for submission.

Transport

The Transport category encourages the provision of and improved access to local amenities and to sustainable means of transport. Measures that support a reduction of car journeys (CO2 emissions and congestion) over the life of the building.

Tra 01 Transport Assessment and Travel Plan
Intent
Tra 01 issue intends to reward awareness of existing local transport and identify improvements to make it more sustainable.

Requirements
A site-specific transport assessment is required to be undertaken no later than Concept Design stage. The transport assessment should demonstrate influences of the proposed development to the site layout and built form. The transport assessment should present the existing and predicted travel patterns and attitudes of existing building or site users towards cycling, walking and public transport. The current local environment for public transportation, cyclists and pedestrians, including age related requirements, is investigated. The number and type of accessible amenities within 500m is reported. The accessible amenities included in the BREEAM scope for this issue are as follows:

- Appropriate food outlet
- Access to cash
- Access to an outdoor open space (public or private, suitably sized and accessible to building users)
- Access to a recreation or leisure facility for fitness or sports
- Publicly available postal facility
- Community facility
- Over the counter services associated with a pharmacy
- Public sector GP surgery or general medical centre
- Childcare facility or school

The assessment also considers disabled access accounting for the varying levels and types of disability, including visual impairment. The public transport Accessibility Index (AI), is calculated using the BREEAM methodology.

Following the site-specific travel assessment, a site-specific travel plan which details long term management strategies to increase or improve the sustainable modes of transport and movement of people and good's during the operation of the development.
MCFC is engaged to involve them with the development of the travel plan. The intention to implement the travel plan into the proposed development's operation is demonstrated.

Anticipation
There are 2 out of 2 credits targeted for this issue. The credit requirements have been communicated with Arup and credit achievement was confirmed for feasibility. A site-specific travel assessment and travel plan have been developed as part of planning. A draft of the travel assessment and plan document has been reviewed for BREEAM compliance. The following items have been communicated with Arup as outstanding items to be addressed in the final submission:

- Travel patterns and attitudes of existing building or site users towards cycling, walking and public transport, to identify relevant constraints and opportunities.
- Predicted travel patterns and transport impact of future building or site users.
- Current local environment for pedestrians and cyclists, accounting for any age-related requirements of occupants and visitors.
- Reporting of the number and type of existing accessible amenities, within 500m of the site, measured as the safe walking distance.
- Disabled access accounting for varying levels and types of disability, including visual impairment.
- Calculation of the existing public transport Accessibility Index (AI).

Tra 02 Sustainable Transport Measures
Intent
Tra 02 intends to maximise the potential

for local public, private and active transport through provision of sustainable transport measures appropriate to site.

Requirements
A pre-requisite for this issue is the submission of a BREEAM compliant Site-specific travel plan developed with input from the MCFC and it has been proven that there is an intention to implement this plan and is supported by facilities management. Sustainable transport measures presented in Table 7.4, BREEAM UK NC V6 SD5079, are assessed for feasibility for the proposed scheme.

Credits are awarded based on the number of points achieved in Table 7.4. The points required to achieve credits in this issue is dependent on the calculated AI of the proposed development.

Anticipation
There are currently 5 out of 10 credits targeted for this issue. The BREEAM coordinators engaged with MCFC to identify easy win sustainable transport measures to be targeted for this issue. The proposed development is anticipated to address the following sustainable design measures:

- Proximity to amenities
- 200 cycle storage spaces
- Location and number of cyclist facilities (showers, changing space, lockers)

The inclusion of the sustainable transport design measures in the transport assessment and travel plan is anticipated. The targeted measures have been communicated and confirmation of their feasibility from Arup is outstanding.

Water

The Water category encourages sustainable water use in the operation of building and its site. Identifying means of reducing potable water consumption (internal and external) over the lifetime of building and minimising losses through leakage.

Wat 01 Water Consumption
Intent
Wat 01 issue is intended to reduce the consumption of potable water for sanitary use in new buildings through the use of water efficient components and water recycling systems.

Requirements
The credits allocated for this issue are calculated by the BREEAM Wat 01 calculator. This calculator intends to assess efficiency of domestic water-consuming comp. The water consumption (litres/person/day) for the assessed building against Is compared against a baseline. If greywater or rainwater system is specified, the yield of these systems (litres/person/day) is calculated and used to offset potable water demand. The specifications of the sanitary fittings and controls to be installed, including (where applicable) specification of: WCs, washbasin taps; urinals; kitchen taps; showers; bath; dishwasher; washing machine should be submitted as part of the evidence for this issue.

For Shell & Core elements of the assessment, the minimum scope of components should include WCs, wash-hand basin taps, showers, urinals and kitchen taps. If the developer is not installing these, the baseline values for any unknown components are used.

Anticipation
There are 4 out of 5 credits targeted for this issue in the Bespoke assessment which assumes the inclusion of rainwater harvesting.

There are 2 out of 5 credits targeted for the Hotel Fully fitted and Hotel Food & Beverage Shell & Core assessments. The credit requirements have been communicated with Populous and confirmation of the feasibility of credit achievement is outstanding.

ME Engineers acknowledge that there's a possibility for the rainwater harvesting to be removed from the scope of the MCFC North Project design. However given confirmation of the achievement of the Mat 01 credits is outstanding, the credits associated with rainwater harvesting have been included in the BREEAM score.

Wat 02 Water Monitoring
Intent
Wat 02 issue is intended to reduce the consumption of potable water in new buildings through the effective management and monitoring of water consumption.

Requirements
A pulsed water meter will be fitted on the mains supply to the building including instances where water is supplied via a borehole or other private source.

Shell & Core – assess water-consuming plant or building areas identifiable by the developer. Do not assess water-consuming plant or building areas to be added or installed by tenant.

For sites with multiple units or buildings, separate sub-meters should be fitted on the water supply to the following areas: each individual unit supplied with water, common areas (covering the supply to toilet blocks), service areas (covering the supply to outlets within storage, delivery, waste disposal areas), ancillary or separate buildings to the main development with water supply.

For water-consuming plant or building areas consuming 10% or more of the building's total water demand: fit easily accessible sub-meters OR install water monitoring equipment integral to plant or area. Each meter pulsed or other open protocol communication output. Connect it to an appropriate utility monitoring and management system e.g. BMS. If no BMS in operation post-construction award credits provided the system used enables connection when BMS becomes operational.

For post occupancy evaluation, the water monitoring strategy used enables the identification of all water consumption for sanitary uses as assessed under Wat 01 (litres/person/day).

Anticipation
There are currently 1 out of 1 credits being targeted for this issue. The credit requirements have been communicated and confirmed for feasibility with ME Engineers.

The mains water supply for the Etihad Stadium is proposed to be extended to serve the North Stand Project.
Water metering is to be provided at the mains supply to buildings which is defined as the point of connection between the existing stadium and proposed water infrastructure. This is intended to be located at the ground floor riser in the North Stand Project with connections to the hotel and commercial building.

BREEAM compliant water meters will be provided for all bars and concessions in the North Stand, hotel and commercial building.

Wat 03 Water Leak Detection
Intent
Wat 03 issue is intended to reduce consumption of potable water in new buildings through minimising wastage due to water leaks.

Requirements
Provisions are made for the leak detection system on the utilities water supply within buildings and between the buildings and the utilities water supply, to detect any major leaks between the utilities supply and the buildings under assessment. Permanent automated water leak detection system that alerts the building occupants to the leak or an inbuilt automated diagnostic procedure for detecting leaks. The leak detection system should be activated when flow rate passing through water meter is at a flow rate above a pre-set maximum for a pre-set period of time. The leak detection system is designed to avoid false alarms caused by normal operation of large

water-consuming plant such as chillers.

The other aspect of this issue is the specification of flow control devices which regulate water supply to each WC or sanitary facility (cold water supply to taps, WCs and urinals) according to demand, to minimize undetected wastage and leaks from sanitary fittings and supply pipework
.
For the hotel, the credit available for flow control devices applies to guest bedrooms with ensuite facilities and communal WC areas. Credit can be achieved by providing flow control devices to groups of 10 rooms, rather than each individual room.
Anticipation
There are 2 of out 2 credits targeted for this issue. The credit requirements have been communicated and confirmed for feasibility with ME Engineers. A leak detection system has been included in the metering strategy and is to be located at the point of connection between existing and proposed water infrastructure. The leak detection system will be provided on the incoming within the new north stand extension so that it detects if any leakage occurs in external pipe between entry point and point of connection. Leak detection systems are also intended to be installed on the connecting branches to the hotel and commercial building.

Flow control devices, specified as solenoid valves, are intended to be installed in each WC in the commercial, North Stand and Hotel to regulate water supply. All WCs in hotel rooms will have a solenoid valve specified.

Wat 04 Water Efficient Equipment
Intent
Wat 04 issue intends to reduce water consumption for uses not assessed under Wat 01 by encouraging the specification of water efficient equipment.

Requirements
The requirements for credit achievement of this issue include Identification of the building's water demand from uses other than domestic-scale drinking and sanitary components and mitigate or reduce their consumption and the identification systems or processes to reduce relevant water demand.

Anticipation
There is 1 out 1 credit targeted for this issue. The incorporation of rainwater harvesting into the proposed water infrastructure is intended to facilitate the achievement of this credit. The credit requirements have been engaged with ME Engineers and Populous and confirmation of the feasibility of credit achievement is outstanding.

Materials

The Materials category encourages steps taken to reduce the impact of construction materials through design, construction, maintenance and repair. Sustainable procurement of materials and low embodied impact over their life including extraction, processing and manufacture, and recycling.

Mat 01 Environmental Impacts from Construction products – Building Life Cycle Assessment (LCA)
Intent
Man 01 issue is intended to reduce the building's environmental life cycle impacts through conducting LCA and integrating its outcomes in the design decision-making process.

Requirements
This issue requires the use of BREEAM compliant LCA tool to measure the life cycle impacts of the building elements. The LCA should include mandatory building elements indicated in the 'Materials Assessment scope' section in BREEAM International Mat 01 calculator. Mandatory requirements in the 'Materials Assessment tool, method and data' section are met. The credits are allocated based on BREEAM International Mat 01 calculator score which is determined based on the robustness of LCA tool and scope of assessment.

Anticipation
There are 3 out of 7 credits being targeted for this issue. The credit requirements have been communicated with Buro Happold and the LCA Options Appraisal has been submitted for BREEAM assessor review.

Mat 03 Responsible Sourcing of Construction Products
Intent
Mat 03 recognises and encourages the specification and procurement of responsibly sourced construction products.

Requirements
A pre-requisite of this issue, is the sourcing of sustainably harvested and traded timber.

By end of Concept Design, the policy and procedures that set out procurement are documented for all suppliers and trades to abide by and are in compliance with BS 8900-1:2013 Responsible sourcing of construction products is outlined. The Procurement documentation is disseminated to all relevant internal and external personnel and included in the construction contract. Procurement documentation must encourage the specification of products with responsible sourcing certification. The available credits for Mat 03 issue are awarded based on the result of the Mat 03 Calculator tool . Credits are awarded based on the scope of the assessment and number of points achieved in the Mat 03 calculator which is presented in Table 9.10, BREEAM UK NC V6 SD5079 V6.
Anticipation
There are 2 out of 4 credits targeted for this issue. The sustainable procurement plan has been received. The structural and architectural specifications will form the evidence submission for this issue. The credit requirements have been submitted for communicated and the feasibility of targeting these credits has been confirmed.

Mat 05 Design for Durability
Intent
Mat 05 issue encourages the protection of exposed elements of the building and landscape, to minimise the frequency of replacement and maximise materials optimisation.

Requirements
Credit achievement for this issue requires the design to incorporate suitable durability and protection measures to prevent the damage of vulnerable parts of internal/external building/landscaping elements. This issue also requires consideration for protection from high pedestrian traffic, internal vehicular/ trolley movement within 1m of internal building fabric and potential vehicular collision with building facade.

Appropriate measures to improve the durability of the building and specific measures to limit material degradation due to environmental factors are incorporated into the design. The scope of assessment and methodology should follow BREEAM guidance.

Anticipation
There is 1 out of 1 credits targeted for this issue. The credit requirements have been communicated with Populous and is awaiting confirmation of feasibility.
Waste

The Waste category encourages the sustainable management (and reuse where possible) of construction and operational waste and waste through future maintenance and repairs associated with building structure.
The aim is to divert waste arising from construction and operation from landfill. Measures which reduce future waste through incorporating design adaptability to future changes in climate.

Wst 01 Construction Waste Management
Intent

Wst 01 issue aims to promote resource efficiency through the effective and appropriate management of construction waste and minimise waste going to landfill.

Requirements
A pre-requisite for this issue is to carry out a pre-demolition audit of any existing buildings, structures or hard surfaces being considered for demolition. Opportunities for refurbishment or reuse are considered for feasibility, or in case of demolition, the approach which maximises recovery of material for subsequent high grade recycling is investigated. The pre-demolition audit is required to be carried out at Concept Design stage, and is intention of informing the design, consider materials for reuse and set targets for waste management. All contractors are engaged in the pre-demolition audit. A compliant Resource management plan is produced covering non-hazardous waste materials (on-site/dedicated off-site/pre-fabrication) including demolition and excavation waste.

The waste targets set in the pre-demolition audit should meet or improve upon BREEAM benchmarks for non-hazardous waste, excluding demolition and excavation waste. The targets set for diversion from landfill should meet or improve upon the BREEAM benchmarks for non-hazardous construction waste and demolition and excavation waste generated. Waste should be sorted by material into separate key waste groups as per BREEAM guidelines, either on-site or through licenses contractor for recovery.

Anticipation
There are 5 out of 5 credits targeted for this issue. The credit requirements have been communicated with Laing O'Rourke and confirmation of their feasibility is outstanding.

Wst 02 Use of Sustainably Sourced Materials
Intent
Wst 02 issue encourages the use of sustainably sourced materials throught the specification of products with BREEAM compliant EPDs.

Requirements
Evidence requirements for this issue include the completion of a pre-demolition audit for any existing buildings, structures or hard surfaces on site and the completion of the WST 02 table to present the the aggregate for each relevant building element will be specified in line with the BREEAM requirements.

Anticipation
There is 1 out of 1 credit included as potential for this issue. The credit requirements have been communicated with Laing O'Rourke and Sisk. Confirmation of the feasibility of credit achieveemnt is outstanding from Laing O'Rourke and Sisk.

Wst 03 Operational Waste
Intent
Wst 03 issue encourages provisions to be made for suitable space and facilities to allow for segregation and storage of operational recyclable waste volumes generated by the assessed building or unit, its occupants and activities.

Requirements
Evidence requirements for this issue included the submission of annotated drawings to show both general and recyclable waste storage areas and that the latter will be at least 2m2 per 1000m2 of net floor area and located within 20m of the development.

Additionally, written confirmation is required confirming the recycle storage will be BREEAM compliant - adequately sized and labelled 'recycling'.

Anticipation
There is 1 out of 1 credit targeted for this issue. The credit requirements have been communicated with Populous, Laing O'Rourke and Sisk. Confirmation of the feasibility of credit achievement has been received from Populous but is outstanding from Laing O'Rourke and Sisk.

Wst 05 Adaptation to Climate Change
Intent
Wst 05 issue encourages the implementation of measures taken to mitigate the impact of extreme weather conditions arising from climate change over the lifespan of the building.

Requirements
Evidence to be submitted for this issue is in the form of a systematic (structural and fabric resilience specific) risk assessment to identify and evaluate the impact on the building over its projected life cycle from expected extreme weather conditions arising from climate change and, where feasible, mitigate against these impacts. The assessment must cover the following:

- Hazard identification
- Hazard assessment
- Risk estimation
- Risk evaluation
- Risk management.

Design drawings demonstrating the structure and fabric are adequately protected from the risks of a future climate should also be submitted.

Anticipation
There is 1 out of 1 credit targeted for this issue. The credit requirements have been communicated with Populous and the systematic risk assessment has been received for inclusion in the evidence submission for this issue.

Wst 06 Design for Disassembly and Adaptability
Intent
Wst 06 issue recognises and encourages measures to accommodate future changes to the use of the building and its systems over its lifespan.

Requirements
Evidence to be submitted for this issue is in the form of a building-specific functional adaptation strategy study to explore the ease of disassembly and the functional adaptation potential of different design scenarios by the end of Concept Design.

Drawings or specification confirming potential for future adaptation of the building's function are also included in the evidence submission.

Anticipation
There are 2 out of 2 credits targeted for this issue. The credit requirements have been communicated with Populous and confirmed for their feasibility. A building-specific functional adaptation strategy study has been undertaken and submitted for review. This will form part of the evidence submission for Wst 06.

Land Use & Ecology

The Land Use and Ecology category encourages sustainable land use, habitat protection and creation, and improvement of long term biodiversity for the building's site and surrounding land. Reuse of brownfield sites or low ecological value, mitigation and enhancement of ecology, and long-term biodiversity management.

LE 01 Site Selection
Intent
LE 01 issue encourages the reuse of previously developed and contaminated land where appropriate remediation has been taken.

Requirements
This issue requires that at least 75% of the proposed development is on previously occupied land. This issue also requires a Contaminated land professional to undertake a site investigation, risk assessment and appraisal, which deems that land within the development footprint to be affected by contamination.
The contaminated land professional submits a report which identifies degree of contamination, contaminant sources/types and options for remediating sources of contamination. MCFC confirms that the remediation strategy proposed by the contaminated land specialist will be implemented.

Anticipation
There are 2 out of 2 credits targeted for this issue. The previously occupied aspect of the issue has been communicated with Populous who have provided relevant site drawings which highlight the proposed development is to be constructed on a site which is greater than 75% predeveloped. The credit requirements for the contaminated land investigation have been communicated with Buro Happold and confirmed for feasibility. The timeline for submitting the completed main works application for the contaminated land remediation strategy is April 2023. It is anticipated to receive a draft of the application prior to this, to review and confirm BREEAM compliance.

LE 02 Ecological Risks and Opportunities
Intent
LE 02 intends to determine the ecological value of the site, including surrounding areas, the risks and opportunities for ecological protection and enhancement.

Requirements
Given that there are planning requirements to the proposed development requires the comprehensive route outlined in BREEAM guidance to be followed for credit achievement. This requires a Suitably Qualified Ecologist (SQE) to carry out a survey and evaluation for the site early enough to influence preparation works, layout and strategic planning decisions. The SQE determines the site's ecological baseline based on the current and potential ecological value, the direct and indirect risks, the capacity and feasibility for enhancement of site's ecological value. The ecological outcomes of the site are determined and the recommendations of the survey and evaluation are communicated with project team. The evidence requirements for this issue include an ecological assessment report including identification of the optimal ecological outcomes for the site. Identification and appraisal of the ecological outcomes informs the selection of measures to meet the optimal ecological outcomes for the site. This methodology is carried out in line with the mitigation hierarchy of action, according to the BREEAM comprehensive route.

Anticipation
There are 2 out of 2 credits targeted for this issue. The credit requirements have been communicated with the SQE and confirmation of the feasibility of credit achievement is outstanding. A draft of the Ecology Assessment report has been reviewed and assessed for BREEAM compliance. Credit achievement is dependent on the implementation of the recommendations set out in the Ecology Report. The appointment of a suitably qualifed ecologist to carry out a site-visit to confirm the measures have been implemented as recommended is outstanding.

Pollution

The Pollution category the prevention and control of pollution and surface water run-off associated with the building's location and use. Issues in this section aim to reduce the building's impact on surrounding communities and environments arising from light pollution, noise, flooding and emissions to air, land and water.

Pol 01 Impact of Refrigerants
Intent
Pol 01 aims to reduce the level of GHG emissions arising from the leakage of refrigerants used in heat or cool the building through specification and leak prevention or detection.

Requirements
A pre-requisite of this issue is the responsible specification of refrigeration systems which complies with the requirements of BS EN 378:2016 (Parts 2 and 3).

Evidence requirements for this issue include written confirmation or specifications confirming the refrigeration type and system, including:

- Global Warming Potential (GWP) of the specified system refrigerant(s)
- Total refrigerant charge (kg)
- Heating / cooling capacity (kW)

Evidence submission should include design drawings confirming the type and location of systems using refrigerants within the development and a copy of the completed BREEAM Pol 01 Calculator.

The specification of a leak detection strategy which ensures the refrigeration system hermetically sealed or only use environmentally benign refrigerants, or a refrigerant leak detection has been installed. The type of system, scope and that the containment strategy of the system is clarified. The specified system should be capable of automatically responding and managing the remaining refrigerant charge to limit loss of refrigerant. Design drawings confirming the type and location of refrigerant leak detection systems (if present) are included in the evidence submission for this issue.

Anticipation
There are 1 out of 3 credits targeted for this issue. The credit requirements have been communicated with ME Engineers and confirmed for feasibility. A DELC of less than or equal to 1000kgCO_2-eq/kW cooling and heating capacity of the refrigeration systems specified is intended to be incorporated into the design.

Pol 02 Local Air quality
Intent
Pol 02 encourages the reduction in emissions of NOx arising from the building's space and water heating systems through the use of low or no combustion heat sources in the proposed development.

Requirements
Evidence submission for this issue is in the form of written confirmation or specification confirming that all space and water heating will be supplied by non-combustion systems (i.e. only powered by electricity) or confirmation of the make and model of the boiler or combined heat and power system. Evidence submission should also include a copy of the Defra map confirming whether the site is in a high or low pollution location. Where combustion systems are specified for the development, written confirmation or specification confirming the details for the specified combustion system(s) both existing and new if applicable is required. The NOx emissions (mg/kWh) and PM10 or Volatile Organic Compounds (VOC) emissions (mg/m3) of the development are reported where applicable, for space and water heating. The reported NOx emissions levels are reported by appliance type, fuel and location and do not exceed the maximum limits specified by BREEAM
.
Anticipation
There are 2 out of 2 credits targeted for this issue. The credit requirements have been communicated with ME Engineers and confirmed for feasibility.
Pol 03 Flood and surface water management
Intent
Pol 03 issue intends to avoid, reduce and delay the discharge of rainfall to public sewers and watercourses, thereby minimising risk and impact of localised flooding on-site and off-site, watercourse pollution and other environmental damage.

Requirements
A pre-requisite for this issue is the appointment of an appropriate consultant to carry out and demonstrate the development's compliance with all relevant criteria.

A Site-specific Flood Risk Assessment (FRA) report is undertaken. All current and future sources of flooding are considered. The report confirms the development is in a flood zone defined as having a low annual probability of flooding. Should the site be identified as a medium/high probability zone for flooding, site plans/sections are provided which confirm:

- The design ground levels (for the development and site) compared to design flood levels; AND

- Safe access routes to the development.

Written confirmation that the findings of the drainage consultant's report will be followed by the commissioning of relevant maintenance agreements for the ownership, long-term operation and maintenance of all specified Sustainable Drainage Systems (SuDS). The drainage report should also confirm that flooding of property will not occur in the event of the local drainage system failure AND EITHER:

- The post-development runoff volume will be no greater than pre-development runoff volume (managed by SuDS); OR
- The consultant provides robust justification why the above criteria cannot be achieved (i.e. infiltration etc. are not technically viable) AND the post-development discharge rates can be limited to the highest of the following; pre-development 1 in 1 year peak runoff rate OR the mean annual runoff rate (Qbar) OR 2 litres/second/hectare.

Anticipation
There are 4 out of 5 credits targeted for this issue. The credit requirements have been communicated with Buro Happold and compliance with BREEAM is awaiting confirmation. A draft of the drainage consultant report has been received. Confirmation of the feasibility of achieving the credits for flood resilience and surface water run-off rate has been received. Confirmation of the feasibility of achieving the final credit for surface water run off volume outstanding.

Pol 05 Reduction of Noise Pollution
Intent
Pol 05 issue aims to reduce the likelihood of noise arising from fixed installations on the new development affecting noise-sensitive areas.

Requirements
This issue requires the commissioning of a Noise Impact Assessment carried out by a suitably qualified acoustic consultant, in compliance with BS 4142:2014.
Existing background noise levels (at nearest/most exposed noise sensitive area to the development and including existing plant on a building, where the development is an extension) and expected noise rating level from the assessed buildings proposed plant are reported. The noise levels reported at the nearest/most exposed noise sensitive area to the development are confirmed of whether they are higher or lower than 5dB lower than the background noise levels. In the case that the 5dB lower than background is not achieved, specification of attenuation measures to attenuate the noise at its source to a compliant level are developed.
Anticipation
There are 1 out of 1 credits anticipated for this issue. The credit requirements have been communicated with Buro Happold and confirmation of their feasibility is outstanding.

Innovation

Man 03
In this issues, innovation credits are achieved through the implementation of all responsible construction measures presented in BREEAM guidance.
This credit is targeted and has been communicated with Laing O'Rourke and Sisk. Feasibility of credit achievement is outstanding.
Hea 02
The innovation credit for Hea 02 issue requires commitment to the exemplary performance of construction material emission limits set out in BREEAM guidelines. This credit is targeted for the MCFC North Stand Project Very Good Rating. The credit requirements have been communicated with Laing O'Rourke and Sisk. Confirmation of the feasibility of credit achievement is outstanding.

Hea 06
This credit is targeted with the assumption that documentation will be submitted to demonstrate a compliant risk based security based rating scheme has been used and the performance of the scheme has been confirmed by an independent assessment and verification. The credit requirements of this issue have been communicated with RS Security Consultant's and confirmation of the feasibility of credit achievement for this issue.

Ene 01
This credit is targeted with the assumption that a post occupancy energy assessor to report on the actual energy consumption compared with the targets set out in the energy strategy will be engaged. The credit requirements of this issue have been communicated and confirmed for feasibility with Gardiner & Theobald.

Distinct Credits

Wst 04 Speculative Finishes
Intent
Wst 04 issue encourages the specification and fitting of finishes selected by the building occupant and therefore avoid unnecessary waste of materials. This issue is applicable to the workspace of the proposed development.

Requirements
This issue is only applicable to tenanted workspace areas. Speculative finishes are installed for show room purposes only. Floor and ceiling finishes are only specified where they have been selected. Evidence for this issue is submitted in the form of written commitment that the tenanted areas, where the future occupant is not known and carpets or other floor or ceiling finishes are installed, these are be limited to a show area only.

Anticipation
This issue is only applicable to the workspaces in the proposed development. For the Bespoke assessment, it is recommended to target 1 out of 1. Credit achievement is considered within the scope of MCFC.

BREEAM Pre-Assessment Bespoke Fully Fitted Checklist

BREEAM NC UK V6 PRE-ASSESSMENT

Project: MCFC Bespoke

Available	153
Targeted	95
Anticipated	7
Potential	26
Targeted score	67.7%
Anticipated Score	73.3%
Potential Score	89.3%

Credits Colour Code

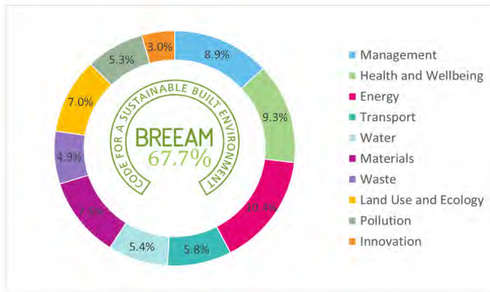
	Base credits to be targeted
	Anticipated credits to be targeted upon confirmation it can be achieved
	Potential credits not needed for Very Good level scope/ Not targeted
	High risk/not targeted
	N/A credit for the assessment scope /Excluded

Status Colour Code

	Credit requirements anticipated
	Credit requirements not Completed/Targeted
	Credit requirements completed
	N/A credit

BREEAM rating	% score
Outstanding	≥85
Excellent	≥70
Very good	≥55
Good	≥45
Pass	≥30
Unclassified	<30

Category	Available	Targeted	Potential	Anticipated	Achieved	Weighting	Targeted Score	Anticipated Score	Potential Score	Achieved Score
Management	21	17	4	1	3	11%	8.9%	9.4%	11.0%	1.6%
Health and Wellbeing	18	12	5	4	4	14%	9.3%	12.4%	13.2%	3.1%
Energy	23	15	0	0	15	16%	10.4%	10.4%	10.4%	10.4%
Transport	12	7	0	0	0	10%	5.8%	5.8%	5.8%	0.0%
Water	9	7	1	1	4	7%	5.4%	6.2%	6.2%	3.1%
Materials	14	7	6	0	4	15%	7.5%	7.5%	13.9%	4.3%
Waste	11	9	2	1	2	6%	4.9%	5.5%	6.0%	1.1%
Land Use and	13	7	6	0	4	13%	7.0%	7.0%	13.0%	4.0%
Pollution	12	8	2	0	7	8%	5.3%	5.3%	6.7%	4.7%
Innovation	20	6	0	0	0	10%	3.0%	3.0%	3.0%	0.0%
Total	153	95	26	7	43	110%	67.7%	73%	89.3%	32.3%





Management

Title	Topic	Available	Targeted	Potential	Sub-Topic	Requirements	Status	Responsibility	Time Critical	M Consultant Meeting notes (19	Consultant Feedback
Man 01	Project Brief and Design	4	4	0	Project Delivery Planning	Design team responsibilities schedule / contact list	Completed	GARDINER & THEOBALD	Before end of Concept Design	Information included in stage 2 report and project directory - V2 including contact list Please provide summarized schedule with contact details	
						Meeting minutes/agendas/presentations demonstrating early consultation with all relevant stakeholders identifying roles, responsibilities and contributions of design team at each key phase	Completed	MCFC/ GARDINER & THEOBALD/ BREEAM Consultant	Before end of Concept Design		
					Interested Parties	Consultation plan setting out the process, timeline and scope of the consultation.	Completed	MCFC/ GARDINER & THEOBALD/ BREEAM Consultant			
						All documents used and collected from the consultation process including list of stakeholders, meeting minutes, agendas, presentations.	Completed	MCFC/ GARDINER & THEOBALD/ BREEAM Consultant			
						Documentation confirming that feedback was given to the consultees on their ideas / concerns (e.g. presentations, website/newsletter updates)	Anticipated	BREEAM Consultant			
					BREEAM AP (Concept & Developed Design)	Please ensure that ME Engineers is invited to key design team meetings, and provided minutes for all other team meetings.	Completed	GARDINER & THEOBALD			
						Compliance Letter confirming that BREEAM AP was appointed and will report progress against BREEAM targets	Completed	GARDINER & THEOBALD/BREEAM Consultant	Before end of /Concept Design		
						Meeting minutes confirming attendance of ME Engineers to review project progress against BREEAM	Completed	GARDINER & THEOBALD/BREEAM Consultant		BREEAM Meeting 19/10/2022	
						BREEAM Progress report	Anticipated	BREEAM Consultant			
Man 02	Life cycle cost and service life planning	4	1	3	Elemental LCC	Elemental life cycle cost plan at RIBA Stage 2 (60 year design life, unless otherwise confirmed by the client) in line with PD 156865:2008. This must: a. Show an indication of future replacement costs over a period of analysis agreed to by the client (e.g. 20, 30, 50, 60+ years) b. Include service life, maintenance and operation cost estimates	Not-Completed/Targeted	T&T	Before end of Concept Design		
						Documentation (specifications / drawings) demonstrating examples of how the elemental LCC has influenced the design of the building	Not-Completed/Targeted	T&T/ PCP	Before end of Concept Design		
					Component level LCC options appraisal	Component level life cycle cost plan at RIBA Stage 4 in line with PD 156865:2008 that includes the following component types (where present): envelope, services, finishes, external spaces.	Not-Completed/Targeted	T&T	Before end of Concept Design		
						A specification document / drawings showing how the component level LCC plan has been used to influence building and systems design/specification to minimise life cycle costs and maximise critical value	Not-Completed/Targeted	T&T/ PCP	Before end of Concept Design		
					Capital cost reporting	Compliance letter confirming the predicted capital costs, included contingencies, in pounds per square metre (£/m2).	Anticipated	T&T			

Man 03	Responsible construction practices	6	6	0	Prerequisite - Legally harvested & traded timber Environmental management	Pre-requisite: Written confirmation that all site timber will be legally harvested and traded timber	Anticipated	LOR		
						Written confirmation that any party managing the construction site (main contractor / demolition contractor) has ISO 14001 or BS 8555:2016 certification.	Completed	GARDINER & THEOBALD/LOR		
						Written confirmation that the main contractor's pollution prevention procedures will be implemented at the site (in line with PPG6)	Anticipated	LOR		
					Responsible construction management Monitoring of construction site impacts - Energy & wate	Written commitment that the main contractor will carry out the mandatory BREEAM Responsible Construction Management requirements.	Anticipated	LOR		
						Written confirmation that responsibility has been assigned to an individual(s) for monitoring, recording and reporting energy and water consumption data resulting from all construction processes.	Anticipated	LOR		
						Written confirmation that targets have been set for site water and energy consumption, and that consumption will be monitored and recorded.	Anticipated	LOR		
					Transport of construction materials & waste	Written confirmation that responsibility has been assigned to an individual(s) for monitoring, recording and reporting of transport details for all deliveries to the site, and all waste removal from the site	Anticipated	LOR		
						Written confirmation that targets will be set in respect of transport movements (in km and litres of fuel), and these will be monitored and recorded separately in terms of: Materials delivered to the site -Waste removed from the site.	Anticipated	LOR		
Man 04	Commissioning and handover	4	3	1	Commissioning - Testing schedule and responsibilities	Schedule of commissioning and testing, identifying suitable timescales for commissioning and re-commissioning of all systems.	Anticipated	Commissioning Specialist/LOR		
						Written confirmation of procedures for commissioning of the BMS	Anticipated			
						Written confirmation that an appropriate project team member is appointed to monitor and programme pre-commissioning, commissioning and re-commissioning on behalf of the client, and that commissioning will be undertaken in line with CIBSE, BSRIA and Building Regulations.	Anticipated	Commissioning Specialist/.OR	Before end of Technical Design - appointment	
						Project Programme including dates for commissioning.	Anticipated	Commissioning Specialist/LOR		
					Commissioning - Design and preparation	Written confirmation that a specialist commissioning manager will be appointed during the design stage to undertake design reviews and provide advice during construction programming, installation and testing	Anticipated	LOR	Before end of Technical Design - appointment	It has been discussed that a specialist commissioning manager might be appointed during the design stage to undertake design reviews and provide advice during construction programming, installation and testing. The credit will be targeted upon confirmation
					Testing and Inseption Building Fabric	Post-construction testing and inspection to quality-assure the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths. Survey and Testing undertaken by Suitably qualified professsional. Remediation works are undertaken and completed prior to building handover and close out.	Not-Completed/Targeted	LOR		
					Handover	Written commitment to produce two non-technical building user guides: 1. A non-technical user guide for distribution to the building occupiers 2. A technical user guide for the premises facilities manager	Anticipated	LOR		
						Confirmation that the building user guides will be provided to the building occupants.	Anticipated	LOR		
						Confirmation of the content of the training schedules prepared: 1. A non-technical training schedule for the building occupiers. 2. A technical training schedule for the premises facilities manager	Anticipated	LOR		
Man 05	Aftercare	3	3	0	Aftercare Support	Written confirmation that the following will be undertaken post development: - Collect the energy and water consumption data for at least 12 months after occupation - Compare this with what was expected - Analyse any discrepancies with a view of adjusting systems if they are not operating as expected / designed	Anticipated	MCFC/ GARDINER & THEOBALD		
						Written confirmation that aftercare support and training will be provided in line with the following: - A meeting to introduce the aftercare team and Building User Guide, present key information about how the building operates and answer questions. - Initial aftercare - e.g. on site attendance on a weekly basis for at least 4 weeks after handover. - On site FM training to include a walkabout of the building. - Longer term after care (e.g. a helpline, nominated individual or other appropriate system) to support building users for at least 12 months of occupation	Anticipated	MCFC/ GARDINER & THEOBALD		
					Commissioning - Implementation Post Occupancy Evaluation	Written confirmation that seasonal commissioning responsibilities will be completed over a minimum 12 month period, once the building becomes occupied (in line with BREEAM criteria for either complex or simple systems	Anticipated	MCFC/ GARDINER & THEOBALD		

HEA 06	Security	1	1	0	Security of site and building	A copy of the Security Needs Assessment report, provided by a Suitably Qualified Security Specialist outlining: 1. Scope of their advice/involvement. 2. The stage of design in which their advice was sought (no later than RIBA stage 2) 3. Summary of their recommendation	Anticipated	RS Security Consultants Ltd / POP	(before end of Concept Design) - appointment.	SNA Received. Awaiting input from Populous.		
						Written confirmation of the qualifications of the Suitably Qualified Security Specialist	Anticipated	RS Security Consultant Ltd				
						Written confirmation and / or site drawings confirming design in accordance with Suitably Qualified Security Specialist recommendation.	Anticipated	POP				
						Written confirmation from Suitably Qualified Security Specialist that any deviations from original recommendations have been agreed (if applicable)	Anticipated	RS Security Consultant Ltd				
HEA 07	Safe and healthy surroundings	2	1	0	Safe access	Site plan showing safe and separate access routes for: - cyclists (including cycle paths to cycle storage); - pedestrians (including mark-ups of any traffic calming measures, i.e. speed bumps, and raised pedestrian crossings); - small vehicles (including parking provision and pedestrian access from car to building); and - delivery vehicles / areas (including manoeuvring layouts and mark-up of any waste storage areas).	Not-Completed/Targeted	POP				
					Outside space	Site plan demonstrating outside amenity space accessible to all building occupants. The space must: -be an outdoor landscaped area (garden / terrace open to the sky) -have appropriate seating -be designated as non-smoking -be away from areas that will be subject to noise disturbance (e.g. building services, car parks, busy roads, delivery areas, etc	Anticipated	POP				
						Written statement confirming the amenity space has been sized appropriately for the number of expected building users	Anticipated	POP				

Total	Available	Targeted	Potential	weighting	Score	Potential Score					
	18	12	5	14%	9%	13%					

Energy

Title	Topic	Available	Targeted	Potential	Sub-Topic	Requirements	Status	Responsibility	Time Critical	M Consultant Meeting notes (19/3/	Consultant Feedback	
Ene 01	Reduction of energy use and carbon emissions	13	7	0	Energy Performance	A copy of the 2021 Part L Approved Document checks (BRUKL Output Document)	Completed	ME Engineers				
						Confirmation of suitably qualified energy modeller's qualifications and experience	Completed	ME Engineers				
					Prediction of Operational Energy Consumption	TM54 assessment to predict operational energy MOM4 of Workshop discussing the assessment outcomes and recommendations	Completed	ME Engineers				
Ene 02	Energy monitoring	2	2	0	Sub-metering of end-use categories	Written confirmation / specifications confirming that all major energy consuming systems will be sub-metered.	Anticipated	ME Engineers		•Generally accepted that the metering credit was achievable •Duncan Cash confirmed there is an allowance within the budget for the metering credit •MEE action – liaise with Duncan to ascertain what allowance/solution has been made for the breeam and ensure it is reolicated in our		
						Technical drawings and specification confirming: - energy consuming systems (heating, hot water, small power, lighting and any major fans) and their rated outputs. - metering arrangement for each system, type and location of meter specified - meters are pulsed and labelled.	Anticipated	ME Engineers				
					Sub-metering of high energy load and tenancy areas	Written confirmation / specifications confirming that different function / tenant areas will be sub-metered (e.g. kitchen, office floor plates,	Anticipated	ME Engineers				
						Technical drawings confirming: additional sub meter(s) for different function / tenancy areas.	Anticipated	ME Engineers				
Ene 03	External lighting	1	1	0	External lighting	Marked up site plans showing location and purpose of all external light fittings	Anticipated	ME Engineers				
						Written confirmation / specifications confirming external lighting meets luminaire requirements (>70 lumens per circuit watt), and are fitted with daylight sensors, and presence detectors in areas of intermittent pedestrian traffic	Anticipated	ME Engineers				
Ene 04	Low carbon Design	3	3	0	Passive Design Analysis	Results of thermal modelling (Hea04)	Anticipated	ME Engineers	Stage 4			
						A Pasdive Design Analysis report of the proposed building (at RIBA Stage 2), that identifies passive design solutions and quantifies the total reduced energy demand and carbon dioxide emissions resulting from them.	Completed	ME Engineers	Before end of Concept Design			
						Free Cooling assessment report	Completed	ME Engineers				
						Drawing plans / specificaton confirming specification of passive design measures	Anticipated	ME Engineers				
					LZC feasibility study	A copy of the low/zero carbon feasibility study including quantified reduced regulated carbon dioxide (CO2 eq) emissions resulting from the low carbon / renewable technology	Completed	ME Engineers				
						A drawing or specification showing the specification of the low carbon / renewable technology as recommended within the feasibility study	Anticipated	ME Engineers				
Ene 06	Energy Efficient Transport systems	2	2	0	Energy consumption	Transport lift analysis to determine lift demand and usage patterns for the building. The analysis must determine the optimum number and size of lifts (including counter-balancing ratio), and the estimated energy consumption for one of the following: - at least two type of systems - an arrangement of systems - a strategy which is fit for purpose	Anticipated	ME Engineers				
						Written confirmation that the lift analysis considered the use of regenerative drive, and the lift with the lowest energy consumption has been specified.	Anticipated	ME Engineers				

					Energy efficient features - Lifts	Copy of the lift specification or manufacturer literature to confirm the energy-efficient features specified include: - Standby condition for off-peak periods - Car lighting and display lighting provided has an average luminous efficacy of > 70 luminaire lumens per circuit watt - Drive controller capable of variable speed, variable-voltage and variable frequency (VVVF	Anticipated	ME Engineers				
Ene 08	Energy efficient equipment	2	0	0	Energy efficient features - Equipment	Submit Energy modelling results showing annual Unregulated energy consumption inline to the methods described in CIBSE TM54 Evaluating operational energy performance of buildings at the design stage. The report should highlight significant unregulated energy contributors to annual unregulated energy consumption and show that a meaningful measures to reduce unregulated energy demand of the significant contributors and overall unregulated energy consumption through using energy efficiency measures and using efficient equipment	Not-Completed/Targeted	ME Engineers				
Total		Available 23	Targeted 15	Potential 0	weighting 10%	Score 10%	Potential Score 10%					
Transport												
Title	Topic	Available	Targeted	Potential	Sub-Topic	Requirements	Status	Responsibility	Time Critical	M Consultant Meeting notes (19/1	Consultant Feedback	
Tra 01	Transport assessment and travel plan	2	2	0	Travel Plan	Travel Plan developed during the feasibility and design stages based on a site-specific travel assessment or statement in accordance with BREEAM requirements (please contact BREEAM assessor for full details)	Anticipated	Arup	Preparation and Brief			
						Written confirmation that the travel plan will be implemented post construction and be supported by the building's management in operation.	Anticipated	MCFC/GARDINER & THEOBALD				
Tra 02	Sustainable transport measures	10	5	0	Transport options implementation	Assessment of existing site Accessibility Index (AI), AND evidence of sustainable transport measures.	Anticipated	Arup/BREEAM Assessor				
						Written confirmation that electric recharging stations will be provided (of a minimum of 3kW) for at least 10% of the total car parking capacity for the development.	Anticipated	GARDINER & THEOBALD/Arup/ME Engineers/POP				
						For fully-fitted buildings only: Written confirmation that a facility to facilitate and encourage building users to car share will be set up, and marketing and communication materials raising awareness of the sharing scheme with	Anticipated	MCFC/GARDINER & THEOBALD/Arup				
						Evidence of existing and new amenities where relevant.	Anticipated	Arup/POP				
						Drawing plan confirming specification of compliant sustainable transport measures (where applicable): a) 10% electric recharging car parking spaces b) 5% marked-up car share spaces located nearest the development entrance c) Location and number of cycle storage spaces d) Location and number of cyclist facilities (showers, changing space, lockers)	Anticipated	Arup/POP				
Total		Available 12	Targeted 7	Potential 0	weighting 10%	Score 6%	Potential Score 6%					
Water												
Title	Topic	Available	Targeted	Potential	Sub-Topic	Requirements	Status	Responsibility	Time Critical	M Consultant Meeting notes (19/1	Consultant Feedback	
Wat 01	Water Consumption	5	4	0	Water consumption	Written Confirmation / Technical specification of sanitary fittings and controls to be installed. Including (where applicable) specification of: WCs, washbasin taps; urinals; kitchen taps; showers; bath; dishwasher; washing machine.	Anticipated	POP				
						Drawing to show location and specification of sanitaryware	Anticipated	POP				
Wat 02	Water Monitoring	1	1	0	Water monitoring	Compliance letter confirming a pulsed water meter will be fitted on the mains supply to the building	Anticipated	LOR				
						Design drawing to confirm the water meter is on the mains supply to the assessed building	Anticipated	ME Engineers				
Wat 03	Water Leak detection	2	2	0	Leak detection system	Compliance letter confirming a BREEAM compliant leak detection system will be specified	Anticipated	ME Engineers				
						Drawings to confirm a leak detection system has been installed on the mains water supply within the building and also between the building and the utilities water meter. Installation of flow control devices on each sanitary facility or WC.	Anticipated	ME Engineers				
Wat 04	Water efficient Equipment	1	0	1	Water efficient Equipment	For landscape areas provide a design report demonstrating to the assessor that a reduction in water consumption has been achieved using existing 'tried and tested' solutions. The following are some examples of solutions deemed to satisfy compliance for a number of different building types or functions -Drip-fed subsurface irrigation incorporating soil moisture sensors. The irrigation control should be zoned to permit variable irrigation to different planting assemblages. -Reclaimed or recovered water from a rainwater collection or waste water recovery system with appropriate storage, i.e. greywater collection from building functions or processes that use potable water, e.g. vehicle wash, sanitary facilities, irrigation etc. -External landscaping and planting that relies solely on precipitation, during all seasons of the year. -All planting specified is restricted to contextually appropriate species that thrive without irrigation and will continue to do so in those conditions likely as a result of climate change, i.e. typically warmer and drier conditions.	Anticipated	POP/ME Engineers				
Total		Available 9	Targeted 7	Potential 1	weighting 7%	Score 5%	Potential Score 6%					
Materials												
Title	Topic	Available	Targeted	Potential	Sub-Topic	Requirements	Status	Responsibility	Time Critical	M Consultant Meeting notes (19/1	Consultant Feedback	
Mat 01	Life Cycle Assessment	7	3	4	Superstructure	Design drawings, including elevations and build-ups detailing the build up of all major materials within the superstructure of the building.	Anticipated	BH - Lucy/Ben				
						A completed copy of the 'LCA DETAILS' document OR Mat 01 Table if the simplified approach is to be undertaken (to be provided by Assessor).	Anticipated	BH - Lucy/Ben				
						A copy of the LCA report including 3 - 4 option appraisals at Concept Design stag	Anticipated	BH - Lucy/Ben	Before planning			
						A copy of the LCA report including 3 option appraisals at Technical Design stage	Anticipated	BH - Lucy/Ben	Before end of Technical Design			

					Substructure and landscape	Drawings including build-ups detailing the build up of all major materials within the substructure of the building and hard landscaping elements of the development	Not-Completed/Targeted	POP/BH				
						A completed copy of the 'LCA DETAILS' document including detail of substructure and hard landscaping	Not-Completed/Targeted	POP/BH				
						A copy of the LCA report including 3 option appraisals at concept design stage	Not-Completed/Targeted	POP/BH/LCA Consultant				
Mat 02	Environmental Product Declaration	1	1	0	Specification of products with EPDs	Contractor requirements document confirming that at least 15 products with recognised EPDs will be procured for the development	Not-Completed/Targeted	LOR				
Mat 03	Responsible sourcing construction product	4	2	1	Prerequisite - Legally harvested & traded timber	Compliance letter / Contractor Requirements confirming all timber procured will be legally harvested and traded timber	Anticipated	LOR				
					Enabling sustainable procurement	A copy of the sustainable procurement plan for the development or at a company operational level (developer or architect), produced at concept design stage. The plan must include sustainability aims, objectives and strategic targets to guide procurement activities	Anticipated	POP	Before end of Concept Design			
					Measuring responsible sourcing	Drawings to show the specification of the build up of the relevant building elements (see MAT03 Table)	Anticipated	POP				
						Completed MAT03 Table, including manufacturer details for each material specified and their corresponding volume (in m3) or mass (in kg) and where possible.	Anticipated	POP				
						A copy of suppliers responsible sourcing certification (e.g. ISO14001, BES6001, FSC) where available OR	Anticipated	POP				
						Compliance Letter committing to procure from suppliers who can provide the relevant responsible sourcing certification for each material type (e.g. ISO14001, BES6001, FSC)	Anticipated	POP				
Mat 05	Design for durability and resilience	1	1	0	Design for durability and resilience	Design drawings marked up to show vulnerable areas of the building that may be susceptible to damage, including: - Areas of high user numbers - i.e. main entrances, circulation spaces - Areas of internal transport movement - i.e. trolley movement - External walls within 1m of vehicular movement	Anticipated	POP	Credit requirements on (20/20/2022). Highly recommended to target this credit			
						Design drawings / specification outlining the measures taken to enhance durability: - Bollards / barriers / raised kerbs in delivery areas - Robust external wall construction - Protection rails to internal walls - Kickplates on doors - Hard wearing floors	Anticipated	POP				
						Written confirmation or specifications confirming elements have been designed to limit long and short term material degradation through confirming that elements or products achieve an appropriate quality or durability standard.	Anticipated	POP				
						Marked up drawing(s), or maintenance plan confirming access to the roof and façade for cost-effective cleaning, replacement and repair in the building's design.	Anticipated	POP				
						Marked up drawing highlighting features of the roof and façade design that prevent water damage, ingress and detrimental ponding.	Anticipated	POP				
Mat 06	Material efficiency	1	0	1	Material efficiency	Report (at Preparation and Brief stage) setting targets relating to material efficiency and report on opportunities and methods to optimise the use of materials at each key stage of the project	Not-Completed/Targeted	POP	Preparation and Brief			
						Commitment to implement the targets outlined in the above report, plus develop and record the implementation of materials efficiency at developed design, technical design and construction	Not-Completed/Targeted	POP				

Total	Available	Targeted	Potential	weighting	Score	Potential Score				
	14	7	6	15%	8%	14%				

Waste

Title	Topic	Available	Targeted	Potential	Sub-Topic	Requirements	Status	Responsibility	Time Critical	M Consultant Meeting notes (19/1	Consultant Feedback
Wst 01	Construction waste management	5	5	0	Pre-demolition audit	Confirmation that a pre-demolition audit will be carried out using an appropriate methodology. This must show the recovery of demolition material for subsequent high grade or value applications. The audit must cover the content of Pre-demolition audit scope and: a: Be carried out at Concept Design stage prior to strip-out or demolition works b: Guide the design, consider materials for reuse and set targets for waste management c: Engage all contractors in the process of maximising high grade reuse and recycling opportunities d: Compare actual waste arisings and waste management routes used with those forecast and investigate significant deviations from planned targets.	Anticipated	LOR	Before end of Concept Design		
					Construction resource efficiency	Compliance letter confirming a compliant Site Waste Management Plan will be produced containing the appropriate benchmarks, commitments and procedures, and that data records will be kept on waste arisings and waste management routes.	Anticipated	LOR			
						Confirmation that less than 3.4 m3 or 3.2 tonnes of waste will be generated per 100m2 of floor area	Anticipated	LOR			
					Diversion of resources from landfill	Confirmation that the non-hazardous construction waste will meet the following diversion from landfill benchmarks:. Non-demolition 70% by volume or 80% by tonnage, demolition waste 80% by volume or 90% by tonnage	Anticipated	LOR			

Wst 02	Use of sustainably sourced	1	0	1	Pre-demolition Audit	Compliance letter confirming that a pre-demolition audit will be undertaken for any existing buildings, structures, or hard surfaces on site	Anticipated	LOR					
					Project sustainable aggregate point	Compliance letter confirming that the aggregate for each relevant building element will be specified in line with the BREEAM requirements Completed Wst02 Table	Not-Completed/Targeted Not-Completed/Targeted	LOR LOR					
Wst 03	Operational waste	1	1	0	Operational waste	Annotated drawing to show both general and recyclable waste storage areas and that the latter will be at least 2m2 per 1000 m2 of net floor area and located within 20m of the development	Anticipated	POP			To be reviewed in line with the existing operational waste storage		
						Compliance Letter confirming the recycle storage will be BREEAM compliant: adequately sized and labelled 'recycling'	Anticipated	LOR					
Wst 04	Speculative floor and ceiling finishes	1	0	1	Speculative floor and ceiling finishes	Written Commitment that For tenanted areas, where the future occupant is not known and carpets or other floor or ceiling finishes are installed, these must be limited to a show ares only. Only install floor and ceiling finishes selected by the known occupant of a development. Alternatively, where only ceiling finishes and no carpets are installed, the building owner confirms that the first tenants will not be permitted to make substantial alterations to the ceiling finishes.	Anticipated	MCFC/GARDINER & THEOBALD			Only for office building Recommended to be targeted for commercial office building assessment		
Wst 05	Adaptation to climate change	1	1	0	Resilience of structure, fabric, building services and renewables installation	A copy of the systematic (structural and fabric resilience specific) risk assessment to identify and evaluate the impact on the building over its projected life cycle from expected extreme weather conditions arising from climate change and, where feasible, mitigate against these impacts. The assessment must cover the following: - Hazard identification - Hazard assessment - Risk estimation - Risk evaluation - Risk management.	Anticipated	POP	Preparation and Brief		Credit requirements on (20/20/2022). Highly recommended to target this credit. Input received from Populous (16/01/2023).		
						Design drawings demonstrating the structure and fabric are adequately protected from the risks of a future climate	Anticipated	POP					
Wst 06	Design for disassembly and adaptability	2	2	0	Design for disassembly and functional adaptability - recommendation	A building-specific functional adaptation strategy study to explore the ease of disassembly and the functional adaptation potential of different design scenarios by the end of Concept Design. Drawings or specification confirming potential for future adaptation of the building's function	Anticipated Anticipated	POP POP	Preparation and Brief		Credit requirements on (20/20/2022). Highly recommended to target this credit. Input received from Populous (16/01/2023).		

Total	Available	Targeted	Potential	weighting	Score	Potential Score					
	11	9	2	6%	5%	6%					

Land Use and Ecology

Title	Topic	Available	Targeted	Potential	Sub-Topic	Requirements	Status	Responsibility	Time Critical	M Consultant Meeting notes (16/1	Consultant Feedback	
LE 01	Site selection	2	2	0	Previously occupied land	Design drawings (including existing site plan), report or site photographs.	Anticipated	POP				
					Contaminated land	Site assessment report for land contamination required highlighting the remediation measures for the Contractor.	Anticipated	Ecologist				
LE 02	Ecological risks and opportunities	2	2	0	Survey and Evaluation	Comprehensive route (Route 2) A Suitably Qualified Ecologist (SQE) carries out a survey and evaluation (see Methodology) for the site early enough to influence site preparation works, layout.	Anticipated	Ecologist			It has been discussed that there is undergoing Ecology site survey for planning requirements	
						Ecological assessment report including identification pf the optimal ecological outcomes for the site. Identification, appraize and select measures to meet the optimal ecological outcomes for the site (criterion in line with the mitigation hierarchy of action, according to the route being used)	Anticipated	Ecologist				
LE 03	Managing negative impacts on ecology	3	2	1	Prerequisite – Ecological risks and opportunities	Survey and evaluation report confirming that ecological outcomes' criteria have been achieved using the Comprehensive route (Route 2).	Anticipated	Ecologist				
					Planning and measures on-site	Ecology report outlining Further planning to avoid and manage negative ecological impacts on-site is carried	Anticipated	Ecologist				
					Managing negative impacts	Ecology report showing that the Negative impacts from site preparation and construction works are managed according to the mitigation hierarchy and no overall loss (see Definitions) of ecological value has occurred.	Not-Completed/Targeted	Ecologist				
LE 04	Change and enhancement of ecological value	4	1	3	Prerequisite - Managing negative impacts on ecology	The client or contractor confirms compliance is monitored against all relevant UK, EU or international legislation relating to the ecology of the site.	Anticipated	Ecologist				
					Change and enhancement of ecology	Locally relevant ecological measures have been implemented that enhance the site's ecological value. (Rout 1) Measures have been implemented that enhance ecological value, which are based on input from the project team and SQE in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in LE 02 (Route 2)	Anticipated	Ecologist				
					Ecological enhancement	Up to three credits are awarded based on the change in ecological value occurring as a result of the project. This must be calculated in accordance with the process set out in GN36 - BREEAM, CEEQUAL and HQM Ecology Calculation Methodology	Not-Completed/Targeted	Ecologist				
LE 05	Long term ecology management and maintenance	2	0	2	Prerequisite - Statutory obligations, planning and site implementation	The client or contractor has confirmed that compliance is being monitored against all relevant UK, EU and international standards relating to the ecology of the site.	Not-Completed/Targeted	Ecologist				

					Management and maintenance throughout the project– Foundation and Comprehensive routes (Route 1 and Route 2) 3 Measures have been implemented to manage and maintain ecology	Measures have been implemented to manage and maintain ecology throughout the project. These measures are based on input from the project team in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in LE 02 section on Ecology and Biodiversity has been included as part of the tenant or building owner information supplied, to inform the owner or occupant of local ecological features, value and biodiversity on or near the site	Not-Completed/Targeted	Ecologist			
					Landscape and ecology management plan	A Landscape and Ecology Management Plan, or equivalent, has been developed in accordance with BS 42020:2013 Section 11.1 The landscape and management plan or similar will be updated to support maintenance of the ecological value of the site (see sections relating to Maintenance and Monitoring in CEEM, CIRIA, IEMA, for helpful guidance	Not-Completed/Targeted	Ecologist			
Total		Available 13	Targeted 7	Potential 6	weighting 13%	Score 7%	Potential Score 13%					
Pollution												
Title	Topic	Available	Targeted	Potential	Sub-Topic	Requirements	Status	Responsibility	Time Critical	M Consultant Meeting notes (19/3/	Consultant Feedback	
Pol 01	Impact of refrigerants	3	2	1	Prerequisite - BS EN 378:2016 (ammonia)	Written statement confirming that all systems with electric compressors will comply with the requirements of BS EN 378:2016 (Parts 2 and 3).	Anticipated	ME Engineers	MEP			
					Impact of refrigerant	Written confirmation / specification confirming the refrigeration type and system, including: 1. Global Warming Potential (GWP) of the specified system refrigerant(s) 2. Total refrigerant charge (kg) 3. Heating / cooling capacity (kW)	Anticipated	ME Engineers	MEP			
						Design drawings confirming the type and location of systems using refrigerants within the development.	Anticipated	ME Engineers	MEP			
						A copy of the completed BREEAM Pol 01 Calculator, confirming the number of credits achieved	Anticipated	BREEAM Assessor	Assessor			
					Leak detection	Written confirmation / specification confirming that all systems are hermetically sealed / only use environmentally benign refrigerants, OR refrigerant leak detection has been installed (clarifying the type of system, scope and that the containment strategy is capable of automatically responding and managing the remaining refrigerant charge to limit loss of refrigerant).	Anticipated	ME Engineers	MEP			
						Design drawings confirming the type and location of refrigerant leak detection systems (if present).	Anticipated	ME Engineers	MEP			
Pol 02	Local air quality	2	2	0	Local air quality	Written confirmation / specification confirming that all space and water heating will be supplied by non-combustion systems (i.e. only powered by electricity), OR confirmation of the make and model of the system (boiler, CHP).	Anticipated	ME Engineers	MEP			
						copy of the Defra map confirming whether the site is in a high or low pollution location.	Anticipated	BREEAM Assessor	Assessor			
						Written confirmation / specification confirming details for the specified combustion system(s) (both existing and new if applicable) confirming the NOx emissions (mg/kWh) and PM10/VOC emissions (mg/m3), where applicable, for space and water heating.	Anticipated	ME Engineers	MEP			
Pol 03	Flood and surface water management	5	3	1	Prerequisite	Written confirmation that an appropriate consultant has been appointed to carry out and develop the development's compliance with all flood and surface water management criteria.	Anticipated	GARDINER & THEOBALD	Project Manager			
					Flood resilience	Site-specific Flood Risk Assessment (FRA) report (considering all current and future sources of flooding) confirming the development is in a flood zone defined as having a low annual probability of flooding	Anticipated	BH				
						Site plans/sections (for medium or high annual probability) confirming: - The design ground levels (for the development and site) compared to design flood levels; AND - Safe access routes to the development.	Anticipated	BH				
					Surface water run-off rate	Pre-requisite: statement from the appropriate consultant to confirm that bespoke surface water runoff design solutions have been developed for the site (accounting for specific site requirements and conditions).	Anticipated	BH				
						A copy of the drainage consultant's report	Anticipated	BH				
						EITHER compliance letter from the client OR section from the drainage consultant's report confirming that there will be relevant maintenance agreements for the ownership, long-term operation and maintenance of all specified Sustainable Drainage Systems (SuDS	Anticipated	MCFC/GARDINER & THEOBALD/BH				
					Surface water run-off volume	A copy of the drainage consultant's report confirming that flooding of property will not occur in the event of the local drainage system failure AND EITHER: - The post-development runoff volume will be no greater than pre-development runoff volume (managed by SuDS); OR - The consultant provides robust justification why the above criteria cannot be achieved (i.e. infiltration etc. are not technically viable) AND the post-development discharge rates can be limited to the highest of the following; pre-development 1 in 1 year peak runoff rate OR the mean annual runoff rate (Qbar) OR 2 litres/second/hectare.	Anticipated	BH				

Pol 04	Reduction of night time light pollution	1	0	0			Written confirmation / specification confirming EITHER: - There will be no external lighting included in the development; OR - External lighting designs in compliance with Table 2 of the ILP Guidance Notes (2011) and can be automatically switched off between 23:00 and 07:00 (or safety/security lighting on during the night complies with Table 2 of the ILP Guidance Notes (2011). Any illuminated advertisements (where present) are designed in compliance with ILP PLG05 (2015	Not-Completed/Targeted	ME Engineers MEP					
							A marked up copy of the site plan showing areas of the building and site that will be externally lit AND any nearby properties that may be affected	Not-Completed/Targeted	ME Engineers MEP					
Pol 05	Reduction of noise pollution	1	1	0	Reduction of noise pollution		Written confirmation that a Noise Impact Assessment has been commissioned and will be carried out by a suitably qualified acoustic consultant, in compliance with BS 4142:2014; AND - If the Noise Impact Assessment concludes that noise levels are above 5dB lower than the background noise throughout the day and night, measures will be installed to attenuate the noise at its source to a compliant level.	Anticipated	GARDINER & THEOBALD/BH					
							A copy of the Noise Impact Assessment, in line with BS 4142:2014, confirming: - Existing background noise levels (at nearest/most exposed noise sensitive area to the development and including existing plant on a building, where the development is an extension) and expected noise rating level from the assessed buildings proposed plant; - Confirmation of whether noise levels at the nearest/most exposed noise sensitive area to the development are higher or lower than 5dB lower than the background noise levels; - (Where the 5dB lower than background is not achieved) specification of attenuation measures to attenuate the noise at its source to a compliant level.	Anticipated	BH - VanGuardia					
Total		Available	Targeted	Potential	weighting	Score	Potential Score								
		12	8	2	8%	5%	7%								
Innovation															
Title	Topic	Available	Targeted	Potential	Sub-Topic	Requirements	Status	Responsibility	Time Critical	M Consultant Meeting notes (19/1	Consultant Feedback				
Man 03	Responsible construction practices	1	1	0	-	Achieve all responsible construction measures	Anticipated	LOR							
Hea01	Visual Comfort	2	0	0	-	-	Not-Completed/Targeted	POP/EH/ME Engineers							
Hea02	Indoor Air quality	1	1	0	-	Commit to Construction materials Emissions limits	Anticipated	LOR/POP							
Hea06	Security	1	1	0	-	Submit documentation that shows that compliant risk based security rating scheme has been used. The performance against the scheme has been confirmed by independent assessment and verification	Anticipated	Security Consultant							
Ene01	Reduction of energy use and carbon emissions	5	2	0	-	Achieve Net Zero Or Negative Carbon Building The client or building occupier commits funds to pay for the post occupancy stage. This requires an assessor to be appointed and to report on the actual energy consumption compared with the targets	Anticipated	MCFC/GARDINER & THEOBALD							
Wat01	Water Consumption	1	0	0	-	Achieve water savings higher than 63%	Not-Completed/Targeted	ME Engineers							
Mat 01	Building life cycle assessment (LCA)	3	0	0	-	-	Not-Completed/Targeted	POP/BH/LCA consultant							
Mat 03	Responsible sourcing of construction products	1	0	0	-	-	Not-Completed/Targeted	LOR							
Wst 01	Construction waste management	1	0	0	-	-	Not-Completed/Targeted	LOR							
Wst 02	Use of recycled and sustainably sourced aggregates	1	0	0	-	-	Not-Completed/Targeted	LOR							
Wst 05	Adaptation to climate change	1	1	0	-	-	Anticipated	POP/ME							
LE01	Ecological risks and opportunities	1	0	0	-	-	Not-Completed/Targeted	Ecologist							
LE02	Ecological change and enhancement	1	0	0	-	-	Not-Completed/Targeted	Ecologist							
Total		Available	Targeted	Potential	weighting	Score	Potential Score								
		20	6	0	10%	3%	3%				-				

BREEAM Pre-Assessment Hotel (Non-Residential) Fully Fitted Checklist

BREEAM NC UK V6 PRE-ASSESSMENT

Project: MCFC Hotel (Residential Institution) Fully Fitted

Available	153
Targeted	92
Anticipated	6
Potential	26
Base score	65.4%
Anticipated Score	70.5%
Potential Score	87%

BREEAM rating	% score
Outstanding	≥85
Excellent	≥70
Very good	≥55
Good	≥45
Pass	≥30
Unclassified	<30

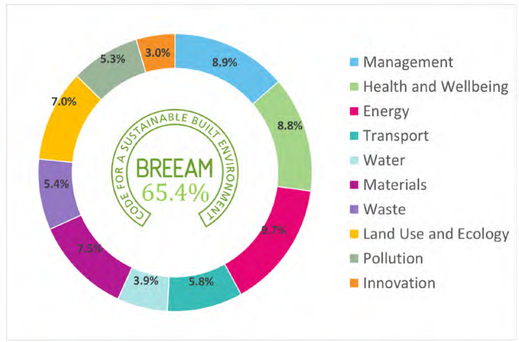
Credits Colour Code

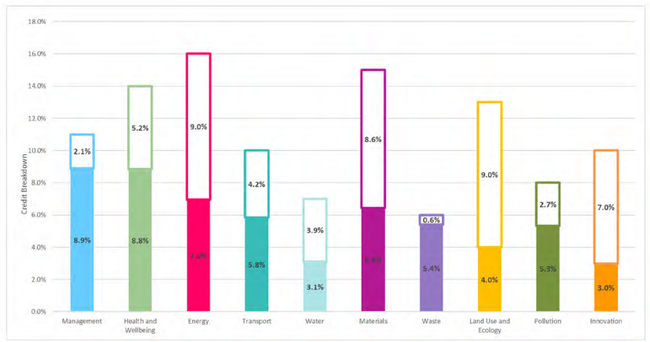
- Base credits to be targeted
- Anticipated credits to be targeted upon confirmation it can be achieved
- Potential credits not needed for Very Good level scope/ Not targeted
- High risk/not targeted
- N/A credit for the assessment scope /Excluded

Status Colour Code

- Credit requirements anticipated
- Credit requirements not Completed/Targeted
- Credit requirements completed
- N/A credit

Category	Available	Targeted	Potential	Anticipated	Weighting	Targeted Score	Anticipated Score	Potential Score
Management	21	17	4	1	11%	8.9%	9.4%	11%
Health and Wellbeing	19	12	6	4	14%	8.8%	11.8%	13%
Energy	23	14	0	0	16%	9.7%	9.7%	10%
Transport	12	7	0	0	10%	5.8%	5.8%	6%
Water	9	5	1	1	7%	3.9%	4.7%	5%
Materials	14	7	6	0	15%	7.5%	7.5%	14%
Waste	10	9	1	0	6%	5.4%	5.4%	6%
Land Use and Ecology	13	7	6	0	13%	7.0%	7.0%	13%
Pollution	12	8	2	0	8%	5.3%	5.3%	7%
Innovation	20	6	0	0	10%	3.0%	3.0%	3%
Total	153	92	26	6	110%	65.4%	70.5%	87.1%





57.8

Management

Title	Topic	Available	Targeted	Potential	Achieved	Sub-Topic	Requirements	Status	Responsibility	Time Critical	BREEAM Consultant Meeting notes (19/10/2021)	Consultant Feedback
Man 01	Project Brief and Design	4	4	0		Project Delivery Planning	Design team responsibilities schedule / contact list	Completed	GARDINER & THEOBALD	Before end of Concept Design	Information Included in stage 2 report and project directory V2 including contact list Please provide summarized schedule with contact details	
							Meeting minutes/agendas/presentations demonstrating early consultation with all relevant stakeholders identifying roles, responsibilities and contributions of design team at each key phase	Completed	MCFC/ GARDINER & THEOBALD/ BREEAM Consultant	Before end of Concept Design		
						Interested Parties	Consultation plan setting out the process, timeline and scope of the consultation.	Completed	MCFC/ GARDINER & THEOBALD/ BREEAM Consultant			
							All documents used and collected from the consultation process including list of stakeholders, meeting minutes, agendas, presentations.	Completed	MCFC/ GARDINER & THEOBALD/ BREEAM Consultant			
							Documentation confirming that feedback was given to the consultees on their ideas / concerns (e.g. presentations, website/newsletter updates)	Anticipated	BREEAM Consultant			
						BREEAM AP (Concept & Developed Design)	Please ensure that ME-Engineers is invited to key design team meetings, and provided minutes for all other team meetings.	Completed	GARDINER & THEOBALD			
							Compliance Letter confirming that BREEAM AP was appointed and will report progress against BREEAM targets.	Completed	GARDINER & THEOBALD/BREEAM Consultant	Before end of Concept Design		
							Meeting minutes confirming attendance of ME-Engineers to review project progress against BREEAM.	Completed	GARDINER & THEOBALD/BREEAM Consultant		BREEAM Meeting 19/10/2022	
							BREEAM Progress report	Anticipated	BREEAM Consultant			
Man 02	Life cycle cost and service life planning	4	1	3		Elemental LCC	Elemental life cycle cost plan at RIBA Stage 2 (60 year design life, unless otherwise confirmed by the client) in line with PD 156865:2008. This must: a. Show an indication of future replacement costs over a period of analysis agreed to by the client (e.g. 20, 30, 50, 60+ years) b. Include service life, maintenance and operation cost estimates	Not-Completed/Targeted	T&T	Before end of Concept Design		
							Documentation (specifications / drawings) demonstrating examples of how the elemental LCC has influenced the design of the building	Not-Completed/Targeted	T&T/ POP	Before end of Concept Design		
						Component level LCC options appraisal	Component level life cycle cost plan at RIBA Stage 4 in line with PD 156865:2008 that includes the following component types (where present): envelope, services, finishes, external spaces.	Not-Completed/Targeted	T&T	Before end of Concept Design		
							A specification document / drawings showing how the component level LCC plan has been used to influence building and systems design/specification to minimise life cycle costs and maximise critical value	Not-Completed/Targeted	T&T/ POP	Before end of Concept Design		
						Capital cost reporting	Compliance letter confirming the predicted capital costs, included contingencies, in pounds per square metre (£k/m2).	Anticipated	T&T			
Man 03	Responsible construction practices	6	6	0		Prerequisite - Legally harvested & traded timber Environmental management	Pre-requisite: Written confirmation that all site timber will be legally harvested and traded timber	Anticipated	SISK			
							Written confirmation that any party managing the construction site (main contractor / demolition contractor) has ISO 14001 or BS 8555:2016 certification.	Completed	GARDINER & THEOBALD/SISK			
							Written confirmation that the main contractor's pollution prevention procedures will be implemented at the site (in line with PPG6)	Anticipated	SISK			

						Responsible construction management Monitoring of construction site impacts - Energy & wate	Written commitment that the main contractor will carry out the mandatory BREEAM Responsible Construction Management requirements.	Anticipated	SISK			
							Written confirmation that responsibility has been assigned to an individual(s) for monitoring, recording and reporting energy and water consumption data resulting from all construction processes.	Anticipated	SISK			
							Written confirmation that targets have been set for site water and energy consumption, and that consumption will be monitored and recorded.	Anticipated	SISK			
						Transport of construction materials & waste	Written confirmation that responsibility has been assigned to an individual(s) for monitoring, recording and reporting of transport details for all deliveries to the site, and all waste removal from the site	Anticipated	SISK			
							Written confirmation that targets will be set in respect of transport movements (in km and litres of fuel), and these will be monitored and recorded separately in terms of: Materials delivered to the sit -Waste removed from the site.	Anticipated	SISK			
Man 04	Commissioning and handover	4	3	1		Commissioning - Testing schedule and responsibilities	Schedule of commissioning and testing, identifying suitable timescales for commissioning and re-commissioning of all systems.	Anticipated	Commissioning Specialist/SISK			
							Written confirmation that an appropriate project team member is appointed to monitor and programme pre-commissioning, commissioning and re-commissioning on behalf of the client, and that commissioning will be undertaken in line with CIBSE, BSRIA and Building Regulations.	Anticipated	Commissioning Specialist/SISK	Before end of Technical Design - appointment		
							Project Programme including dates for commissioning.	Anticipated	Commissioning Specialist/SISK			
						Commissioning - Design and preparation	Written confirmation that a specialist commissioning manager will be appointed during the design stage to undertake design reviews and provide advice during construction programming, installation and testing	Anticipated	SISK	Before end of Technical Design - appointment	It has been discussed that a specialist commissioning manager might be appointed during the design stage to undertake design reviews and provide advice during construction programming, installation and testing. The credit will be targeted upon confirmation	
						Testing and Inspection Building Fabric	Post-construction testing and inspection to quality-assure the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths. Survey and Testing undertaken by Suitably qualified professional. Remediation works are undertaken and completed prior to building handover and close out.	Not-Completed/Targeted	LOR			
						Handover	Written commitment to produce two non-technical building user guides: 1. A non-technical user guide for distribution to the building occupiers 2. A technical user guide for the premises facilities manager	Anticipated	SISK			
							Confirmation that the building user guides will be provided to the building occupants.	Anticipated	SISK			
							Confirmation of the content of the training schedules prepared: 1. A non-technical training schedule for the building occupiers. 2. A technical training schedule for the premises facilities manager	Anticipated	SISK			
Man 05	Aftercare	3	3	0		Aftercare Support	Written confirmation that the following will be undertaken post development: - Collect the energy and water consumption data for at least 12 months after occupation - Compare this with what was expected - Analyse any discrepancies with a view of adjusting systems if they are not operating as expected / designed	Anticipated	MCFC/ GARDINER & THEOBALD		N/A for Shell and Core areas	
							Written confirmation that aftercare support and training will be provided in line with the following: - A meeting to introduce the aftercare team and Building User Guide, present key information about how the building operates and answer questions. - Initial aftercare - e.g. on site attendance on a weekly basis for at least 4 weeks after handover. - On site FM training to include a walkabout of the building. - Longer term after care (e.g. a helpline, nominated individual or other appropriate system) to support building users for at least 12 months of occupation	Anticipated	MCFC/ GARDINER & THEOBALD			
						Commissioning - Implementation Post Occupancy Evaluation	Written confirmation that seasonal commissioning responsibilities will be completed over a minimum 12 month period, once the building becomes occupied (in line with BREEAM criteria for either complex or simple systems	Anticipated	MCFC/ GARDINER & THEOBALD			
							Written commitment to undertake a POE in line with the BREEAM requirements 1 year after building occupation	Anticipated	MCFC/ GARDINER & THEOBALD			
							Written statement confirming that there will be appropriate dissemination of information on the buildings post occupancy performance.	Anticipated	MCFC/ GARDINER & THEOBALD			

Total	Available	Targeted	Potential	Achieved	weighting	Score	Potential Score				
	21	17	4	0	11%	9%	11%				

Health

Title	Topic	Available	Targeted	Potential	Achieved	Sub-Topic	Requirements	Status	Responsibility	Time Critical	BREEAM Consultant Meeting notes (19/10/2021)	Consultant Feedback
HEA 01	Visual Comfort	5	1	4		Glare Control	Daylight and glare assessment report including glare strategies	Anticipated	BH		To be considered for targeting at stage 3/4 as façade design develops. Credit requirements to be considered in the façade design	
						Daylight	Daylight and glare assessment report including glare strategies	Anticipated	BH			
						View out	View out assessment report	Anticipated	BH			
						Internal and external lighting levels, zoning and control	Written confirmation that internal lighting and external lighting will meet the relevant illuminance level standards	Anticipated	ME Engineers			
							Written confirmation that lighting controls will be appropriately zoned and occupant controlled	Anticipated	ME Engineers			
							Lighting layout drawings - demonstrating zoning and control system	Anticipated	ME Engineers			
HEA 02	Indoor Air quality	4	3	1		Prerequisite - Indoor air quality (IAQ) plan	A copy of a BREEAM Compliant indoor air quality plan covering: a. Removal of contaminant sources b. Dilution and control of contaminant sources c. Procedures for pre-occupancy flush out d. Third party testing and analysis e. Maintaining indoor air quality in-use	Anticipated	LOR/Indoor air quality consultant			
						Ventilation	Confirmation that air intakes and exhausts will be located in accordance with best practice in terms of minimising build-up of air pollutants	Anticipated	ME Engineers			
							Written confirmation that HVAC systems will incorporate suitable filtration to minimise external air pollution (BS EN 16798-3:2017) - with air classification of at least SUP 2	Anticipated	ME Engineers			
								Anticipated			The ventilation requirement is discussed for the minimum distance between the AHUs exhaust and intake. The credit requirement will be attempted for all cases, however wherever the minimum distance not achieved, Air quality study based on CFD simulation will be conducted to verify that the intent of the credit is satisfied.	
							Drawings demonstrating air intakes and exhausts will be at least 10m apart (horizontally)		ME Engineers			
							WHERE BUILDING AREAS ARE SUBJECT TO LARGE / VARIABLE OCCUPANCY - Written confirmation that CO2 sensors / air quality sensors will be installed in areas of large / variable occupancy - with demand-controlled ventilation to the space	Anticipated	ME Engineers			
						Emissions from construction products	Written confirmation that VOC (volatile organic compounds) requirements will be met for at least three of the following product types: 1. Interior paint and coatings 2. Wood-based products (including timber floor) 3. Flooring materials (including floor levelling compounds and resin flooring) 4. Ceiling, wall, and acoustic and thermal insulation materials 5. Interior adhesives and sealants (including floor adhesives)	Anticipated	SISK/POP			

						Post-construction indoor air quality measurement	Written commitment to carry out post-construction indoor air quality testing to confirm that formaldehyde concentration levels do not exceed World Health Organisation guidelines for indoor air quality	Not-Completed/Targeted	SISK			
HEA 04	Thermal Comfort	3	3	0		Thermal Modelling CIBSE AM11	Written confirmation that full dynamic thermal modelling is carried out in compliance with CIBSE AM11	Anticipated	ME Engineers			
							FOR AIR CONDITIONED BUILDINGS: Thermal modelling results demonstrating compliance with CIBSE Guide A, and confirming PPD and PMV	Anticipated	ME Engineers	Stage 3/4		
						Design for future thermal comfort	Thermal modelling (CIBSE AM11) results demonstrating compliance with CIBSE Guide A for a future climate change environment	Anticipated	ME Engineers	Stage 3/4		
							OR: Where thermal modelling results cannot demonstrate compliance with CIBSE Guide A for a future climate change environment, drawings and / or statement detailing how the building has been or could be easily adapted using passive design solutions to comply with CIBSE Guide A	Anticipated	ME Engineers			
						Thermal zoning and controls	Written statement confirming that the thermal modelling report has informed the design of the building	Anticipated	ME Engineers			
							Specification and / or design drawings confirming the controls for the heating system (in line with the outcome of the thermal modelling report)	Anticipated	MEP			
HEA 05	Acoustic Comfort	4	3	1		Acoustic performance	Acoustic report confirming the building will meet the appropriate acoustic performance standards for: - sound insulation - indoor ambient noise level - reverberation times	Anticipated	BH - VanGuardia	Before end of Technical Design - appointment		
						Acoustic performance	Written confirmation that any remediation works will be followed where required	Anticipated	SISK			
							Qualifications, experience & membership of the Suitably Qualified Acoustician	Anticipated	BH - VanGuardia			
HEA 06	Security	1	1	0		Security of site and building	A copy of the Security Needs Assessment report, provided by a Suitably Qualified Security Specialist outlining: 1. Scope of their advice/involvement 2. The stage of design in which their advice was sought (no later than RIBA stage 2) 3. Summary of their recommendation	Anticipated	RS Security Consultants Ltd / POP	Before end of Concept Design - appointment	SNA Received. Awaiting input from Populous.	
							Written confirmation of the qualifications of the Suitably Qualified Security Specialist	Anticipated	RS Security Consultant Ltd			
							Written confirmation and / or site drawings confirming design in accordance with Suitably Qualified Security Specialist recommendation.	Anticipated	POP			
							Written confirmation from Suitably Qualified Security Specialist that any deviations from original recommendations have been agreed (if applicable)	Anticipated	RS Security Consultant Ltd			
HEA 07	Safe and healthy surroundings	2	1	0		Safe access	Site plan showing safe and separate access routes for: - cyclists (including cycle paths to cycle storage); - pedestrians (including mark-ups of any traffic calming measures, i.e. speed bumps, and raised pedestrian crossings); - small vehicles (including parking provision and pedestrian access from car to building); and - delivery vehicles / areas (including manoeuvring layouts and mark-up of any waste storage areas).	Not-Completed/Targeted	POP			
						Outside space	Site plan demonstrating outside amenity space accessible to all building occupants. The space must: -be an outdoor landscaped area (garden / terrace open to the sky) -have appropriate seating -be designated as non-smoking -be away from areas that will be subject to noise disturbance (e.g. building services, car parks, busy roads, delivery areas, etc	Anticipated	POP			
							Written statement confirming the amenity space has been sized appropriately for the number of expected building users	Anticipated	POP			

Total	Available	Targeted	Potential	Achieved	weighting	Score	Potential Score				
	19	12	6	0	14%	9%	13%				

Energy

Title	Topic	Available	Targeted	Potential	Achieved	Sub-Topic	Requirements	Status	Responsibility	Time Critical	BREEAM Consultant Meeting notes (19/10/2021)	Consultant Feedback
Ene 01	Reduction of energy use and carbon emissions	13	6	0		Energy Performance	A copy of the 2021 Part L Approved Document checks (BRUKL Output Document)	Completed	ME Engineers			
							Confirmation of suitably qualified energy modeller's qualifications and experience	Completed	ME Engineers			
							TM54 assessment to predict operational energy	Anticipated	ME Engineers			
							MOMs of Workshop discussing the assessment outcomes and recommendations					
Ene 02	Energy monitoring	2	2	0		Sub-metering of end-use categories	Written confirmation / specifications confirming that all major energy consuming systems will be sub-metered.	Anticipated	ME Engineers		•Generally accepted that the metering credit was achievable •Duncan Cash confirmed there is an allowance within the budget for the metering credit •MEE action – liaise with Duncan to ascertain what allowance/solution has been made for the breeam and ensure it is replicated in our design.	
							Technical drawings and specification confirming: - energy consuming systems (heating, hot water, small power, lighting and any major fans) and their rated outputs. - metering arrangement for each system, type and location of meter specified - meters are pulsed and labelled.	Anticipated	ME Engineers			
						Sub-metering of high energy load and tenancy areas	Written confirmation / specifications confirming that different function / tenant areas will be sub-metered (e.g. kitchen, office floor plates,.	Anticipated	ME Engineers			
							Technical drawings confirming; additional sub meter(s) for different function / tenancy areas.	Anticipated	ME Engineers			
Ene 03	External lighting	1	1	0		External lighting	Marked up site plans showing location and purpose of all external light fittings	Anticipated	ME Engineers			
							Written confirmation / specifications confirming external lighting meets luminaire requirements (>70 lumens per circuit watt), and are fitted with daylight sensors, and presence detectors in areas of intermittent pedestrian traffic	Anticipated	ME Engineers			
Ene 04	Low carbon Design	3	3	0		Passive Design Analysis	Results of thermal modelling (Hea04)	Anticipated	ME Engineers	Stage 4		
							A Passive Design Analysis report of the proposed building (at RIBA Stage 2), that identifies passive design solutions and quantifies the total reduced energy demand and carbon dioxide emissions resulting from them.	Completed	ME Engineers	Before end of Concept Design		
							Free Cooling assessment report	Anticipated	ME Engineers			
							Drawing plans / specification confirming specification of passive design measures	Anticipated	ME Engineers			
						LZC feasibility study	A copy of the low/zero carbon feasibility study including quantified reduced regulated carbon dioxide (CO2.eq) emissions resulting from the low carbon / renewable technology	Completed	ME Engineers			
							A drawing or specification showing the specification of the low carbon / renewable technology as recommended within the feasibility study	Anticipated	ME Engineers			
Ene 06	Energy Efficient Transport systems	2	2	0		Energy consumption	Transport lift analysis to determine lift demand and usage patterns for the building. The analytis must determine the optimum number and size of lifts (including counter-balancing ratio), and the estimated energy consumption for one of the following: - at least two type of systems - an arrangement of systems - a strategy which is fit for purpose	Anticipated	ME Engineers			
							Written confirmation that the lift analysis considered the use of regenerative drive, and the lift with the lowest energy consumption has been specified.	Anticipated	ME Engineers			
						Energy efficient features - Lifts	Copy of the lift specification or manufacturer literature to confirm the energy-efficient features specified include: - Standby condition for off-peak periods - Car lighting and display lighting provided has an average luminous efficacy of >70 luminaire lumens per circuit watt - Drive controller capable of variable speed, variable-voltage and variable frequency (VVVF	Anticipated	ME Engineers			

Ene 08	Energy efficient equipment	2	0	0		Energy efficient features - Equipment	Submit Energy modelling results showing annual Unregulated energy consumption inline to the methods described in CIBSE TM54: Evaluating operational energy performance of buildings at the design stage. The report should highlight significant unregulated energy contributors to annual unregulated energy consumption and show that a meaningful measures to reduce unregulated energy demand of the significant contributors and overall unregulated energy consumption through using energy efficiency measures and using efficient equipment	Not-Completed/Targeted	ME Engineers			
Total		Available	Targeted	Potential	Achieved	weighting	Score	Potential Score				
		23	14	0	0	16%	10%	10%				
Transport												
Title	**Topic**	**Available**	**Targeted**	**Potential**	**Achieved**	**Sub-Topic**	**Requirements**	**Status**	**Responsibility**	**Time Critical**	**BREEAM Consultant Meeting notes (19/10/2021)**	**Consultant Feedback**
Tra 01	Transport assessment and travel plan	2	2	0		Travel Plan	Travel Plan developed during the feasibility and design stages based on a site-specific travel assessment or statement in accordance with BREEAM requirements (please contact BREEAM assessor for full details)	Anticipated	Arup	Preparation and Brief		
							Written confirmation that the travel plan will be implemented post construction and be supported by the building's management in operation.	Anticipated	MCFC/GARDINER & THEOBALD			
Tra 02	Sustainable transport measures	10	5	0		Transport options implementation	Assessment of existing site Accessibility Index (AI), AND evidence of sustainable transport measures.	Anticipated	Arup/BREEAM Assessor			
							Written confirmation that electric recharging stations will be provided (of a minimum of 3kW) for at least 10% of the total car parking capacity for the development.	Anticipated	GARDINER & THEOBALD/Arup/ME Engineers/POP			
							For fully-fitted buildings only: Written confirmation that a facility to facilitate and encourage building users to car share will be set up, and marketing and communication materials raising awareness of the sharing scheme with	Anticipated	MCFC/GARDINER & THEOBALD/Arup			
							Evidence of existing and new amenities where relevant. Drawing plan confirming specification of compliant sustainable transport measures (where applicable): a) 10% electric recharging car parking spaces b) 5% marked-up car share spaces located nearest the development entrance c) Location and number of cycle storage spaces d) Location and number of cyclist facilities (showers, changing space, lockers)	Anticipated Anticipated	Arup/POP Arup/POP			
Total		Available	Targeted	Potential	Achieved	weighting	Score	Potential Score				
		12	7	0	0	10%	6%	6%				
Water												
Title	**Topic**	**Available**	**Targeted**	**Potential**	**Achieved**	**Sub-Topic**	**Requirements**	**Status**	**Responsibility**	**Time Critical**	**BREEAM Consultant Meeting notes (19/10/2021)**	**Consultant Feedback**
Wat 01	Water Consumption	5	2	0		Water consumption	Written Confirmation / Technical specification of sanitary fittings and controls to be installed. Including (where applicable) specification of: WCs, washbasin taps; urinals; kitchen taps; showers; bath; dishwasher; washing machine	Anticipated	POP			
							Drawing to show location and specification of sanitaryware	Anticipated	POP			
Wat 02	Water Monitoring	1	1	0		Water monitoring	Compliance letter confirming a pulsed water meter will be fitted on the mains supply to the building	Anticipated	SISK			
							Design drawing to confirm the water meter is on the mains supply to the assessed building	Anticipated	ME Engineers			
Wat 03	Water Leak detection	2	2	0		Leak detection system	Compliance letter confirming a BREEAM compliant leak detection system will be specified Drawings to confirm a leak detection system has been installed on the mains water supply within the building and also between the building and the utilities water meter.	Anticipated Anticipated	ME Engineers ME Engineers			
							installation of flow control devices on each sanitary facility or WCs in hotel (can be group rooms of 10 in hotel).					
Wat 04	Water efficient Equipment	1	0	1		Water efficient Equipment	For landscape areas provide a design report demonstrating to the assessor that a reduction in water consumption has been achieved using existing 'tried and tested' solutions. The following are some examples of solutions deemed to satisfy compliance for a number of different building types or functions -Drip fed subsurface irrigation incorporating soil moisture sensors. The irrigation control should be zoned to permit variable irrigation to different planting assemblages. -Reclaimed or recovered water from a rainwater collection or waste water recovery system with appropriate storage, i.e. greywater collection from building functions or processes that use potable water, e.g. vehicle wash, sanitary facilities, irrigation etc. -External landscaping and planting that relies solely on precipitation, during all seasons of the year. -All planting specified is restricted to contextually appropriate species that thrive without irrigation and will continue to do so in those conditions likely as a result of climate change, i.e. typically warmer and drier conditions.	Not-Completed/Targeted	POP/ME Engineers			
Total		Available	Targeted	Potential	Achieved	weighting	Score	Potential Score				
		9	5	1	0	7%	4%	5%				
Materials												
Title	**Topic**	**Available**	**Targeted**	**Potential**	**Achieved**	**Sub-Topic**	**Requirements**	**Status**	**Responsibility**	**Time Critical**	**BREEAM Consultant Meeting notes (19/10/2021)**	**Consultant Feedback**
Mat 01	Life Cycle Assessment	7	3	4		Superstructure	Design drawings, including elevations and build-ups detailing the build up of all major materials within the superstructure of the building. A completed copy of the 'LCA DETAILS' document OR Mat 01 Table if the simplified approach is to be undertaken (to be provided by Assessor).	Anticipated Anticipated	BH - Lucy/Ben BH - Lucy/Ben			
							A copy of the LCA report including 3 - 4 option appraisals at Concept Design stag A copy of the LCA report including 3 option appraisals at Technical Design stage	Anticipated Anticipated	BH - Lucy/Ben BH - Lucy/Ben	Before planning Before end of Technical Design		
						Substructure and landscape	Drawings including build-ups detailing the build up of all major materials within the substructure of the building and hard landscaping elements of the development A completed copy of the 'LCA DETAILS' document including detail of substructure and hard landscaping	Not-Completed/Targeted Not-Completed/Targeted	POP/BH POP/BH			
							A copy of the LCA report including 3 option appraisals at concept design stage	Not-Completed/Targeted	POP/BH/LCA Consultant			
Mat 02	Environmental Product Declaration	1	1	0		Specification of products with EPDs	Contractor requirements document confirming that at least 15 products with recognised EPDs will be procured for the development	Not-Completed/Targeted	SISK			
Mat 03	Responsible sourcing construction product	4	2	1		Prerequisite - Legally harvested & traded timber	Compliance letter / Contractor Requirements confirming all timber procured will be legally harvested and traded timber	Anticipated	SISK			
						Enabling sustainable procurement	A copy of the sustainable procurement plan for the development or at a company operational level (developer or architect), produced at concept design stage. The plan must include sustainability aims, objectives and strategic targets to guide procurement activities	Anticipated	POP	Before end of Concept Design		
						Measuring responsible sourcing	Drawings to show the specification of the build up of the relevant building elements (see MAT03 Table)	Anticipated	POP			
							Completed MAT03 Table, including manufacturer details for each material specified and their corresponding volume (in m3) or mass (in kg) and where possible	Anticipated	POP			
							A copy of suppliers responsible sourcing certification (e.g. ISO14001, BES6001, FSC) where available OR	Anticipated	POP			
							Compliance Letter committing to procure from suppliers who can provide the relevant responsible sourcing certification for each material type (e.g. ISO14001, BES6001, FSC)	Anticipated	POP			

Mat 05	Design for durability and resilience	1	1	0		Design for durability and resilience	Design drawings marked up to show vulnerable areas of the building that may be susceptible to damage, including: - Areas of high user numbers - i.e. main entrances, circulation spaces - Areas of internal transport movement - i.e. trolley movement - External walls within 1m of vehicular movement	Anticipated	POP		Credit requirements on (20/20/2022). Highly recommended to target this credit	
							Design drawings / specification outlining the measures taken to enhance durability: - Bollards / barriers / raised kerbs in delivery areas - Robust external wall construction - Protection rails to internal walls - Kickplates on doors - Hard wearing floors	Anticipated	POP			
							Written confirmation or specifications confirming elements have been designed to limit long and short term material degradation through confirming that elements or products achieve an appropriate quality or durability standard.	Anticipated	POP			
							Marked up drawing(s), or maintenance plan confirming access to the roof and façade for cost-effective cleaning, replacement and repair in the building's design.	Anticipated	POP			
							Marked up drawing highlighting features of the roof and façade design that prevent water damage, ingress and detrimental ponding.	Anticipated	POP			
Mat 06	Material efficiency	1	0	1		Material efficiency	Report (at Preparation and Brief stage) setting targets relating to material efficiency and report on opportunities and methods to optimise the use of materials at each key stage of the project	Not-Completed/Targeted	POP	Preparation and Brief		
							Commitment to implement the targets outlined in the above report, plus develop and record the implementation of materials efficiency at developed design, technical design and construction	Not-Completed/Targeted	POP			

Total	Available	Targeted	Potential	Achieved	weighting	Score	Potential Score
	14	7	6	0	15%	8%	14%

Waste

Title	Topic	Available	Targeted	Potential	Achieved	Sub-Topic	Requirements	Status	Responsibility	Time Critical	BREEAM Consultant Meeting notes (19/10/2021)	Consultant Feedback
Wst 01	Construction waste management	5	5	0		Pre-demolition audit	Confirmation that a pre-demolition audit will be carried out using an appropriate methodology. This must show the recovery of demolition material for subsequent high grade or value applications. The audit must cover the content of Pre-demolition audit scope and: a: Be carried out at Concept Design stage prior to strip-out or demolition works b: Guide the design, consider materials for reuse and set targets for waste management c: Engage all contractors in the process of maximising high grade reuse and recycling opportunities d: Compare actual waste arisings and waste management routes used with those forecast and investigate significant deviations from planned targets.	Anticipated	SISK	Before end of Concept Design		
						Construction resource efficiency	Compliance letter confirming a compliant Site Waste Management Plan will be produced containing the appropriate benchmarks, commitments and procedures, and that data records will be kept on waste arisings and waste management routes.	Anticipated	SISK			
							Confirmation that less than 3.4 m3 or 3.2 tonnes of waste will be generated per 100m2 of floor area	Anticipated	SISK			
						Diversion of resources from landfill	Confirmation that the non-hazardous construction waste will meet the following diversion from landfill benchmarks;. Non-demolition 70% by volume or 80% by tonnage, demolition waste 80% by volume or 90% by tonnage	Anticipated	SISK			
Wst 02	Use of sustainably sourced	1	0	1		Pre-demolition Audit	Compliance letter confirming that a pre-demolition audit will be undertaken for any existing buildings, structures, or hard surfaces on site	Anticipated	SISK			
						Project sustainable aggregate point	Compliance letter confirming that the aggregate for each relevant building element will be specified in line with the BREEAM requirements	Not-Completed/Targeted	SISK			
							Completed Wst02 Table	Not-Completed/Targeted	SISK			
Wst 03	Operational waste	1	1	0		Operational waste	Annotated drawing to show both general and recyclable waste storage areas and that the latter will be at least 2m2 per 1000m2 of net floor area and located within 20m of the development	Anticipated	POP		To be reviewed in line with the existing operational waste storage	
							Compliance Letter confirming the recycle storage will be BREEAM compliant: adequately sized and labelled 'recycling'	Anticipated	SISK			
Wst 05	Adaptation to climate change	1	1	0		Resilience of structure, fabric, building services and renewables installation	A copy of the systematic (structural and fabric resilience specific) risk assessment to identify and evaluate the impact on the building over its projected life cycle from expected extreme weather conditions arising from climate change and, where feasible, mitigate against these impacts. The assessment must cover the following: - Hazard identification - Hazard assessment - Risk estimation - Risk evaluation - Risk management.	Anticipated	POP	Preparation and Brief	Credit requirements on (20/20/2022). Highly recommended to target this credit. Input received from Populous (16/01/2023).	
							Design drawings demonstrating the structure and fabric are adequately protected from the risks of a future climate	Anticipated	POP			
Wst 06	Design for disassembly and adaptability	2	2	0		Design for disassembly and functional adaptability - recommendation	A building-specific functional adaptation strategy study to explore the ease of disassembly and the functional adaptation potential of different design scenarios by the end of Concept Design.	Anticipated	POP	Preparation and Brief	Credit requirements on (20/20/2022). Highly recommended to target this credit. Input received from Populous (16/01/2023).	
							Drawings or specification confirming potential for future adaptation of the building's function	Anticipated	POP			

Total	Available	Targeted	Potential	Achieved	weighting	Score	Potential Score
	10	9	1	0	6%	5%	6%

Land Use and Ecology

Title	Topic	Available	Targeted	Potential	Achieved	Sub-Topic	Requirements	Status	Responsibility	Time Critical	BREEAM Consultant Meeting notes (19/10/2021)	Consultant Feedback
LE 01	Site selection	2	2	0		Previously occupied land	Design drawings (including existing site plan), report or site photographs.	Anticipated	POP			
						Contaminated land	Site assessment report for land contamination required highlighting the remediation measures for the Contractor.	Anticipated	Ecologist			
LE 02	Ecological risks and opportunities	2	2	0		Survey and Evaluation	Foundation route (Route 1) The site is evaluated using the BREEAM Ecological Risk Evaluation Checklist (Guidance Note 34) confirming that the Foundation route can be used (see Methodology and Definitions).	Anticipated	Ecologist		It has been discussed that there is undergoing Ecology site survey for planning requirements	
							Comprehensive route (Route 2) A Suitably Qualified Ecologist (SQE) carries out a survey and evaluation (see Methodology) for the site early enough to influence site preparation works, layout					
							Ecological assessment report including identification pf the optimal ecological outcomes for the site. Identification, appraise and select measures to meet the optimal ecological outcomes for the site (criterion in line with the mitigation hierarchy of action, according to the route being used)	Anticipated	Ecologist			
LE 03	Managing negative impacts on ecology	3	2	1		Prerequisite – Ecological risks and opportunities	Survey and evaluation report confirming that ecological outcomes' criteria have been achieved using the Foundation route (Route 1) or the Comprehensive route (Route 2).	Anticipated	Ecologist			
						Planning and measures on-site	Ecology report outlining Further planning to avoid and manage negative ecological impacts on-site is carried	Anticipated	Ecologist			

						Managing negative impacts	Ecology report showing that the Negative impacts from site preparation and construction works are managed according to the mitigation hierarchy and no overall loss (see Definitions) of ecological value has occurred.	Not-Completed/Targeted	Ecologist				
LE 04	Change and enhancement of ecological value	4	1	3		Prerequisite - Managing negative impacts on ecology	The client or contractor confirms compliance is monitored against all relevant UK, EU or international legislation relating to the ecology of the site.	Anticipated	Ecologist				
						Change and enhancement of ecology	Locally relevant ecological measures have been implemented that enhance the site's ecological value. (Rout 1) Measures have been implemented that enhance ecological value, which are based on input from the project team and SQE in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in LE 02 (Route 2).	Anticipated	Ecologist				
						Ecological enhancement	Up to three credits are awarded based on the change in ecological value occurring as a result of the project. This must be calculated in accordance with the process set out in GN36 - BREEAM, CEEQUAL and HQM Ecology Calculation Methodology	Not-Completed/Targeted	Ecologist				
LE 05	Long term ecology management and maintenance	2	0	2		Prerequisite - Statutory obligations, planning and site implementation	The client or contractor has confirmed that compliance is being monitored against all relevant UK, EU and international standards relating to the ecology of the site.	Not-Completed/Targeted	Ecologist				
						Management and maintenance throughout the project– Foundation and Comprehensive routes (Route 1 and Route 2) 3 Measures have been implemented to manage and maintain ecology	Measures have been implemented to manage and maintain ecology throughout the project. These measures are based on input from the project team in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in LE 02 section on Ecology and Biodiversity has been included as part of the tenant or building owner information supplied, to inform the owner or occupant of local ecological features, value and biodiversity on or near the site	Not-Completed/Targeted	Ecologist				
						Landscape and ecology management plan	A Landscape and Ecology Management Plan, or equivalent, has been developed in accordance with BS 42020:2013 Section 11.1 The landscape and management plan or similar will be updated to support maintenance of the ecological value of the site (see sections relating to Maintenance and Monitoring in CIEEM, CIRIA, IEMA, for helpful guidance	Not-Completed/Targeted	Ecologist				
	Total	Available	Targeted	Potential	Achieved	weighting	Score	Potential Score					
		13	7	6	0	13%	7%	13%					
							Pollution						
Title	Topic	Available	Targeted	Potential	Achieved	Sub-Topic	Requirements	Status	Responsibility	Time Critical	BREEAM Consultant Meeting notes (19/10/2021)	Consultant Feedback	
Pol 01	Impact of refrigerants	3	2	1		Prerequisite - BS EN 378:2016 (ammonia)	Written statement confirming that all systems with electric compressors will comply with the requirements of BS EN 378:2016 (Parts 2 and 3).	Anticipated	ME Engineers				
						Impact of refrigerant	Written confirmation / specification confirming the refrigeration type and system, including: 1. Global Warming Potential (GWP) of the specified system refrigerant(s) 2. Total refrigerant charge (kg) 3. Heating / cooling capacity (kW)	Anticipated	ME Engineers				
							Design drawings confirming the type and location of systems using refrigerants within the development.	Anticipated	ME Engineers				
							A copy of the completed BREEAM Pol 01 Calculator, confirming the number of credits achieved	Anticipated	BREEAM Assessor				
						Leak detection	Written confirmation / specification confirming that all systems are hermetically sealed / only use environmentally benign refrigerants, OR refrigerant leak detection has been installed (clarifying the type of system, scope and that the containment strategy is capable of automatically responding and managing the remaining refrigerant charge to limit loss of refrigerant).	Anticipated	ME Engineers				
							Design drawings confirming the type and location of refrigerant leak detection systems (if present).	Anticipated	ME Engineers				
Pol 02	Local air quality	2	2	0		Local air quality	Written confirmation / specification confirming that all space and water heating will be supplied by non-combustion systems (i.e. only powered by electricity), OR confirmation of the make and model of the system (boiler, CHP).	Anticipated	ME Engineers				
							copy of the Defra map confirming whether the site is in a high or low pollution location.	Anticipated	BREEAM Assessor				
							Written confirmation / specification confirming details for the specified combustion system(s) (both existing and new if applicable) confirming the NOx emissions (mg/kWh) and PM10/VOC emissions (mg/m3), where applicable, for space and water heating.	Anticipated	ME Engineers				
Pol 03	Flood and surface water management	5	3	1		Prerequisite	Written confirmation that an appropriate consultant has been appointed to carry out and develop the development's compliance with all flood and surface water management criteria.	Anticipated	GARDINER & THEOBALD				
						Flood resilience	Site-specific Flood Risk Assessment (FRA) report (considering all current and future sources of flooding) confirming the development is in a flood zone defined as having a low annual probability of flooding	Anticipated	BH				
							Site plans/sections (for medium or high annual probability) confirming: - The design ground levels (for the development and site) compared to design flood levels; AND - Safe access routes to the development.	Anticipated	BH				
						Surface water run-off rate	Pre-requisite: statement from the appropriate consultant to confirm that bespoke surface water runoff design solutions have been developed for the site (accounting for specific site requirements and conditions).	Anticipated	BH				
							A copy of the drainage consultant's report	Anticipated	BH				
							EITHER compliance letter from the client OR section from the drainage consultant's report confirming that there will be relevant maintenance agreements for the ownership, long-term operation and maintenance of all specified Sustainable Drainage Systems (SuDS	Anticipated	MCFC/GARDINER & THEOBALD/BH				
						Surface water run-off volume	A copy of the drainage consultant's report confirming that flooding of property will not occur in the event of the local drainage system failure AND EITHER: - The post-development runoff volume will be no greater than pre-development runoff volume (managed by SuDS); OR - The consultant provides robust justification why the above criteria cannot be achieved (i.e. infiltration etc. are not technically viable) AND the post-development discharge rates can be limited to the highest of the following; pre-development 1 in 1 year peak runoff rate OR the mean annual runoff rate (Qbar) OR 2 litres/second/hectare.	Anticipated	BH				
Pol 04	Reduction of night time light pollution	1	0	0			Written confirmation / specification confirming EITHER: - There will be no external lighting included in the development; OR - External lighting design is in compliance with Table 2 of the ILP Guidance Notes (2011) and can be automatically switched off between 23:00 and 07:00 (or safety/security lighting on during the night complies with Table 2 of the ILP Guidance Notes (2011). Any illuminated advertisements (where present) are designed in compliance with ILP PLG05 (2015	Not-Completed/Targeted	ME Engineers				
							A marked up copy of the site plan showing areas of the building and site that will be externally lit AND any nearby properties that may be affected	Not-Completed/Targeted	ME Engineers				

Pol 05	Reduction of noise pollution	1	1	0		Reduction of noise pollution	Written confirmation that a Noise Impact Assessment has been commissioned and will be carried out by a suitably qualified acoustic consultant, in compliance with BS 4142:2014; AND - If the Noise Impact Assessment concludes that noise levels are above 5dB lower than the background noise throughout the day and night, measures will be installed to attenuate the noise at its source to a compliant level. A copy of the Noise Impact Assessment, in line with BS 4142:2014, confirming: - Existing background noise levels (at nearest/most exposed noise sensitive area to the development and including existing plant on a building, where the development is an extension) and expected noise rating level from the assessed buildings proposed plant; - Confirmation of whether noise levels at the nearest/most exposed noise sensitive area to the development are higher or lower than 5dB lower than the background noise levels; - (Where the 5dB lower than background is not achieved) specification of attenuation measures to attenuate the noise at its source to a compliant level.	Anticipated Anticipated	GARDINER & THEOBALD/BH BH : VanGuardia			
Total		**Available**	**Targeted**	**Potential**	**Achieved**	**weighting**	**Score**	**Potential Score**				
Total		**12**	**8**	**2**	**0**	**8%**	**5%**	**7%**				
Innovation												
Title	**Topic**	**Available**	**Targeted**	**Potential**	**Achieved**	**Sub-Topic**	**Requirements**	**Status**	**Responsibility**	**Time Critical**	**BREEAM Consultant Meeting notes (19/10/2021)**	**Consultant Feedback**
Man 03	Responsible construction practices	1	1	0		-	Achieve all responsible construction measures	Anticipated	SISK			
Hea01	Visual Comfort	2	0	0		-	-	Not-Completed/Targeted	POP/BH/ME Engineers			
Hea02	Indoor Air quality	1	1	0		-	Commit to Construction materials Emissions limits	Anticipated	SISK/POP			
Hea06	Security	1	1	0		-	Submit documentation that shows that compliant risk based security rating scheme has been used. The performance against the scheme has been confirmed by independent assessment and verification	Anticipated	Security Consultant			
Ene01	Reduction of energy use and carbon emissions	5	2	0		-	Achieve Net Zero Or Negative Carbon Building The client or building occupier commits funds to pay for the post occupancy stage. This requires an assessor to be appointed and to report on the actual energy consumption compared with the targets	Anticipated	MCFC/GARDINER & THEOBALD			
Wat01	Water Consumption	1	0	0		-	Achieve water savings higher than 65%	Not-Completed/Targeted	ME Engineers			
Mat 01	Building life cycle assessment (LCA)	3	0	0		-	-	Not-Completed/Targeted	POP/BH/LCA consultant			
Mat 03	Responsible sourcing of construction products	1	0	0		-	-	Not-Completed/Targeted	SISK			
Wst 01	Construction waste management	1	0	0		-	-	Not-Completed/Targeted	SISK			
Wst 02	Use of recycled and sustainably sourced aggregates	1	0	0		-	-	Not-Completed/Targeted	SISK			
Wst 05	Adaptation to climate change	1	1	0		-	-	Anticipated	POP/ME			
LE01	Ecological risks and opportunities	1	0	0		-	-	Not-Completed/Targeted	Ecologist			
LE02	Ecological change and enhancement	1	0	0		-	-	Not-Completed/Targeted	Ecologist			
Total		**Available**	**Targeted**	**Potential**	**Achieved**	**weighting**	**Score**	**Potential Score**				
Innovation		**20**	**6**	**0**	**0**	**10%**	**3%**	**3%**				

BREEAM Pre-Assessment Hotel (Food & Beverage) Shell & Core Checklist

BREEAM NC UK V6 PRE-ASSESSMENT

Project: MCFC Hotel F&B Retail Shell & Core

Available	140
Targeted	84
Anticipated	5
Potential	23
Base score	66.1%
Anticipated Score	69.9%
Potential Score	87.5%

BREEAM rating	% score
Outstanding	≥85
Excellent	≥70
Very good	≥55
Good	≥45
Pass	≥30
Unclassified	<30

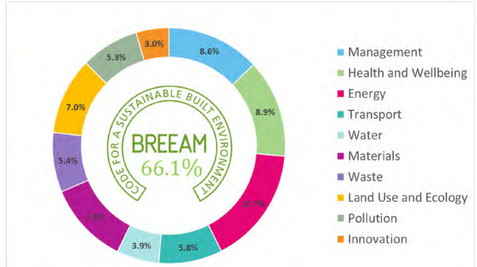
Credits Colour Code

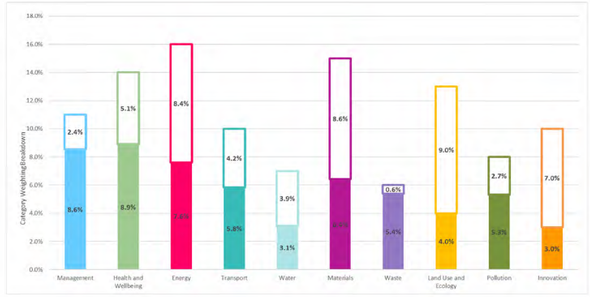
	Base credits to be targeted
	Anticipated credits to be targeted upon confirmation it can be achieved
	Potential credits not needed for Very Good level scope/ Not targeted
	High risk/not targeted
	N/A credit for the assessment scope /Excluded

Status Colour Code

	Credit requirements anticipated
	Credit requirements not Completed/Targeted
	Credit requirements completed
	N/A credit

Category	Available	Targeted	Potential	Anticipated	Weighting	Targeted Score	Anticipated Score	Potential Score
Management	18	14	4	1	11%	8.6%	9.2%	11.0%
Health and Wellbeing	11	7	3	3	14.0%	8.9%	12.7%	12.7%
Energy	21	14	0	0	16%	10.7%	10.7%	10.7%
Transport	12	7	0	0	10%	5.8%	5.8%	5.8%
Water	9	5	1	1	7%	3.9%	4.7%	4.7%
Materials	14	7	6	0	15%	7.5%	7.5%	13.9%
Waste	10	9	1	0	6%	5.4%	5.4%	6.0%
Land Use and Ecology	13	7	6	0	13%	7.0%	7.0%	13.0%
Pollution	12	8	2	0	8%	5.3%	5.3%	6.7%
Innovation	20	6	0	0	10.0%	3.0%	3.0%	3.0%
Total	140	84	23	5	110%	66.1%	69.9%	87.5%





Management

Title	Topic	Available	Targeted	Potentia	Achieve	Sub-Topic	Requirements	Status	Responsibility	Time Critical	BREEAM Consultant Meeting notes (19/10/2021)	Consultant Feedback
Man 01	Project Brief and Design	4	4	0		Project Delivery Planning	Design team responsibilities schedule / contact list	Completed	GARDINER & THEOBALD	Before end of Concept Design	Information included in stage 2 report and project directory V2 including contact list Please provide summarized schedule with contact details	
							Meeting minutes/agendas/presentations demonstrating early consultation with all relevant stakeholders identifying roles, responsibilities and contributions of design team at each key phase	Completed	MCFC/ GARDINER & THEOBALD/ BREEAM Consultant	Before end of Concept Design		
						Interested Parties	Consultation plan setting out the process, timeline and scope of the consultation.	Completed	MCFC/ GARDINER & THEOBALD/ BREEAM Consultant			
							All documents used and collected from the consultation process including list of stakeholders, meeting minutes, agendas, presentations.	Completed	MCFC/ GARDINER & THEOBALD/ BREEAM Consultant			
							Documentation confirming that feedback was given to the consultees on their ideas / concerns (e.g. presentations, website/newsletter updates)	Anticipated	BREEAM Consultant			
						BREEAM AP (Concept & Developed Design)	Please ensure that ME-Engineers is invited to key design team meetings, and provided minutes for all other team meetings.	Completed	GARDINER & THEOBALD			
							Compliance Letter confirming that BREEAM AP was appointed and will report progress against BREEAM targets.	Completed	GARDINER & THEOBALD/BREEAM Consultant	Before end of Concept Design		
							Meeting minutes confirming attendance of ME-Engineers to review project progress against BREEAM.	Completed	GARDINER & THEOBALD/BREEAM Consultant			
							BREEAM Progress report	Anticipated	BREEAM Consultant			
Man 02	Life cycle cost and service life planning	4	1	3		Elemental LCC	Elemental life cycle cost plan at RIBA Stage 2 (60 year design life, unless otherwise confirmed by the client) in line with PD 156865:2008. This must: a. Show an indication of future replacement costs over a period of analysis agreed to by the client (e.g. 20, 30, 50, 60+ years) b. Include service life, maintenance and operation cost estimates	Not-Completed/Targeted	T&T	Before end of Concept Design		
							Documentation (specifications / drawings) demonstrating examples of how the elemental LCC has influenced the design of the building.	Not-Completed/Targeted	T&T/ POP	Before end of Concept Design		
						Component level LCC options appraisal	Component level life cycle cost plan at RIBA Stage 4 in line with PD 156865:2008 that includes the following component types (where present): envelope, services, finishes, external spaces.	Not-Completed/Targeted	T&T	Before end of Technical Design		
							A specification document / drawings showing how the component level LCC plan has been used to influence building and systems design/specification to minimise life cycle costs and maximise critical value	Not-Completed/Targeted	T&T/ POP	Before end of Technical Design		
						Capital cost reporting	Compliance letter confirming the predicted capital costs, included contingencies, in pounds per square metre (£k/m2).	Anticipated	T&T			
Man 03	Responsible construction practices	6	6	0		Prerequisite - Legally harvested & traded timber Environmental management	Pre-requisite: Written confirmation that all site timber will be legally harvested and traded timber	Anticipated	SISK			
							Written confirmation that any party managing the construction site (main contractor / demolition contractor) has ISO 14001 or BS 8555:2016 certification.	Completed	GARDINER & THEOBALD/SISK			
							Written confirmation that the main contractor's pollution prevention procedures will be implemented at the site (in line with PPG6)	Anticipated	SISK			
						Responsible construction management Monitoring of construction site impacts - Energy & wate	Written commitment that the main contractor will carry out the mandatory BREEAM Responsible Construction Management requirements.	Anticipated	SISK			

							Written confirmation that responsibility has been assigned to an individual(s) for monitoring, recording and reporting energy and water consumption data resulting from all construction processes.	Anticipated	SISK			
							Written confirmation that targets have been set for site water and energy consumption, and that consumption will be monitored and recorded.	Anticipated	SISK			
						Transport of construction materials & waste	Written confirmation that responsibility has been assigned to an individual(s) for monitoring, recording and reporting of transport details for all deliveries to the site, and all waste removal from the site	Anticipated	SISK			
							Written confirmation that targets will be set in respect of transport movements (in km and litres of fuel), and these will be monitored and recorded separately in terms of: Materials delivered to the sit -Waste removed from the site.	Anticipated	SISK			
Man 04	Commissioning and handover	4	3	1		Commissioning - Testing schedule and responsibilities	Schedule of commissioning and testing, identifying suitable timescales for commissioning and re-commissioning of all systems.	Anticipated	Commissioning Specialist/SISK			
							Written confirmation that an appropriate project team member is appointed to monitor and programme pre-commissioning, commissioning and re-commissioning on behalf of the client, and that commissioning will be undertaken in line with CIBSE, BSRIA and Building Regulations.	Anticipated	Commissioning Specialist/SISK	Before end of Technical Design appointment		
							Project Programme including dates for commissioning.	Anticipated	Commissioning Specialist/SISK			
						Commissioning - Design and preparation	Written confirmation that a specialist commissioning manager will be appointed during the design stage to undertake design reviews and provide advice during construction programming, installation and testing	Anticipated	SISK	Before end of Technical Design appointment	It has been discussed that a specialist commissioning manager might be appointed during the design stage to undertake design reviews and provide advice during construction programming, installation and testing. The credit will be targeted upon confirmation	
						Testing and Insepction Building Fabric	Post-construction testing and inspection to quality-assure the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths. Survey and Testing undertaken by Suitably qualified professional. Remediation works are undertaken and completed prior to builfing handover and close out.	Not-Completed/Targeted	LOR			
						Handover	Written commitment to produce two non-technical building user guides: 1. A non-technical user guide for distribution to the building occupiers 2. A technical user guide for the premises facilities manager	Anticipated	SISK			
							Confirmation that the building user guides will be provided to the building occupants.	Anticipated	SISK			
							Confirmation of the content of the training schedules prepared: 1. A non-technical training schedule for the building occupiers. 2. A technical training schedule for the premises facilities manager	Anticipated	SISK			
Total		Available	Targeted	Potential	Achieved	weighting	Score	Potential Score				
		18	14	4	0	11%	9%	11%				

Health												
Title	**Topic**	**Available**	**Targeted**	**Potential**	**Achieved**	**Sub-Topic**	**Requirements**	**Status**	**Responsibility**	**Time Critical**	**BREEAM Consultant Meeting notes (19/10/2021)**	**Consultant Feedback**
HEA 01	Visual Comfort	4	1	3		Daylight	Daylight and glare assessment report including glare strategies	Anticipated	BH			
						View out	View out assessment report	Anticipated	BH			
						Internal and external lighting levels, zoning and control	Written confirmation that internal lighting and external lighting will meet the relevant illuminance level standards	Anticipated	ME Engineers			
HEA 02	Indoor Air quality	1	1	0		Prerequisite - Indoor air quality (IAQ) plan	A copy of a BREEAM Compliant indoor air quality plan covering: a. Removal of contaminant sources b. Dilution and control of contaminant sources c. Procedures for pre-occupancy flush out d. Third party testing and analysis e. Maintaining indoor air quality in-use	Anticipated	LOR/Indoor air quality consultant		1 point for Shell and Core areas Detailed IAQP requirements to be fulfilled by indoor air quality consultant is circulated in email dated (20/10/20222)	
						Ventilation	Confirmation that air intakes and exhausts will be located in accordance with best practice in terms of minimising build-up of air pollutants	Anticipated	ME Engineers			
							Written confirmation that HVAC systems will incorporate suitable filtration to minimise external air pollution (BS EN 16798-3:2017) - with air classification of at least SUP 2	Anticipated	ME Engineers			
								Anticipated			The ventilation requirement is discussed for the minimum distance between the AHUs exhaust and intake. The credit requirement will be attempted for all cases, however wherever the minimum distance not achieved, Air quality study based on CFD simulation will be conducted to verify that the intent of the credit is satisfied.	
							Drawings demonstrating air intakes and exhausts will be at least 10m apart (horizontally)		ME Engineers			
							WHERE BUILDING AREAS ARE SUBJECT TO LARGE / VARIABLE OCCUPANCY - Written confirmation that CO2 sensors / air quality sensors will be installed in areas of large / variable occupancy - with demand-controlled ventilation to the space	Anticipated	ME Engineers			
HEA 04	Thermal Comfort	2	2	0		Thermal Modelling CIBSE AM11	Written confirmation that full dynamic thermal modelling is carried out in compliance with CIBSE AM11	Anticipated	ME Engineers	Stage 3/4	2 points for shell and core areas - PMV and PPD indices not required to be reported via BREEAM assessment scoring and reproting tool	
						Design for future thermal comfort	Thermal modelling (CIBSE AM11) results demonstrating compliance with CIBSE Guide A for a future climate change environment	Anticipated	ME Engineers	Stage 3/4		
							OR: Where thermal modelling results cannot demonstrate compliance with CIBSE Guide A for a future climate change environment, drawings and / or statement detailing how the building has been or could be easily adapted using passive design solutions to comply with CIBSE Guide A	Anticipated	ME Engineers			
						Thermal zoning and controls	Written statement confirming that the thermal modelling report has informed the design of the building	Anticipated	ME Engineers			
							Specification and / or design drawings confirming the controls for the heating system (in line with the outcome of the thermal modelling report)	Anticipated	MEP			
HEA 05	Acoustic Comfort	1	1	0		Acoustic performance	Acoustic report confirming the building will meet the appropriate acoustic performance standards for: - indoor ambient noise level	Anticipated	BH - VanGuardia	Before end of Technical Design - appointment	1 point for Shell and Core areas - Only concerned with indoor ambient noise level	
						Acoustic performance	Written confirmation that any remediation works will be followed where required	Anticipated	SISK			
							Qualifications, experience & membership of the Suitably Qualified Acoustician	Anticipated	BH - VanGuardia			
HEA 06	Security	1	1	0		Security of site and building	A copy of the Security Needs Assessment report, provided by a Suitably Qualified Security Specialist outlining: 1. Scope of their advice/involvement 2. The stage of design in which their advice was sought (no later than RIBA stage 2) 3. Summary of their recommendation	Anticipated	RS Security Consultants Ltd / POP	Before end of Concept Design - appointment	SNA Received. Awaiting input from Populous.	
							Written confirmation of the qualifications of the Suitably Qualified Security Specialist	Anticipated	RS Security Consultant Ltd			
							Written confirmation and / or site drawings confirming design in accordance with Suitably Qualified Security Specialist recommendation.	Anticipated	POP			
							Written confirmation from Suitably Qualified Security Specialist that any deviations from original recommendations have been agreed (if applicable)	Anticipated	RS Security Consultant Ltd			
HEA 07	Safe and healthy surroundings	2	1	0		Safe access	Site plan showing safe and separate access routes for: - cyclists (including cycle paths to cycle storage); - pedestrians (including mark-ups of any traffic calming measures, i.e. speed bumps, and raised pedestrian crossings); - small vehicles (including parking provision and pedestrian access from car to building); and - delivery vehicles / areas (including manoeuvring layouts and mark-up of any waste storage areas)	Not-Completed/Targeted	POP			

						Outside space	Site plan demonstrating outside amenity space accessible to all building occupants. The space must: -be an outdoor landscaped area (garden / terrace open to the sky) -have appropriate seating -be designated as non-smoking -be away from areas that will be subject to noise disturbance (e.g. building services, car parks, busy roads, delivery areas, etc	Anticipated	POP				
							Written statement confirming the amenity space has been sized appropriately for the number of expected building users	Anticipated	POP				
Total		Available	Targeted	Potential	Achieved	weighting	Score	Potential Score					
		11	7	3	0	14%	9%	13%					
Energy													
Title	**Topic**	**Available**	**Targeted**	**Potential**	**Achieved**	**Sub-Topic**	**Requirements**	**Status**	**Responsibility**	**Time Critical**	**BREEAM Consultant Meeting notes (19/10/2021)**	**Consultant Feedback**	
Ene 01	Reduction of energy use and carbon emissions	13	6	0		Energy Performance	A copy of the 2021 Part L Approved Document checks (BRUKL Output Document)	Completed	ME Engineers				
							Confirmation of suitably qualified energy modeller's qualifications and experience	Completed	ME Engineers				
							TM54 assessment to predict operational energy	Anticipated	ME Engineers				
							MOMs of Workshop discussing the assessment outcomes and recommendations						
Ene 02	Energy monitoring	2	2	0		Sub-metering of end-use categories	Written confirmation / specifications confirming that all major energy consuming systems will be sub-metered.	Anticipated	ME Engineers				
							Technical drawings and specification confirming: - energy consuming systems (heating, hot water, small power, lighting and any major fans) and their rated outputs. - metering arrangement for each system, type and location of meter specified - meters are pulsed and labelled.	Anticipated	ME Engineers				
						Sub-metering of high energy load and tenancy areas	Written confirmation / specifications confirming that different function / tenant areas will be sub-metered (e.g. kitchen, office floor plates,.	Anticipated	ME Engineers				
							Technical drawings confirming: additional sub meter(s) for different function / tenancy areas.	Anticipated	ME Engineers				
Ene 03	External lighting	1	1	0		External lighting	Marked up site plans showing location and purpose of all external light fittings	Anticipated	ME Engineers				
							Written confirmation / specifications confirming external lighting meets luminaire requirements (>70 lumens per circuit watt), and are fitted with daylight sensors, and presence detectors in areas of intermittent pedestrian traffic	Anticipated	ME Engineers				
Ene 04	Low carbon Design	3	3	0		Passive Design Analysis	Results of thermal modelling (Hea04)	Anticipated	ME Engineers	Stage 4			
							A Passive Design Analysis report of the proposed building (at RIBA Stage 2), that identifies passive design solutions and quantifies the total reduced energy demand and carbon dioxide emissions resulting from them.	Completed	ME Engineers	Before end of Concept Design			
							Free Cooling assessment report	Anticipated	ME Engineers				
							Drawing plans / specification confirming specification of passive design measures	Anticipated	ME Engineers				
						LZC feasibility study	A copy of the low/zero carbon feasibility study including quantified reduced regulated carbon dioxide (CO_2.eq) emissions resulting from the low carbon / renewable technology	Completed	ME Engineers				
							A drawing or specification showing the specification of the low carbon / renewable technology as recommended within the feasibility study	Anticipated	ME Engineers				
Ene 06	Energy Efficient Transport systems	2	2	0		Energy consumption	Transport lift analysis to determine lift demand and usage patterns for the building. The analysis must determine the optimum number and size of lifts (including counter-balancing ratio), and the estimated energy consumption for one of the following: - at least two type of systems - an arrangement of systems - a strategy which is fit for purpose	Anticipated	ME Engineers				
							Written confirmation that the lift analysis considered the use of regenerative drive, and the lift with the lowest energy consumption has been specified.	Anticipated	ME Engineers				
						Energy efficient features - Lifts	Copy of the lift specification or manufacturer literature to confirm the energy-efficient features specified include: - Standby condition for off-peak periods - Car lighting and display lighting provided has an average luminous efficacy of > 70 luminaire lumens per circuit watt - Drive controller capable of variable speed, variable-voltage and variable frequency (VVVF	Anticipated	ME Engineers				
Total		Available	Targeted	Potential	Achieved	weighting	Score	Potential Score					
		21	14	0	0	16%	11%	11%					
Transport													
Title	**Topic**	**Available**	**Targeted**	**Potential**	**Achieved**	**Sub-Topic**	**Requirements**	**Status**	**Responsibility**	**Time Critical**	**BREEAM Consultant Meeting notes (19/10/2021)**	**Consultant Feedback**	
Tra 01	Transport assessment and travel plan	2	2	0		Travel Plan	Travel Plan developed during the feasibility and design stages based on a site-specific travel assessment or statement in accordance with BREEAM requirements (please contact BREEAM assessor for full details)	Anticipated	Arup	Preparation and Brief			
							Written confirmation that the travel plan will be implemented post construction and be supported by the building's management in operation.	Anticipated	MCFC/GARDINER & THEOBALD				
Tra 02	Sustainable transport measures	10	5	0		Transport options implementation	Assessment of existing site Accessibility Index (AI), AND evidence of sustainable transport measures.	Anticipated	Arup/BREEAM Assessor				
							Written confirmation that electric recharging stations will be provided (of a minimum of 3kW) for at least 10% of the total car parking capacity for the development.	Anticipated	GARDINER & THEOBALD/Arup/ME Engineers/POP				
							For fully-fitted buildings only: Written confirmation that a facility to facilitate and encourage building users to car share will be set up, and marketing and communication materials raising awareness of the sharing scheme with	Anticipated	MCFC/GARDINER & THEOBALD/Arup				
							Evidence of existing and new amenities where relevant.	Anticipated	Arup/POP				
							Drawing plan confirming specification of compliant sustainable transport measures (where applicable): a) 10% electric recharging car parking spaces b) 5% marked-up car share spaces located nearest the development entrance c) Location and number of cycle storage spaces d) Location and number of cyclist facilities (showers, changing space, lockers)	Anticipated	Arup/POP				
Total		Available	Targeted	Potential	Achieved	weighting	Score	Potential Score					
		12	7	0	0	10%	6%	6%					
Water													
Title	**Topic**	**Available**	**Targeted**	**Potential**	**Achieved**	**Sub-Topic**	**Requirements**	**Status**	**Responsibility**	**Time Critical**	**BREEAM Consultant Meeting notes (19/10/2021)**	**Consultant Feedback**	
Wat 01	Water Consumption	5	2	0		Water consumption	Written Confirmation / Technical specification of sanitary fittings and controls to be installed. Including (where applicable) specification of: WCs, washbasin taps; urinals; kitchen taps; showers; bath; dishwasher; washing machine	Anticipated	POP				
							Drawing to show location and specification of sanitaryware	Anticipated	POP				
Wat 02	Water Monitoring	1	1	0		Water monitoring	Compliance letter confirming a pulsed water meter will be fitted on the mains supply to the building	Anticipated	SISK				
							Design drawing to confirm the water meter is on the mains supply to the assessed building	Anticipated	ME Engineers				
Wat 03	Water Leak detection	2	2	0		Leak detection system	Compliance letter confirming a BREEAM compliant leak detection system will be specified	Anticipated	ME Engineers				

							Drawings to confirm a leak detection system has been installed on the mains water supply within the building and also between the building and the utilities water meter. Flow control Devices on each sanitary fitting or WC. (cold water supply to taps, WCs and urinals).	Anticipated	ME Engineers			
Wat 04	Water efficient Equipment	1	0	1		Water efficient Equipment	For landscape areas provide a design report demonstrating to the assessor that a reduction in water consumption has been achieved using existing 'tried and tested' solutions. The following are some examples of solutions deemed to satisfy compliance for a number of different building types or functions -Drip-fed subsurface irrigation incorporating soil moisture sensors. The irrigation control should be zoned to permit variable irrigation to different planting assemblages. -Reclaimed or recovered water from a rainwater collection or waste water recovery system with appropriate storage, i.e. greywater collection from building functions or processes that use potable water, e.g. vehicle wash, sanitary facilities, irrigation etc. -External landscaping and planting that relies solely on precipitation, during all seasons of the year. -All planting specified is restricted to contextually appropriate species that thrive without irrigation and will continue to do so in those conditions likely as a result of climate change, i.e. typically warmer and drier conditions.	Anticipated	POP/ME Engineers			
Total		Available	Targeted	Potential	Achieved	weighting	Score	Potential Score				
		9	5	1	0	7%	4%	5%				
Materials												
Title	Topic	Available	Targeted	Potential	Achieved	Sub-Topic	Requirements	Status	Responsibility	Time Critical	BREEAM Consultant Meeting notes (19/10/2021)	Consultant Feedback
Mat 01	Life Cycle Assessment	7	3	4		Superstructure	Design drawings, including elevations and build-ups detailing the build up of all major materials within the superstructure of the building. A completed copy of the 'LCA DETAILS' document OR Mat 01 Table if the simplified approach is to be undertaken (to be provided by Assessor).	Anticipated Anticipated	BH - Lucy/Ben BH - Lucy/Ben			
							A copy of the LCA report including 3 - 4 option appraisals at Concept Design stag A copy of the LCA report including 3 option appraisals at Technical Design stage	Anticipated Anticipated	BH - Lucy/Ben BH - Lucy/Ben	Before planning Before end of Technical Design		
						Substructure and landscape	Drawings including build-ups detailing the build up of all major materials within the substructure of the building and hard landscaping elements of the development A completed copy of the 'LCA DETAILS' document including detail of substructure and hard landscaping	Not-Completed/Targeted Not-Completed/Targeted	POP/BH POP/BH			
							A copy of the LCA report including 3 option appraisals at concept design stage	Not-Completed/Targeted	POP/BH/LCA Consultant			
Mat 02	Environmental Product Declaration	1	1	0		Specification of products with EPDs	Contractor requirements document confirming that at least 15 products with recognised EPDs will be procured for the development	Not-Completed/Targeted	SISK			
Mat 03	Responsible sourcing construction product	4	2	1		Prerequisite - Legally harvested & traded timber	Compliance letter / Contractor Requirements confirming all timber procured will be legally harvested and traded timber.	Anticipated	SISK			
						Enabling sustainable procurement	A copy of the sustainable procurement plan for the development or at a company operational level (developer or architect), produced at concept design stage. The plan must include sustainability aims, objectives and strategic targets to guide procurement activities	Anticipated	POP	Before end of Concept Design		
						Measuring responsible sourcing	Drawings to show the specification of the build up of the relevant building elements (see MAT03 Table)	Anticipated	POP			
							Completed MAT03 Table, including manufacturer details for each material specified and their corresponding volume (in m3) or mass (in kg) and where possible	Anticipated	POP			
							A copy of suppliers responsible sourcing certification (e.g. ISO14001, BES6001, FSC) where available OR	Anticipated	POP			
							Compliance Letter committing to procure from suppliers who can provide the relevant responsible sourcing certification for each material type (e.g. ISO14001, BES6001, FSC)	Anticipated	POP			
Mat 05	Design for durability and resilience	1	1	0		Design for durability and resilience	Design drawings marked up to show vulnerable areas of the building that may be susceptible to damage, including: - Areas of high user numbers - i.e. main entrances, circulation spaces - Areas of internal transport movement - i.e. trolley movement - External walls within 1m of vehicular movement	Anticipated	POP		Credit requirements on (20/20/2022). Highly recommended to target this credit	
							Design drawings / specification outlining the measures taken to enhance durability: - Bollards / barriers / raised kerbs in delivery areas - Robust external wall construction - Protection rails to internal walls - Kickplates on doors - Hard wearing floors	Anticipated	POP			
							Written confirmation or specifications confirming elements have been designed to limit long and short term material degradation through confirming that elements or products achieve an appropriate quality or durability standard.	Anticipated	POP			
							Marked up drawing(s), or maintenance plan confirming access to the roof and façade for cost-effective cleaning, replacement and repair in the building's design. Marked up drawing highlighting features of the roof and façade design that prevent water damage, ingress and detrimental ponding.	Anticipated Anticipated	POP POP			
Mat 06	Material efficiency	1	0	1		Material efficiency	Report (at Preparation and Brief stage) setting targets relating to material efficiency and report on opportunities and methods to optimise the use of materials at each key stage of the project Commitment to implement the targets outlined in the above report, plus develop and record the implementation of materials efficiency at developed design, technical design and construction	Not-Completed/Targeted Not-Completed/Targeted	POP POP	Preparation and Brief		
Total		Available	Targeted	Potential	Achieved	weighting	Score	Potential Score				
		14	7	6	0	15%	8%	14%				
Waste												
Title	Topic	Available	Targeted	Potential	Achieved	Sub-Topic	Requirements	Status	Responsibility	Time Critical	BREEAM Consultant Meeting notes (19/10/2021)	Consultant Feedback
Wst 01	Construction waste management	5	5	0		Pre-demolition audit	Confirmation that a pre-demolition audit will be carried out using an appropriate methodology. This must show the recovery of demolition material for subsequent high grade or value applications. The audit must cover the content of Pre-demolition audit scope and: a: Be carried out at Concept Design stage prior to strip-out or demolition works b: Guide the design, consider materials for reuse and set targets for waste management c: Engage all contractors in the process of maximising high grade reuse and recycling opportunities d: Compare actual waste arisings and waste management routes used with those forecast and investigate significant deviations from planned targets.	Anticipated	SISK	Before end of Concept Design		
						Construction resource efficiency	Compliance letter confirming a compliant Site Waste Management Plan will be produced containing the appropriate benchmarks, commitments and procedures, and that data records will be kept on waste arisings and waste management routes.	Anticipated	SISK			

						Diversion of resources from landfill	Confirmation that less than 3.4 m3 or 3.2 tonnes of waste will be generated per 100m2 of floor area Confirmation that the non-hazardous construction waste will meet the following diversion from landfill benchmarks;. Non-demolition 70% by volume or 80% by tonnage, demolition waste 80% by volume or 90% by tonnage	Anticipated Anticipated	SISK SISK				
Wst 02	Use of sustainably sourced	1	0	1		Pre-demolition Audit	Compliance letter confirming that a pre-demolition audit will be undertaken for any existing buildings, structures, or hard surfaces on site	Anticipated	SISK				
						Project sustainable aggregate point	Compliance letter confirming that the aggregate for each relevant building element will be specified in line with the BREEAM requirements Completed Wst02 Table	Not-Completed/Targeted Not-Completed/Targeted	SISK SISK				
Wst 03	Operational waste	1	1	0		Operational waste	Annotated drawing to show both general and recyclable waste storage areas and that the latter will be at least 2m2 per 1000m2 of net floor area and located within 20m of the development Compliance Letter confirming the recycle storage will be BREEAM compliant:- adequately sized and labelled 'recycling'	Anticipated Anticipated	POP SISK			To be reviewed in line with the existing operational waste storage	
Wst 05	Adaptation to climate change	1	1	0		Resilience of structure, fabric, building services and renewables installation	A copy of the systematic (structural and fabric resilience specific) risk assessment to identify and evaluate the impact on the building over its projected life cycle from expected extreme weather conditions arising from climate change and, where feasible, mitigate against these impacts. The assessment must cover the following: - Hazard identification - Hazard assessment - Risk estimation - Risk evaluation - Risk management. Design drawings demonstrating the structure and fabric are adequately protected from the risks of a future climate	Anticipated Anticipated	POP POP	Preparation and Brief		Credit requirements on (20/20/2022). Highly recommended to target this credit. Input received from Populous (16/01/2023).	
Wst 06	Design for disassembly and adaptability	2	2	0		Design for disassembly and functional adaptability - recommendation	A building-specific functional adaptation strategy study to explore the ease of disassembly and the functional adaptation potential of different design scenarios by the end of Concept Design. Drawings or specification confirming potential for future adaptation of the building's function	Anticipated Anticipated	POP POP	Preparation and Brief		Credit requirements on (20/20/2022). Highly recommended to target this credit. Input received from Populous (16/01/2023).	
Total		Available 10	Targeted 9	Potential 1	Achieved 0	weighting 6%	Score 5%	Potential Score 6%					

Land Use and Ecology												
Title	Topic	Available	Targeted	Potential	Achieved	Sub-Topic	Requirements	Status	Responsibility	Time Critical	BREEAM Consultant Meeting notes (19/10/2021)	Consultant Feedback
LE 01	Site selection	2	2	0		Previously occupied land	Design drawings (including existing site plan), report or site photographs.	Anticipated	POP			
						Contaminated land	Site assessment report for land contamination required highlighting the remediation measures for the Contractor.	Anticipated	Ecologist			
LE 02	Ecological risks and opportunities	2	2	0		Survey and Evaluation	Foundation route (Route 1) The site is evaluated using the BREEAM Ecological Risk Evaluation Checklist (Guidance Note 34) confirming that the Foundation route can be used (see Methodology and Definitions). Comprehensive route (Route 2) A Suitably Qualified Ecologist (SQE) carries out a survey and evaluation (see Methodology) for the site early enough to influence site preparation works, layout	Anticipated	Ecologist		It has been discussed that there is undergoing Ecology site survey for planning requirements	
							Ecological assessment report including identification pf the optimal ecological outcomes for the site. Identification, appraise and select measures to meet the optimal ecological outcomes for the site (criterion in line with the mitigation hierarchy of action, according to the route being used)	Anticipated	Ecologist			
LE 03	Managing negative impacts on ecology	3	2	1		Prerequisite – Ecological risks and opportunities	Survey and evaluation report confirming that ecological outcomes' criteria have been achieved using the Foundation route (Route 1) or the Comprehensive route (Route 2).	Anticipated	Ecologist			
						Planning and measures on-site	Ecology report outlining Further planning to avoid and manage negative ecological impacts on-site is carried	Anticipated	Ecologist			
						Managing negative impacts	Ecology report showing that the Negative impacts from site preparation and construction works are managed according to the mitigation hierarchy and no overall loss (see Definitions) of ecological value has occurred.	Not-Completed/Targeted	Ecologist			
LE 04	Change and enhancement of ecological value	4	1	3		Prerequisite - Managing negative impacts on ecology	The client or contractor confirms compliance is monitored against all relevant UK, EU or international legislation relating to the ecology of the site.	Anticipated	Ecologist			
						Change and enhancement of ecology	Locally relevant ecological measures have been implemented that enhance the site's ecological value. (Rout 1) Measures have been implemented that enhance ecological value, which are based on input from the project team and SQE in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in LE 02 (Route 2)	Anticipated	Ecologist			
						Ecological enhancement	Up to three credits are awarded based on the change in ecological value occurring as a result of the project. This must be calculated in accordance with the process set out in GN36 - BREEAM, CEEQUAL and HQM Ecology Calculation Methodology	Not-Completed/Targeted	Ecologist			
LE 05	Long term ecology management and maintenance	2	0	2		Prerequisite - Statutory obligations, planning and site implementation	The client or contractor has confirmed that compliance is being monitored against all relevant UK, EU and international standards relating to the ecology of the site.	Not-Completed/Targeted	Ecologist			
						Management and maintenance throughout the project– Foundation and Comprehensive routes (Route 1 and Route 2) 3 Measures have been implemented to manage and maintain ecology	Measures have been implemented to manage and maintain ecology throughout the project. These measures are based on input from the project team in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in LE 02. section on Ecology and Biodiversity has been included as part of the tenant or building owner information supplied, to inform the owner or occupant of local ecological features, value and biodiversity on or near the site	Not-Completed/Targeted	Ecologist			

						Landscape and ecology management plan	A Landscape and Ecology Management Plan, or equivalent, has been developed in accordance with BS 42020:2013 Section 11.1 The landscape and management plan or similar will be updated to support maintenance of the ecological value of the site (see sections relating to Maintenance and Monitoring in CIEEM, CIRIA, IEMA, for helpful guidance	Not-Completed/Targeted	Ecologist			
Total		Available	Targeted	Potential	Achieved	weighting	Score	Potential Score				
		13	7	6	0	13%	7%	13%				
Pollution												
Title	Topic	Available	Targeted	Potential	Achieved	Sub-Topic	Requirements	Status	Responsibility	Time Critical	BREEAM Consultant Meeting notes (19/10/2021)	Consultant Feedback
Pol 01	Impact of refrigerants	3	2	1		Prerequisite - BS EN 378:2016 (ammonia)	Written statement confirming that all systems with electric compressors will comply with the requirements of BS EN 378:2016 (Parts 2 and 3).	Anticipated	ME Engineers	MEP		
						Impact of refrigerant	Written confirmation / specification confirming the refrigeration type and system, including: 1. Global Warming Potential (GWP) of the specified system refrigerant(s) 2. Total refrigerant charge (kg) 3. Heating / cooling capacity (kW)	Anticipated	ME Engineers	MEP		
							Design drawings confirming the type and location of systems using refrigerants within the development.	Anticipated	ME Engineers	MEP		
							A copy of the completed BREEAM Pol 01 Calculator, confirming the number of credits achieved	Anticipated	BREEAM Assessor	Assessor		
						Leak detection	Written confirmation / specification confirming that all systems are hermetically sealed / only use environmentally benign refrigerants, OR refrigerant leak detection has been installed (clarifying the type of system, scope and that the containment strategy is capable of automatically responding and managing the remaining refrigerant charge to limit loss of refrigerant).	Anticipated	ME Engineers	MEP		
							Design drawings confirming the type and location of refrigerant leak detection systems (if present).	Anticipated	ME Engineers	MEP		
Pol 02	Local air quality	2	2	0		Local air quality	Written confirmation / specification confirming that all space and water heating will be supplied by non-combustion systems (i.e. only powered by electricity), OR confirmation of the make and model of the system (boiler, CHP):	Anticipated	ME Engineers	MEP		
							copy of the Defra map confirming whether the site is in a high or low pollution location.	Anticipated	BREEAM Assessor	Assessor		
							Written confirmation / specification confirming details for the specified combustion system(s) (both existing and new if applicable) confirming the NOx emissions (mg/kWh) and PM10/VOC emissions (mg/m3), where applicable, for space and water heating.	Anticipated	ME Engineers	MEP		
Pol 03	Flood and surface water management	5	3	1		Prerequisite	Written confirmation that an appropriate consultant has been appointed to carry out and develop the development's compliance with all flood and surface water management criteria:	Anticipated	GARDINER & THEOBALD	Project Manager		
						Flood resilience	Site-specific Flood Risk Assessment (FRA) report (considering all current and future sources of flooding) confirming the development is in a flood zone defined as having a low annual probability of flooding	Anticipated	BH			
							Site plans/sections (for medium or high annual probability) confirming: - The design ground levels (for the development and site) compared to design flood levels; AND - Safe access routes to the development.	Anticipated	BH			
						Surface water run-off rate	Pre-requisite: statement from the appropriate consultant to confirm that bespoke surface water runoff design solutions have been developed for the site (accounting for specific site requirements and conditions).	Anticipated	BH			
							A copy of the drainage consultant's report	Anticipated	BH			
							EITHER compliance letter from the client OR section from the drainage consultant's report confirming that there will be relevant maintenance agreements for the ownership, long-term operation and maintenance of all specified Sustainable Drainage Systems (SuDS	Anticipated	MCFC/GARDINER & THEOBALD/BH			
						Surface water run-off volume	A copy of the drainage consultant's report confirming that flooding of property will not occur in the event of the local drainage system failure AND EITHER: - The post-development runoff volume will be no greater than pre-development runoff volume (managed by SuDS); OR - The consultant provides robust justification why the above criteria cannot be achieved (i.e. infiltration etc. are not technically viable) AND the post-development discharge rates can be limited to the highest of the following; pre-development 1 in 1 year peak runoff rate OR the mean annual runoff rate (Qbar) OR 2 litres/second/hectare.	Anticipated	BH			
Pol 04	Reduction of night time light pollution	1	0	0			Written confirmation / specification confirming EITHER: - There will be no external lighting included in the development; OR - External lighting design is in compliance with Table 2 of the ILP Guidance Notes (2011) and can be automatically switched off between 23:00 and 07:00 (or safety/security lighting on during the night complies with Table 2 of the ILP Guidance Notes (2011). Any illuminated advertisements (where present) are designed in compliance with ILP PLG05 (2015 A marked up copy of the site plan showing areas of the building and site that will be externally lit AND any nearby properties that may be affected	Not-Completed/Targeted	ME Engineers	MEP		
								Not-Completed/Targeted	ME Engineers	MEP		
Pol 05	Reduction of noise pollution	1	1	0		Reduction of noise pollution	Written confirmation that a Noise Impact Assessment has been commissioned and will be carried out by a suitably qualified acoustic consultant, in compliance with BS 4142:2014; AND - If the Noise Impact Assessment concludes that noise levels are above 5dB lower than the background noise throughout the day and night, measures will be installed to attenuate the noise at its source to a compliant level.	Anticipated	GARDINER & THEOBALD/BH			
							A copy of the Noise Impact Assessment, in line with BS 4142:2014, confirming: - Existing background noise levels (at nearest/most exposed noise sensitive area to the development and including existing plant on a building, where the development is an extension) and expected noise rating level from the assessed buildings proposed plant; - Confirmation of whether noise levels at the nearest/most exposed noise sensitive area to the development are higher or lower than 5dB lower than the background noise levels; - (Where the 5dB lower than background is not achieved) specification of attenuation measures to attenuate the noise at its source to a compliant level.	Anticipated	BH - VanGuardia			
Total		Available	Targeted	Potential	Achieved	weighting	Score	Potential Score				
		12	8	2	0	8%	5%	7%				
Innovation												
Title	Topic	Available	Targeted	Potential	Achieved	Sub-Topic	Requirements	Status	Responsibility	Time Critical	BREEAM Consultant Meeting notes (19/10/2021)	Consultant Feedback
Man 03	Responsible construction practices	1	1	0		-	Achieve all responsible construction measures	Anticipated	SISK			
Hea01	Visual Comfort	2	0	0		-	-	Not-Completed/Targeted	POP/BH/ME Engineers		Specialist Consultant	
Hea02	Indoor Air quality	1	1	0		-	Commit to Construction materials Emissions limits	Anticipated	SISK/POP			
Hea06	Security	1	1	0		-	Submit documentation that shows that compliant risk based security rating scheme has been used. The performance against the scheme has been confirmed by independent assessment and verification	Anticipated	Security Consultant		Specialist Consultant	
Ene01	Reduction of energy use and carbon emissions	5	2	0		-	Achieve Net Zero Or Negative Carbon Building The client or building occupier commits funds to pay for the post occupancy stage. This requires an assessor to be appointed and to report on the actual energy consumption compared with the targets	Anticipated	MCFC/GARDINER & THEOBALD			

Wat01	Water Consumption	1	0	0	-	Achieve water savings higher than 65%	Not-Completed/Targeted	ME Engineers	MEP			
Mat 01	Building life cycle assessment (LCA)	3	0	0	-	-	Not-Completed/Targeted	POP/BH/LCA consultant	Specialist Consultant			
Mat 03	Responsible sourcing of construction products	1	0	0	-	-	Not-Completed/Targeted	SISK				
Wst 01	Construction waste management	1	0	0	-	-	Not-Completed/Targeted	SISK				
Wst 02	Use of recycled and sustainably sourced aggregates	1	0	0	-	-	Not-Completed/Targeted	SISK				
Wst 05	Adaptation to climate change	1	1	0	-	-	Anticipated	POP/ME	MEP			
LE01	Ecological risks and opportunities	1	0	0	-	-	Not-Completed/Targeted	Ecologist	Ecologist			
LE02	Ecological change and enhancement	1	0	0	-	-	Not-Completed/Targeted	Ecologist	Ecologist			
Total		Available	Targeted	Potential	Achieved	weighting	Score	Potential Score				
		20	6	0	0	10%	3%	3%				-

22045	MCFC North Stand Project	Energy Strategy

Date:	06/04/2023	
Subject:	**Energy Strategy**	
Circulation:	Richard Hattan	CFG
	Ed Dalton	MCFC
	Eve Grant	Deloitte
	Rachel Brown	Deloitte
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Rev	Date	Description	Prepared By	Checked By
00	06/04/2023	For Review and Discussion	M.M.	M.M

Executive Summary

This section covers the energy strategy for the MCFC North Stand development in compliance with polices and guidelines from the aspirations and initiatives of Manchester City club to City of Manchester Council plans and policies.

The report also includes all supporting assessments and studies for the statement including full micro climate analysis.

The development includes
1- New North Stand
2- Commercial Building
3- Hospitality Building.
4- City Square: An open space bounded by the commercial and hospitality building.
All energy assessments are conducted via Dynamic Simulation Method (DSM). The Energy Modelling Inputs used to date are detailed within this section. All information herein is current at time of issuing.

As required by Manchester City Council outline planning application requirements revised in January 2020 in relation to the guidance of Chapter 4 of the 'Guide to Development in Manchester and policies EN4 and EN6 of the Core Strategy for the City of Manchester, the development to confirm the proposals for the provision of on-site renewable energy to provide 20% of final site energy demand and CO_2 reduction.

Noting that this requirements have been outlined based on the previous building regulations Part L 2013 with 2016 amendments. The new building regulations including the new part L 2021 has been applied on all new buildings since June 2022 which by default intended to deliver 27 % lower CO_2 emissions than under the part L 2013.

Consequently, Complying with Part L 2021 will by default compliance with the Manchester city planning requirements related to 20% reduction in the carbon emissions.

This is attempted by following the Energy Hierarchy and maximizing the use of low and zero carbon technologies referred to as renewable including on site energy generation as PVs and Air Source Heat pump for space and domestic water heating.

One more aspiration for the project energy targets is the targeted BREEAM Energy credits contributing to achieving BREEAM Very good rating level for the all buildings within the development.

The Energy assessments results show that all buildings comply with Part L 2021 energy performance requirements based on the building elements performance requirements outlined in this section.

For BREEAM, the commercial building and the North stand will be assessed in one Bespoke Assessment. Accordingly, an energy assessment has been done combining the North stand and the commercial building in one model. The energy assessment results shows that the combined North stand and commercial building achieves the targeted 3 energy conservation credits as part of ENE 01.

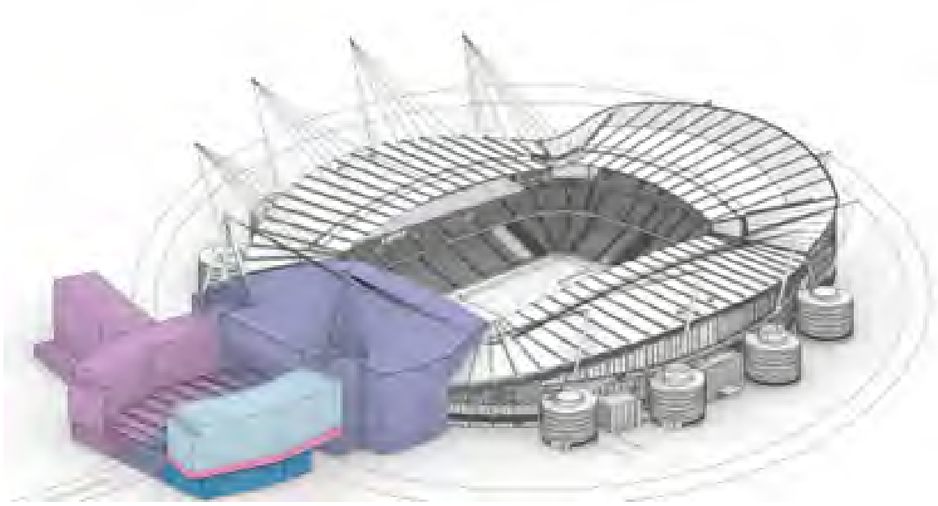
The hotel will have a separate BREEAM assessment under Residential institution Scheme excluding the shell core F&B units in the podium. The energy assessment results shows that the hotel only energy assessment achieves the 2 energy conservation credits as part of ENE 01.

The section also includes overheating analysis to verify the compliance of all naturally ventilated spaces including Lower and upper concourses and city hall with CIBSE TM 52 Overheating and adaptive comfort criteria.

The results shows that all spaces complies with CIBSE TM 52 Overheating and adaptive comfort criteria.

The lower concourses front left and right sides might experience scenario of high temperature with more than 4 K difference between concourses indoor temperature and the ambient temperature. This occurs when the wind speed is low with no enough air flowing from louvers or vomitories with high ambient temperature in case of summer event (June and July) . It is proposed to add zonal additional extract fans capacity of 2000 l/s in zones 1 and 2 to entrain air into the concourse and to be operated only in case of overheating.

This can be added as overheating mode to one of the extract fans in each zone already set to be part of the concourses air extract (i.e. Kitchen extract). This adds further resilience to the concourses operation throughout the year to include summer events scenarios.



North Stand Development

Zero Carbon, Net Zero and Carbon Neutrality

In the overall carbon reduction design journey, the below are main strategies for operational carbon reduction over the project lifetime:

This section includes a quick summary of the primary industry terms describing major energy performance milestones, including those targeted by Manchester Zero Carbon 2038 initiative. Noting that Manchester Zero Carbon Framework 2020-2038 uses Tyndall Centre definition



for Zero carbon and zero emissions and United Nations Environmental Program (UNEP).

Zero carbon and Zero emissions.

These terms would indicate that there are no direct emissions of carbon dioxide (only) or GHGs respectively, from an organisation or individual's activities. This is a strict criterion to fulfil and depends upon the boundary established for reporting. The framework highlights that reducing carbon emissions and GHG emissions to zero will be very challenging for most economic sectors and some organisations will look to reductions beyond their direct reporting boundaries.

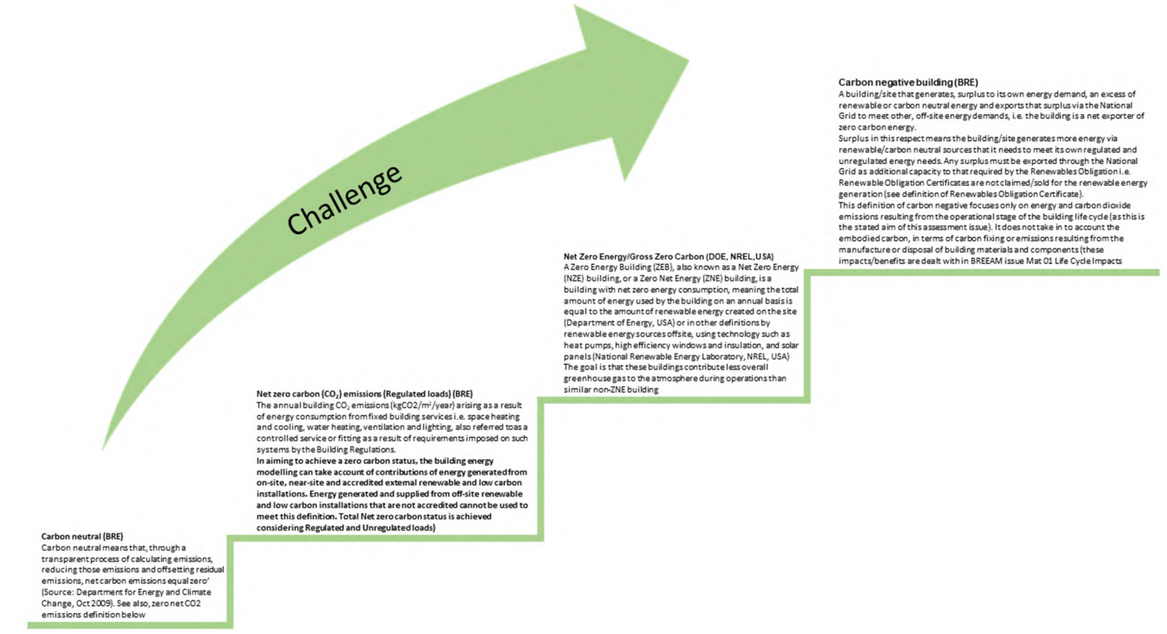
Carbon Neutrality and Net Zero

It is a situation where global anthropogenic carbon dioxide emissions from energy, industry, and land use / land cover change (LULC) are quantitatively balanced to be 'net zero' by carbon dioxide removals. This approach could be extended to geographic or administrative areas which capture both emissions and removals within their boundaries.
The idea of carbon neutrality has also been extended by organisations and individuals to include carbon offsetting relationships where the balance extends across organisational boundaries. Some standards including BRE definitions differentiate between carbon neutrality and net zero carbon approaches. The carbon Neutrality is a transparent process of calculating emissions with attempts reducing those emissions and offsetting residual emissions.

However, Net zero carbon, is more restrictive in terms of the approach by prioritizing energy reduction and on-site and near-site renewable energy generation. Offsetting might be the last resort to achieve net zero carbon status as stated in some interpretations as in UKGBC.

The shown figure summarizes the concepts for Carbon Neutrality, Zero and Net Zero terms and shows how challenging each term is for the developers.

Note: All above terms related to the total carbon emissions of the project which is the sum of the regulated and unregulated loads carbon emissions of the project according to UK national calculation methodology (NCM).



Net zero and carbon neutrality concepts

The regulated loads are defined as the building energy consumption resulting from the specification of controlled, fixed building services and fittings, including space heating and cooling, hot water, ventilation, fans, pumps, and lighting. Such energy uses are inherent in the design of a building.

The unregulated load is defined as building energy consumption resulting from a system or process that is not 'controlled', i.e., energy consumption from systems in the building on which the Building Regulations do not impose a requirement. For example, this may include energy consumption from systems integral to the building and its operation, e.g., IT equipment, lifts, escalators, refrigeration systems, external lighting, ducted-fume cupboards, servers, printers, photocopiers, laptops, cooking, audio-visual equipment, and other appliances.

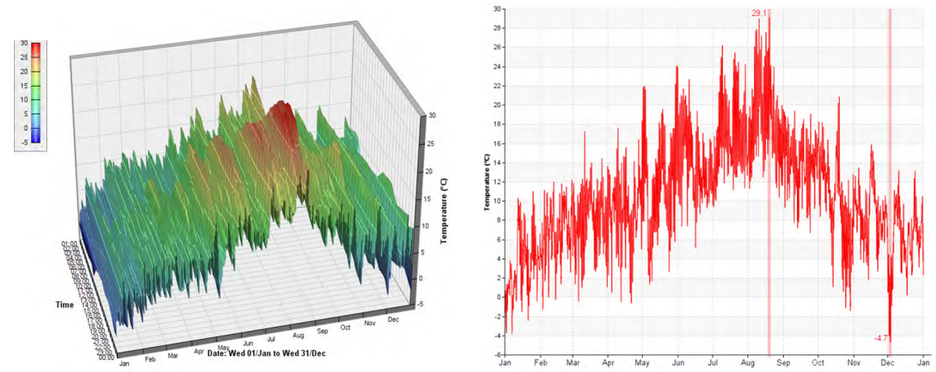
The unregulated loads or the process loads are determined by the building type. Unregulated loads energy consumption can be effectively reduced by efficient building management systems and by using efficient equipment for different purposes other than that covered by the regulated loads. However, in all cases the regulated loads have to be consistent between the notional part L baseline and the assessment cases of proposed energy efficiency measures.

Microclimate Analysis

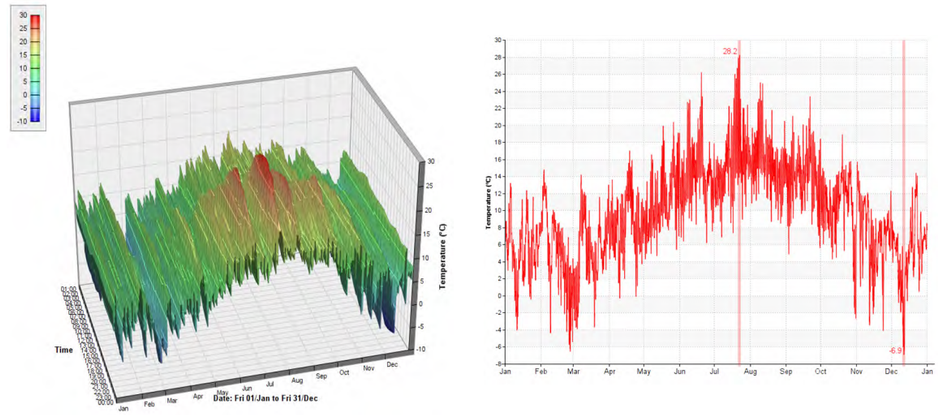
The Microclimate analysis is one of the fundamental studies conducted at the early stages of the project to identify the sustainability potentials of the project and optimizing the Energy Conservation Measures (ECMs) for different components of the masterplan. This section covers the microclimate items which have influence on the energy strategy.

Climate
Manchester has current moderate summer temperature with a peak of 28.2°C for a summer design year (DSY1) * and minimum temperature of -6.7 °C for a typical design year.

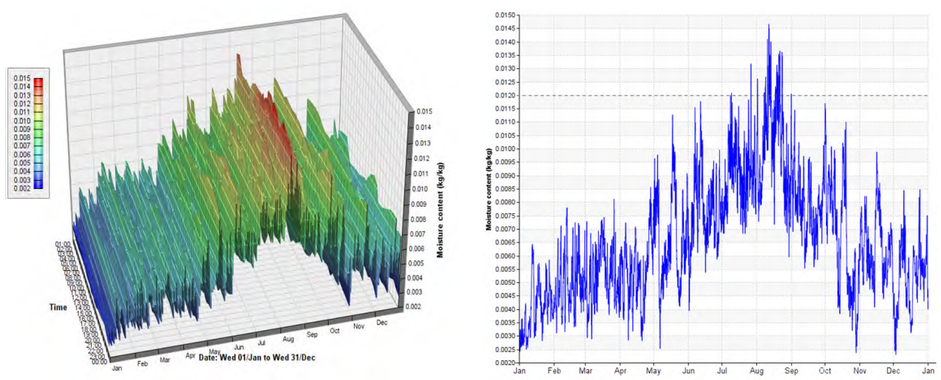
Manchester has a relatively dry weather with low Moisture content below 12 g/kg which is considered to be threshold of comfort.



Manchester Current Weather file-TRY-



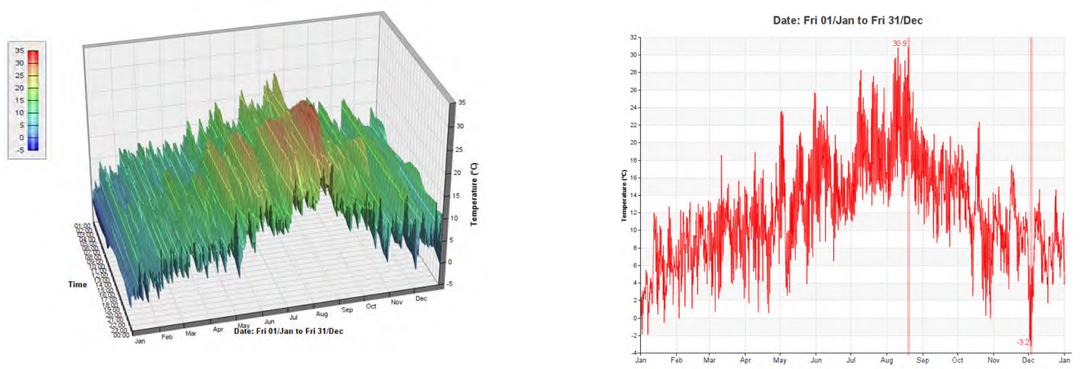
Manchester Current Weather file-DSY1-DBT



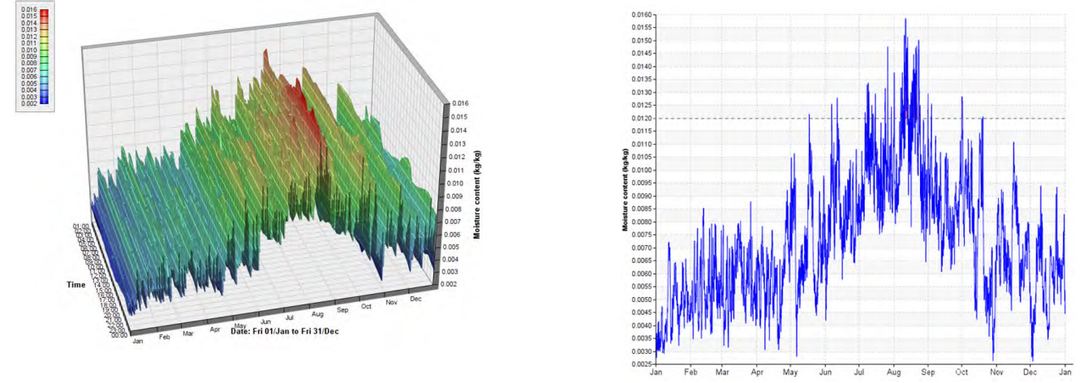
Manchester Current Weather file-DSY1-Moisture content

Future Weather Files
Manchester Weather file 2050 Medium 90 has been considered as best representative for the expected climate change scenario within the lifecycle of the project. This is considered to conservative assumption that takes into account the global initiatives to reduce emissions. This prediction model shows that temperature will increase by 2.8 °C to reach peak of 30.9 °C for typical summer design year.

The moisture content is anticipated to rise with rising temperature; however, the rise is not significant with average of 0.065 g/Kg increase in the moisture levels.



Manchester Future Weather file-DSY1-2050Medium90-DBT



Manchester Future Weather file-DSY1-2050Medium90-Moisture content

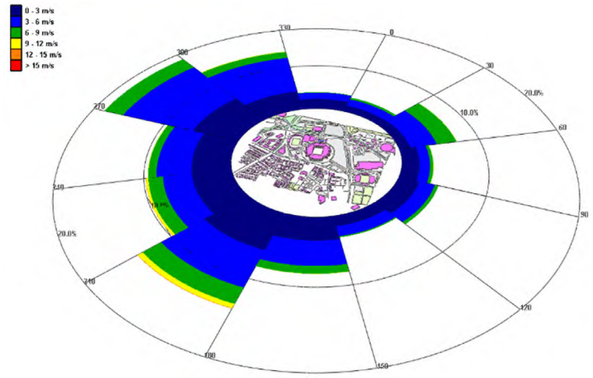
Wind Analysis
Wind analysis shows that the annual prevailing wind direction in Manchester is Southwest.

The annual average wind speed 4.06 m/s. The summer season has both SW and NW prevailing wind directions with average wind speed of 3.61 m/s.

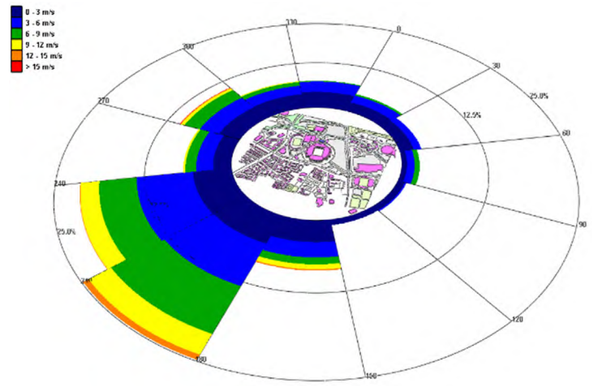
The Vomitories will be one of the main sources of effective natural ventilation within the naturally ventilated GA concourses in summer as it faces the SW prevailing wind direction.

Precipitation
The below figure shows the precipitation profile for Manchester with peak precipitation of 82 mm in January. December has the longest duration of raining with 14 days equivalent duration of continuous raining.

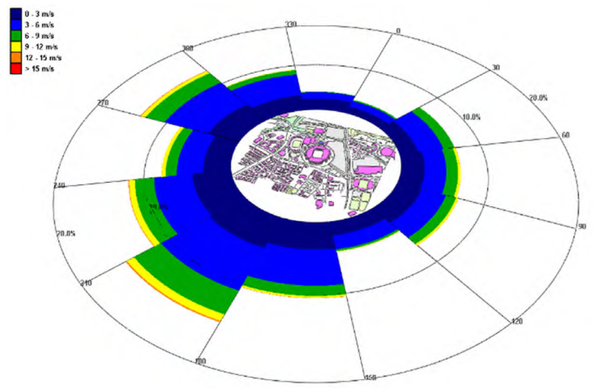
This shall be used as basis of rainwater management strategy for the project and sizing of any adopted rainwater collection system to be reused for indoor and outdoor water conservation purposes.



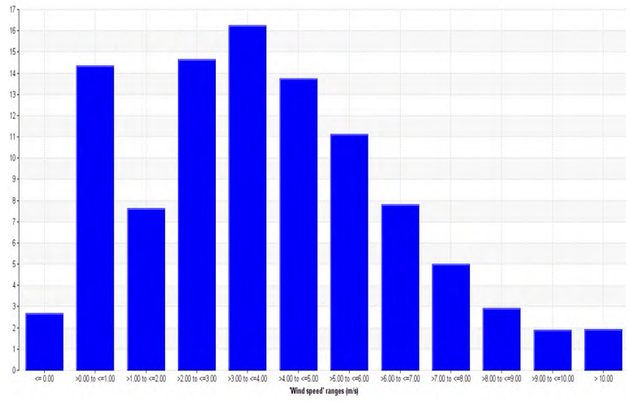
Summer windrose



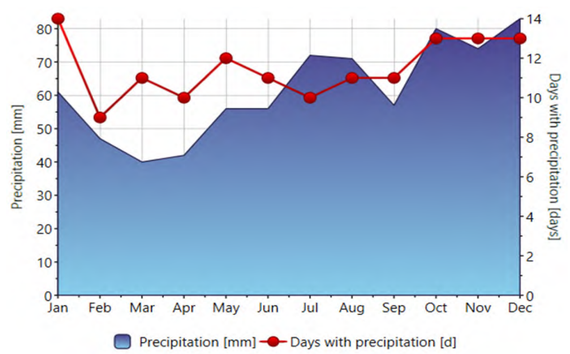
Winter windrose



Annual windrose



Wind velocity frequency of occurrence Distribution



Precipitation in Manchester

Landscape Solar Analysis and Outdoor thermal comfort
The Outdoor thermal comfort has a major influence on the fans experience. The main objectives are to achieve comfortable conditions within City square for best user's experience.

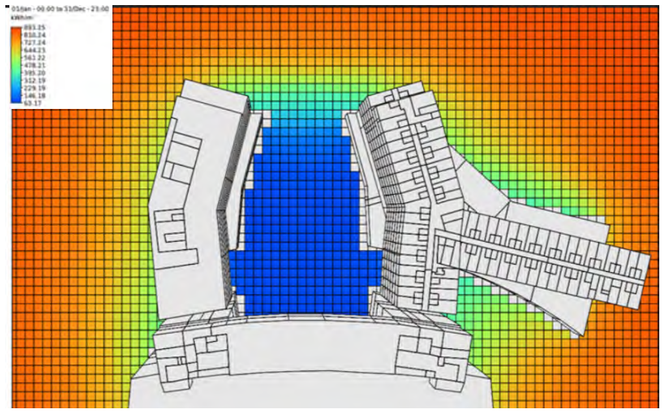
The universal thermal climate index (UTCI) has been adopted as reference scale for thermal stress for evaluating the outdoor thermal expectations within City Square. UTCI describes the synergistic heat exchanges between the thermal environment and the human body, namely its energy budget, physiology and clothing. UTCI takes into consideration the clothing adaptation of the population in response to actual environmental temperature.

The categories relate to UTCI values as follows:

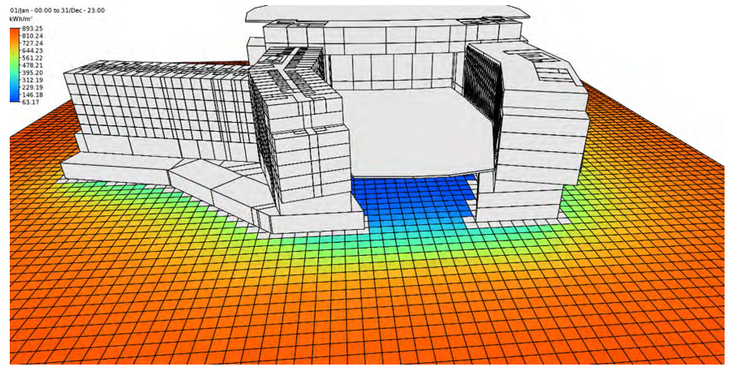
- above +46: extreme heat stress;
- +38 to +46: very strong heat stress;
- +32 to +38: strong heat stress;
- +26 to +32: moderate heat stress;
- +9 to +26: no thermal stress;
- +9 to 0: slight cold stress;
- 0 to -13: moderate cold stress;
- -13 to -27: strong cold stress;
- -27 to -40: very strong cold stress;
- below -40: extreme cold stress.

The shown figures show the UTCI in Manchester throughout the year. The contours shows in unshaded area, Manchester has moderate heat stress conditions in daytime from late spring to early fall.

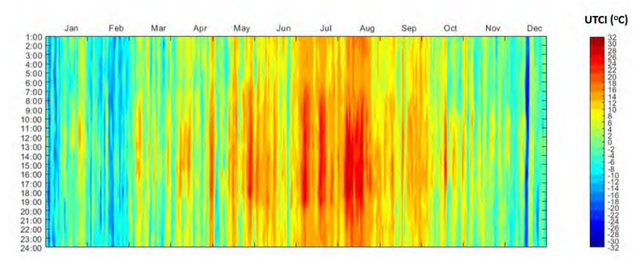
The shading effect under city square canopy effectively reduce the intensity of the extreme thermal stress in summer, late spring and early fall season daytime, from moderate to no thermal stresses The shading also reduces the strong thermal stress in spring and fall seasons daytime to moderate or no thermal stress.



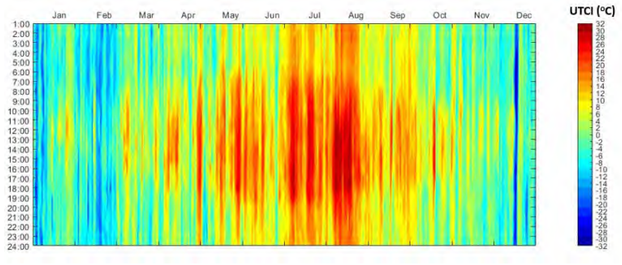
Masteplan shading analysis for North Stand development- Top View



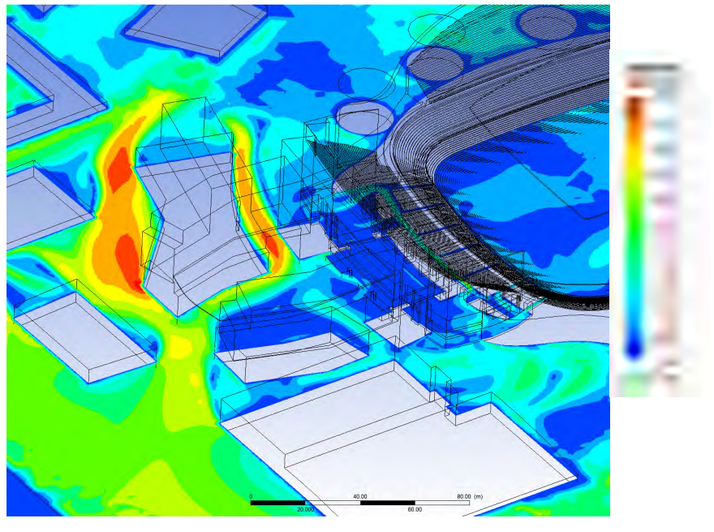
Masteplan shading analysis for North Stand development- Iso View



UTCI Contours- Shaded



UTCI Contours- Unshaded



Windflow Around Etihad Stadium, North Stand Development and City Square

During winter monthes fans will occasionaly exprience strong to very strong cold thermal stresses caused mainly by increased wind velocities casued by funneling through the city square. This can be mitigated by increased clothing levels for the spectators along with natural wind breakers upstream the city sqaure area.

Building solar analysis and PV analysis
Building solar analysis shows that the North Stand provide shading on both Hospitality and Commercial buildings Western and Eastern façades respectively, mitigating the expected high solar loads on these façades The Stand shading effect decreases away from the North Stand.

The Northern façade has lower solar radiation which is about 30% of the incident solar radiation on the southern façade.

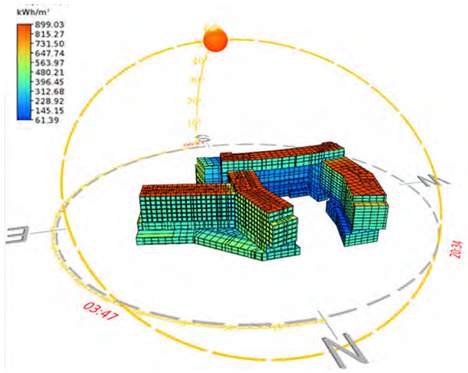
The Hospitality Building partially shade the eastern façade of the commercial building while the hotel building partially shade the western façade of the commercial building. The shading effect of both building decreases at upper floors.

Both the Eastern façade of the commercial building and the western façade of the hotel building is unshaded with relatively high solar loads.

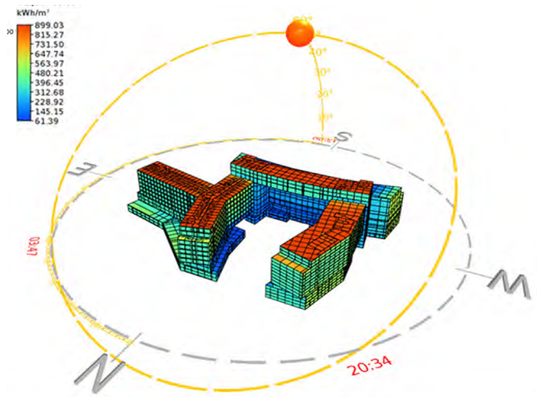
The Commercial Building shades assists in mitigating the incident solar radiation particularly on the Western façade of the building.

The annual incident solar radiation on the roof is 900 KWh/m^2/year

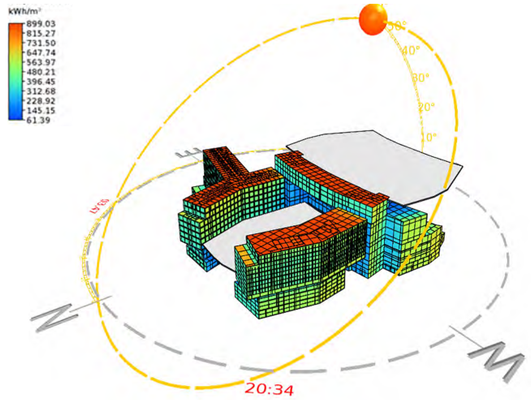
The typical power that could potentially generated from PVs on the roof has been evaluated based on daily generated energy per meter square basis as shown in the shown figure.



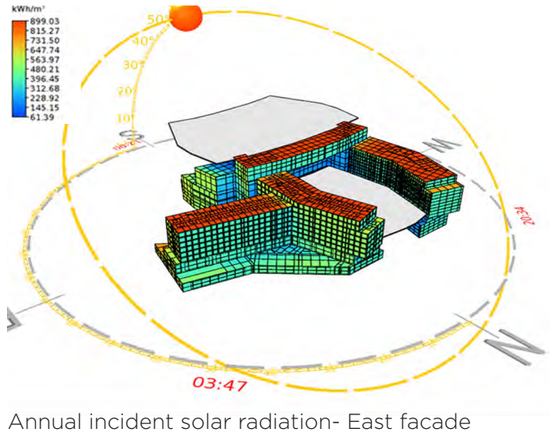
Annual incident solar radiation- North facade



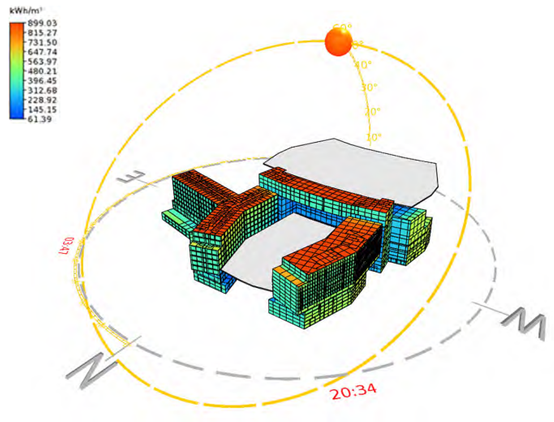
Annual incident solar radiation-North Stand facade



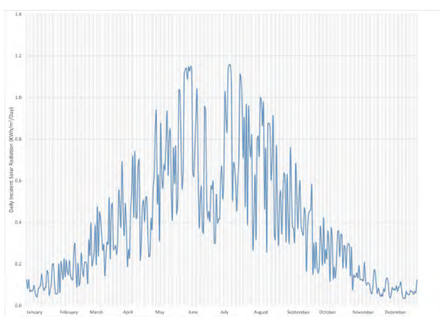
Annual incident solar radiation- West facade



Annual incident solar radiation- East facade



Annual incident solar radiation- Roof



Daily generated energy from PVs on roof (KWh/day/m^2)

Indoor Thermal comfort, natural ventilation, and overheating

One of the design approaches is to rely on natural ventilation for the GA concourses and city hall to boost the reliance on passive cooling techniques. However, this should be attempted without compromising the thermal comfort of the spectators and their stadium experience.

Accordingly , adaptive thermal comfort and overheating assessment has been conducted based on CIBSE TM 52 overheating and adaptive cooling criteria. CIBSE TM 52 defines the limits of thermal comfort and avoiding overheating in European buildings.

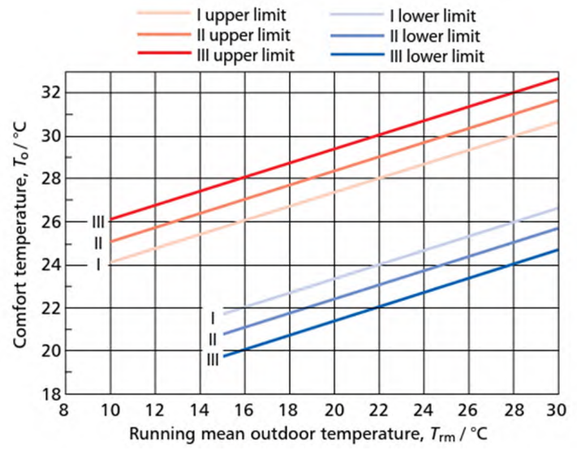
CIBSE TM 52 sets three criteria which taken together, provide a robust yet balanced assessment of the risk of overheating of buildings in the UK and Europe. A room or building that fails any two of the three criteria is classed as overheating.

- The number of hours (He) 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 per cent of occupied hours.
- The hours during which the operative temperature exceeds the specified range within the occupied hours, weighted by a factor, is limited to 6 degree hours.
- To set an absolute maximum value for the indoor operative temperature the value of DT shall not exceed 4 K.

Noting thaty all mechanically conditioned spaces is designed based on the served spaces function to achieve optimum indoor thermal comfort conditions and air quality.

As noted in the wind analysis section, the vomitories will have an essential role in the natural ventilation process . The shown figure shows the lower concourse that has beebn divided into 3 main zones.

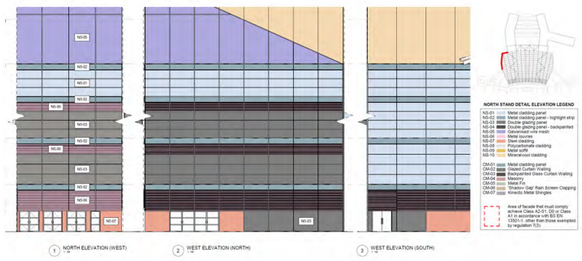
- Zone 1: Left side
- Zone 2: Right side
- Zone 3: Rear Side towards the stadium



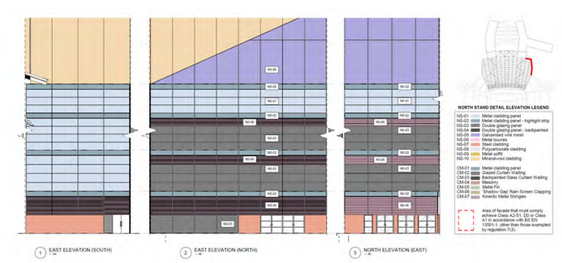
BS EN 15251 Adaptive comfort model



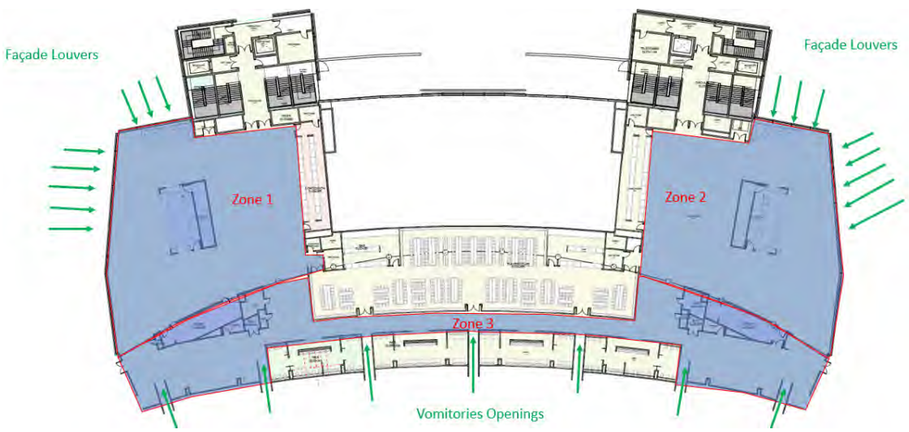
Louvers location on the Northen facade of the North Stand



Louvers location on the Western facade of the North Stand



Louvers location on the Eastern facade of the North Stand



Lower Concourse Ventilation Zones

The upper concourse and city hall are treated as single ventilation zone respectively .

Heat gain	Load
Lighting	10 W/m^2
Miscellaneous Heat gain	10 W/m^2
People	2 m^2/person (1.2 met) (60% sensible)

The internal gains have been assumed at the current stage to be following:
Typical Match day profile has been modelled throughout the year including scenario of summer time sports event as worst case scenario.

The thermal model overheating analysis shows that both city hall and the upper concourse passes the overheating test.

Zones 1 and 2 in the lower concourse fails mainly because of criterion 1 when temperature difference between the concourse indoor temperature and the ambient temperature is higher than 4 K. This occurs when the wind speed is low with not enough air flowing from louvers or from Zone 3 vomitories with high ambient temperature in case of summer event (June and July) . It is proposed to add zonal additional extract fans capacity of 2000 l/s in zones 1 and 2 to entrain air into the concourse and to be operated only in case of overheating.

This can be added as overheating mode to one of the extract fans in each zone already set to be part of the concourses air extract (i.e. Kitchen extract). This adds further resilience to the concourses operation throughout the year to include summer events scenarios.

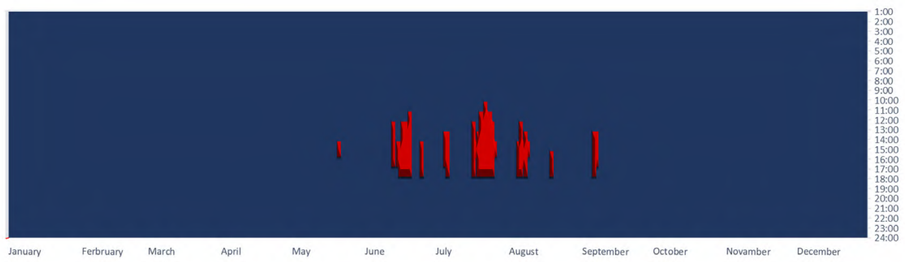
This to be studied further and confirmed based on stage 4 information .

The risk of exceeding the 4 K temperature difference between the indoor concourse temperature and the ambient temperature is mainly in June, July (Summer event scenario) and August and September (Pre-Season) as shown in the annual overheating risk hours distribution figure.

Closing the vomitories has been also assessed as part of risk assessment for the GA Concourse natural ventilation.
The results show that all zones within the lower concourse and the upper concourse fail overheating test.

Closing the vomitories will mandate normal operating mechanical ventilation and distribution system for the lower and upper concourse as part of mixed mode system.

This is not recommended as it changes the intent for the concourses to be naturally ventilated with additional mechanical systems will be required for the concourses in this case.



Annual Overheating risk hours distribution

Room Name	Occupied days (%)	Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria 2 (Max. Daily Deg.Hrs)	Criteria 3 (Max. DeltaT)	Criteria failing	Status
Upper Concourse	100	2.3	22	4	2	Pass
Lower Concourse Zone 3	100	2.3	20	4	2	Pass
City Hall	100	2.2	17	3	2	Pass
Lower Concourse Zone 2	100	2.8	27	5	2 & 3	fail
Lower Concourse Zone 1	100	2.9	25	5	2 & 3	Fail

Overheating test (Worst case scenario)-Natural ventilation only

Room Name	Occupied days (%)	Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria 2 (Max. Daily Deg.Hrs)	Criteria 3 (Max. DeltaT)	Criteria failing	Status
Upper Concourse	100	2.3	22	4	2	Pass
Lower Concourse Zone 3	100	2	17	3	2	Pass
Lower Concourse Zone 2	100	2.3	23	4	2	Pass
Lower Concourse Zone 1	100	2.7	20	4	2	Pass
City Hall	100	2.1	17	3	2	Pass

Overheating test (Worst case scenario)-Natural ventilation only with overheating mode

Room Name	Occupied days (%)	Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria 2 (Max. Daily Deg.Hrs)	Criteria 3 (Max. DeltaT)	Criteria failing	Status
City Hall	100	2.2	18	3	2	Pass
Upper Concourse	100	4.4	29	5	1 & 2 & 3	Fail
Lower Concourse Zone 3	100	6.2	30	5	1 & 2 & 3	Fail
Lower Concourse Zone 2	100	7.1	35	6	1 & 2 & 3	Fail
Lower Concourse Zone 1	100	6.2	34	6	1 & 2 & 3	Fail

Overheating test (Worst case scenario)-Closed vomitories- Natural ventilation only

Room Name	Occupied days (%)	Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria 2 (Max. Daily Deg.Hrs)	Criteria 3 (Max. DeltaT)	Criteria failing	Status
Upper Concourse	100	2.9	24	4	2	Pass
Lower Concourse Zone 3	100	2.5	22	4	2	Pass
Lower Concourse Zone 2	100	2.6	25	4	2	Pass
Lower Concourse Zone 1	100	2.9	21	4	2	Pass
City Hall	100	2.2	18	3	2	Pass

Overheating test (Worst case scenario)-Closed vomitories- mixed mode ventilation (Normal operating mechanical system +Natural ventilation)

A CFD model has been created for the Etihad campus and its surroundings to be used in a wind tunnel based CFD simulation verifying the thermal model predicted conditions inside the concourses. The boundary conditions of the simulation has been selected based on critical summer day condition in terms of temperature and wind direction.

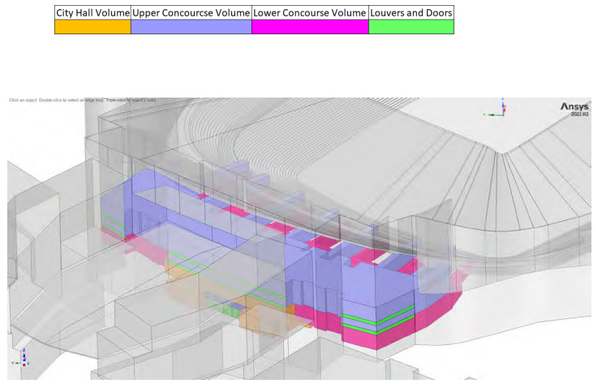
The results show that wind flow cross flow through the facade louvers and the vomitories creates effective air circulation inside the lower and upper concourses. The height of the City Hall spaces allows for effective single sided natural ventilation

For the simulated wind direction North East, Zone 2 has relatively low air circulation velocity. The same is predicted for Zone 1 in case of wind comes from the North West direction.

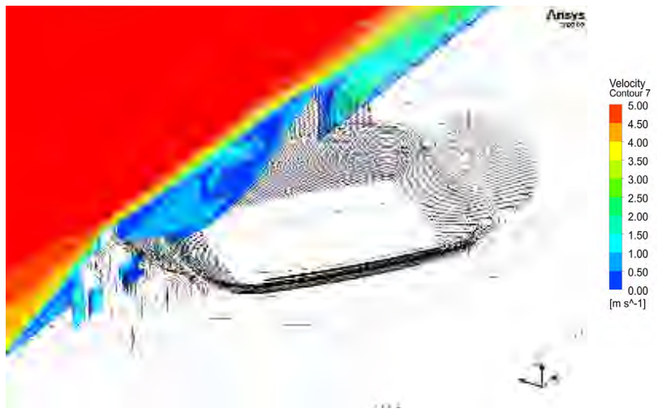
The analysis shows that this will not result in overheating in any of the lower Concourse Zones throughout the football season. however, during the summer time for any potential event or during the pre and start of the season months where wind speed is low and ambient temperature is high, overheating based on exceeding 4k difference between the indoor and the ambient temperature has high probability of occurrence. As noted in the previous section that fans with overheating mode that will increase the extract capacity within the concourses will result in more air entrained inside the concourses with avoiding high temperature increase.



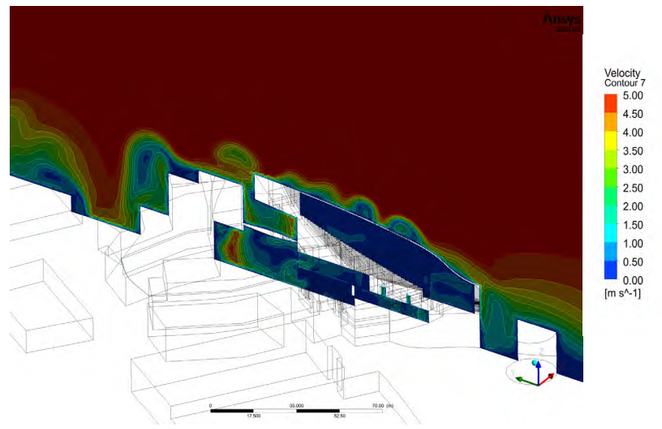
Masterplan CFD model



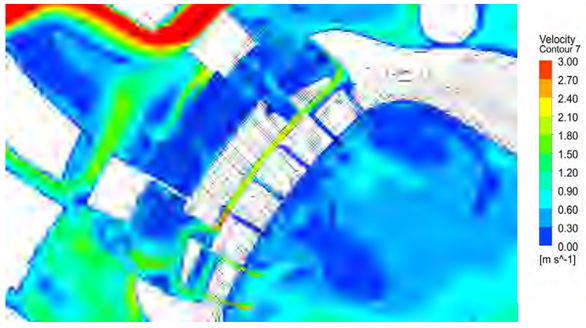
Inner volumes of concourses and City hall CFD model



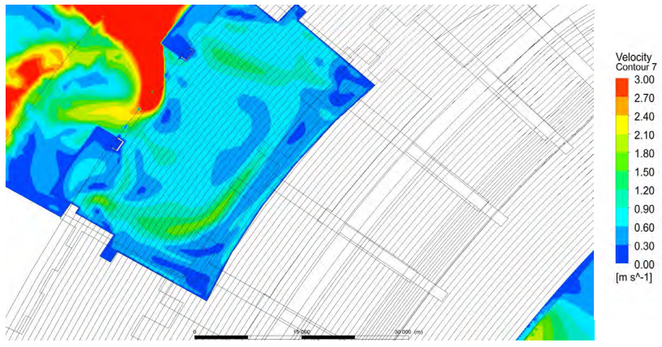
Velocity Contours vertical section across the North Stand- Downwind



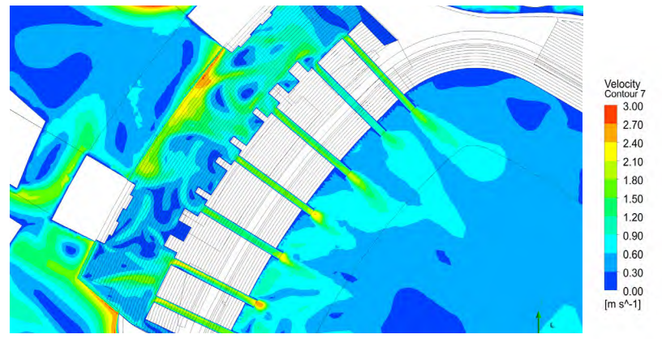
Velocity Contours vertical section across the North Stand- Cross wind



Velocity Contours Horizontal section across the lower concourse 1.8 m from the floor



Velocity Contours Horizontal section across the city hall 1.8 m from the floor



Velocity Contours Horizontal section across the upper concourse 1.8 from the floor

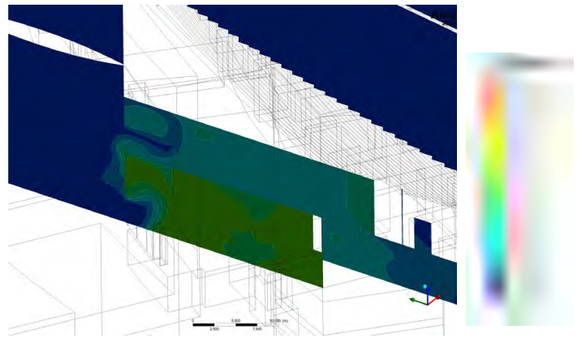
ENERGY STRATEGY

For the study cases, the results show the temperature inside the concourses and the city hall are within CIBSE TM 52 Adaptive Comfort range.

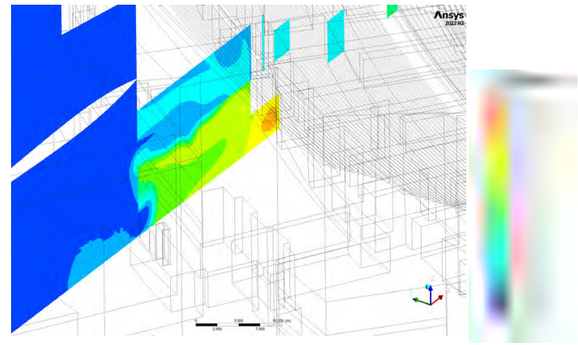
Lower concourse Zone 2 experiences relatively higher temperature compared to Zone 1 and Zone 3, however, it is within the acceptable adaptive comfort range and consistent with the thermal model predictions.

The vertical section through city hall shows the effective circulation assisted by space height creating the necessary pressure deferential for effective air movement within city hall.

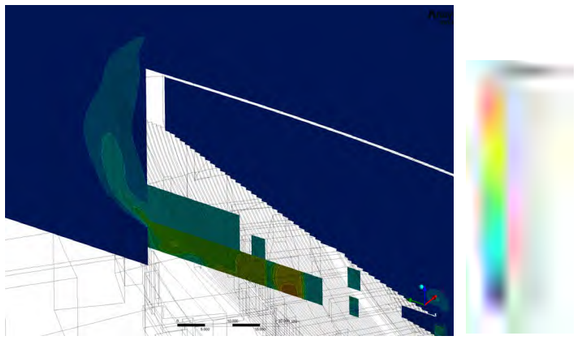
The upper concourse experiences the least temperature rise due to the effective cross ventilation and least obstruction for effective air movement across the concourse with relatively less distance from facade to the vomitories.



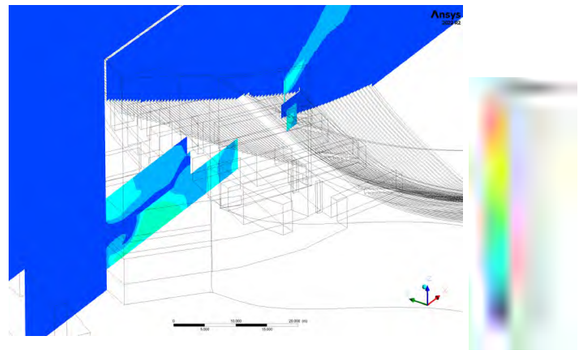
Temperature Contours vertical section across the City Hall, Crosswind



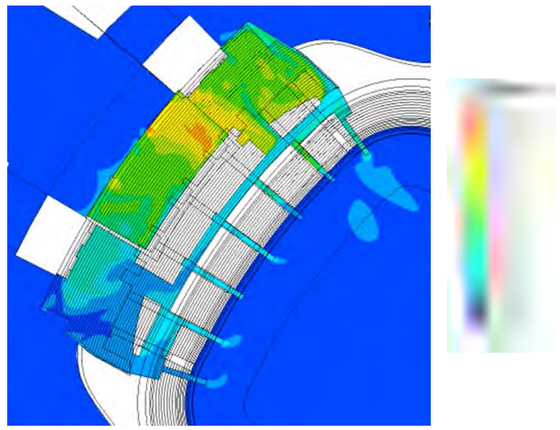
Temperature Contours vertical section across the City Hall, Downwind



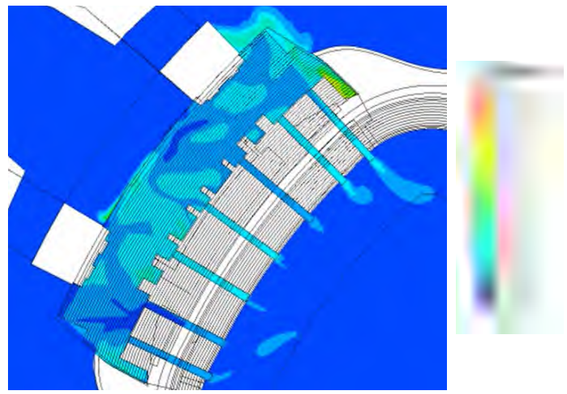
Temperature Contours vertical section across the City Hall and Zone 3, Downwind



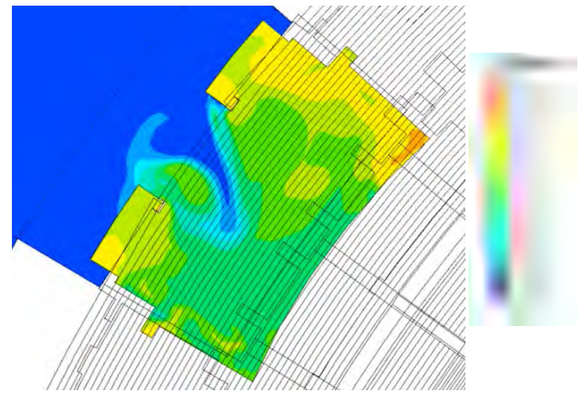
Temperature Contours vertical section across the City Hall and Zone 1, Downwind



Temperature Contours horizontal section across the lower concourse 1.8 m from floor



Temperature Contours horizontal section across the upper concourse 1.8 from floor



Temperature Contours horizontal section

Manchester City Council Energy Planning requirements

As required by Manchester City Council outline planning application requirements revised in January 2020 in relation to the guidance of Chapter 4 of the 'Guide to Development in Manchester and policies EN4 and EN6 of the Core Strategy for the City of Manchester, the development to confirm the proposals for the provision of on-site renewable energy to provide 20% of final site energy demand and CO_2 reduction.

Noting that this requirements have been outlined based on the previous building regulations Part L 2013 with 2016 amendments. The new building regulations including the new part L 2021 has been applied on all new buildings since June 2022 which by default intended to deliver 27 % lower CO_2 emissions than under the part L 2013.

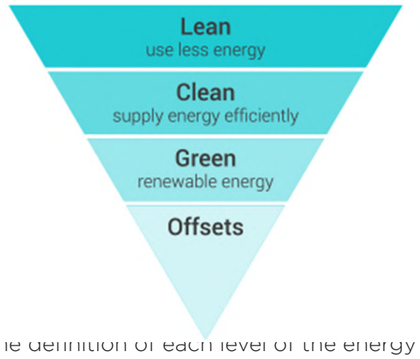
Consequently, Complying with Part L 2021 will by default comply with the Manchester city planning requirements related to 20% reduction in the carbon emissions.

This is attempted by maximizing the use of low and zero carbon technologies referred to as renewable including on site energy generation as PVs and Air Source Heat pump for space and domestic water heating.

The design approach is following the Energy Hierarchy methodology. Noting that the Energy Hierarchy application under the new building regulations is applied differently from the previous building regulations with the baseline case is not based on gas boilers for space and domestic water heating.
Based on GLA energy assessment guidelines June 2022 one of most established standard for nergy hierarchy application , the baseline to have the same proposed design system for space and domestic water heating, however, the baseline system efficiencies to follow part L minimum requirements with any enhanced performance of the proposed design systems shall count towards the Be-green Energy Hierarchy level.

Energy Hierarchy

As one of the most established energy assessment procedures, the energy hierarchy of the Be-lean, Be-clean and Be-green is adopted for the project. Such approach identifies the contribution of each energy efficiency measure whether it is passive in terms of the construction elements and shading structures or active in terms of the mechanical and electrical system.



The definition of each level of the energy hierarchy is as follows:

- Be lean: use less energy and manage demand during operation through fabric and servicing improvements and the incorporation of flexibility measures.
- Be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly by connecting to district heating networks.
- Be green: maximise opportunities for renewable energy by producing, storing, and using renewable energy on-site.

As noted in the previous section , The energy assessment is based on the new part L 2021 regulations. The principles of the energy hierarchy are based on GLA energy assessment guidelines June 2022.

Be-Lean

In line with the Energy Hierarchy, the first step is to demonstrate the energy efficiency measures applied to reduce the project energy demand through various passive design measures, such as optimizing orientation, natural ventilation and lighting, thermal mass and solar shading, and other active design measures, including high efficacy lighting and efficient mechanical ventilation with heat recovery.

The provided table shows comparison between the current regulations with design requirements for each design element.

The facade design has been updated for all buildings based on the facade designer input for the thermal performance of the different elements of the facade provided in the shown table.

Based on the latest facade design, all guest rooms and office spaces are required to have blinds/curtains for compliance with Part L requirement of limiting Solar gain as well as reducing the heating +Cooling Demand of the buildings that contributes towards BREEAM energy credits calculations.

The Notional building of the be lean stage is the baseline against which the carbon reduction will be measured. Noting that baseline system will follow the project specifications, which means that if the building is using ASHP for space and domestic water heating, the baseline model will use ASHP as baseline system with Part L minimum efficiencies . Using high efficiency ASHP system with performance higher than the baseline will be reported as part of the Be-green level.

Element or system	Part L 2021	Design requirements	ME Comment
Opening areas (windows, Curtain wall glazing and doors)	1.6 W/m²K	See Table Below	-
External walls, opaque panels, including semi exposed walls	0.26 W/m²K	0.2 W/m²K	-
Ground Floor	0.18 W/m²K	0.15 W/m²K	-
Intermediate floor	-	1 W/m²K	-
Roofs	0.18 W/m²K	0.15 W/m²K	-
High usage entrance	-	2 W/m²K	-
Pedestrian doors	1.6 W/m²K	1.4 W/m²K	-
Air Permeability	8 m^3/m^2.hr	3 m^3/m^2.hr	-
Interior lighting	Minimum efficiency 95 Lumens/ Watt	Minimum efficiency 110 Lumens/ Watt	-
Exterior Lighting	Minimum efficiency 80 Lumens/ Watt	Minimum efficiency 85 Lumens/ Watt	
Local exhaust fans	-	SFP=0.3 W/l/s if the fan located remotely SFP= 0.5 W/l/s	-
Mechanically ventilated zones	Heat Recovery with sensible efficiency higher than 73% variable speed controller	Demand control ventilation SFP less than 1.5 W/l/s Heat Recovery with sensible efficiency 85% Variable speed controller	-
Air Distribution	Fan Coil Units SFP	0.2-0.3 W/l/s	-

Demand Reduction design requirements

	Commercial	Hotel	North Stand
Typical Ratio	80% glazing 20% solid	50% glazing 50% solid	-
Possible split based on percentages above	Glazing (Center Frame) : 1.3 W/m2K Solid : 0.2 W/m2K	Glazing (Center +Frame) : 1.4 W/m2K Solid : 0.2 W/m2K	• Suite level and Sky bar façade, all glazed structure is 1.2 W/m². • upper concourse glazing, 1.2 W/m² • All Opaque areas U-Value 0.2 W/m².

Facade Design thermal performance summary

Be-Clean-Heat network
There are currently three operational District Heating Networks operating in Manchester. These are the Manchester Oxford Road Corridor, Manchester Civic quarter, and Media City District Heating Networks.

The MCFC North Stand development is situated outside of these District Heating Networks and is also sited beyond any planned extension that are underway. As such, a district heating network connection is not currently being provided for the MCFC North Stand development.

Thus, the be-clean energy level will be set as that of Be-Lean subject to any further information about potential plans for a community heating or heating network in the area of the project.

Be-Green
The final stage of the Energy Hierarchy, which applies to the use of renewable, low and zero carbon Energy technologies.

Based on the preliminary assessment, two low and low carbon technologies have been identified as feasible for the North Stand redevelopment as follows:
1- Use of high-performance Heat pumps for heating, cooling, and domestic hot water
2- PV-Panels.

A decentralized HVAC system approach based on VRF systems have been adopted for all elements in the development with advantage of having higher efficiency (Typically Less individual system capacity results Higher SCOP/ SEER) and modularity that gives higher resilience.

The hot water generation for all high demanding application is based on ASHP for hot water generation. Wherever the demand for hot water is expected to be low, electric water heaters are proposed.

This report is focusing on the system impact on the building regulation compliance and associated energy performance milestones as defined in this report. However, the system choice has also to account for cost and life cycle impacts.

The below table set benchmark performance anticipated for decentralized systems for space heating and cooling and hot water systems.

Service	System	Efficiency
Cooling and Heating	Decentralized VRF units	Heating SCOP 4.2 Cooling SEER 5.2
Ventilation	MVHR Fresh Air Handling Units	Hear Recovery efficiency 80% SFP 1.5 W/l/s Hotel Room MVHR 1.2 W/l/s
Domestic Hot water	Heat pumps	SCOP 3.2
	Instantaneous at the point of use (Elec)	Efficiency 100%

The below sections show the proposed systems and ventilation strategies for each building based on initial design assessment.

Element	Strategy
Space Cooling	Heat Pump (Decentralised)
Space Heating	Heat Pump (Decentralised)
DHW	Heat Pump
DHW (Toilets)	Elec
Naturally, Ventilated Areas*	Concourse

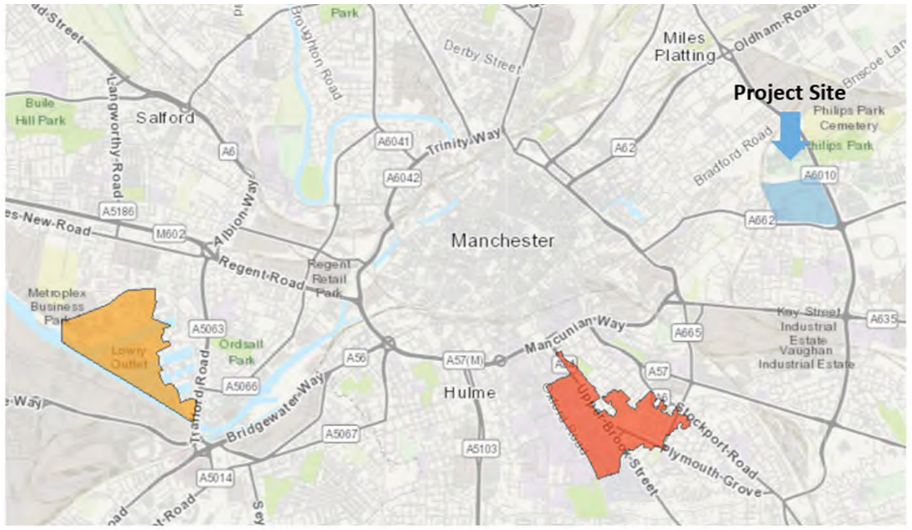
North Stand

Element	Strategy
Space Cooling	Heat Pump (Decentralised)
Space Heating	Heat Pump (Decentralised)
DHW	Elec

Commercial

Element	Strategy
Space Cooling	Heat Pump (Decentralised)
Space Heating	Heat Pump (Decentralised)
DHW	Heat Pump

Hotel



UK District Heating Development Map developed by the Department for Business, Energy & Industrial Strategy

PV systems

The shown table provides comparison between multiple PV options that can be adopted for the project.

The choice of the PV option to consider the sourcing of PVs and any additional required supporting structure such that it will not lead to an increase in the building's carbon footprint in the short term as a result of the increase in its embodied carbon.

Moreover, While, PVs are expected to further reduce the operational carbon emissions, the overall reduction in the project's carbon footprint on the long run has to account for the project's operation nature, generated power management strategy, the additional requirements for energy storage, PVs maintenance requirements and life cycle.

Solar Cell Type	Efficiency Rate	Advantages	Disadvantages
Monocrystalline Solar Panels (Mono-SI)	~20%	High efficiency rate; optimized for commercial use; high life-time value	Expensive Heavy and has to be accounted for structurally.
Polycrystalline Solar Panels (p-Si)	~15%	Lower price	Sensitive to high temperatures; lower lifespan & slightly less space efficiency
Thin-Film: Amorphous Silicon Solar Panels (A-SI)	~7-10%	Relatively low costs; easy to produce & flexible	shorter warranties & lifespan Plus, thin film panels degrade much faster than other panel types, meaning they need to be replaced more often, which leads to more long-term recurring costs.

PV types of comparison

At current stage Monocrystalline PVs are recommended and will be the basis of all assessments in the energy strategy.

The shown table summarises the minimum PV area requirements for each asset based on the energy assessments detailed in the following sections to achieve the energy performance objectives for the project as follows:

1. Compliance with Part L 2021 for each asset.

2. Achieve the BREEAM Energy Credits for each asset as targeted in the BREEAM Pre-Assessment Scorecard contributing towards the overal BREEAM Very Good Rating.

Building	PV area (m^2)
North Stand	250
Commercial Building	250
Hotel Building	500

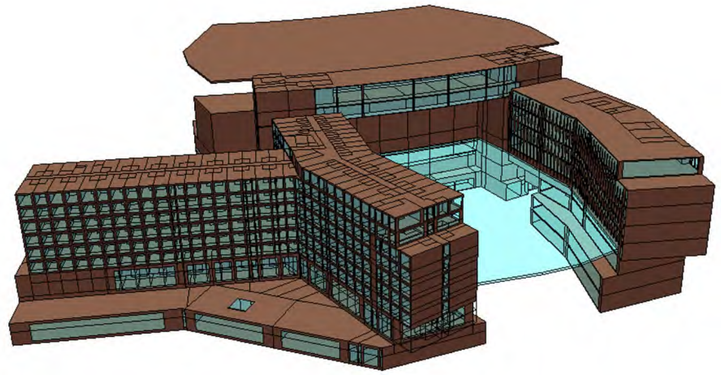
PV area requirements

Thermal Model
A full-scale thermal model has been created for, North Stand, Commercial and Hospitality Building using IESVE 2022.

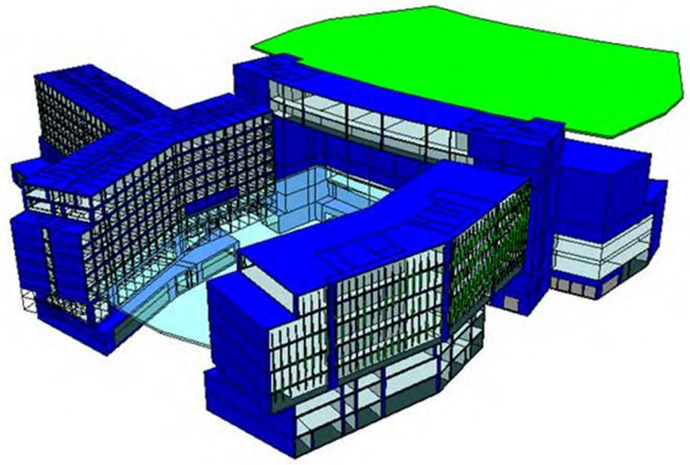
All shading elements have been modelled per the latest architectural models.

The models have followed CIBSE AM11. The below figure shows thermal template view for the models.

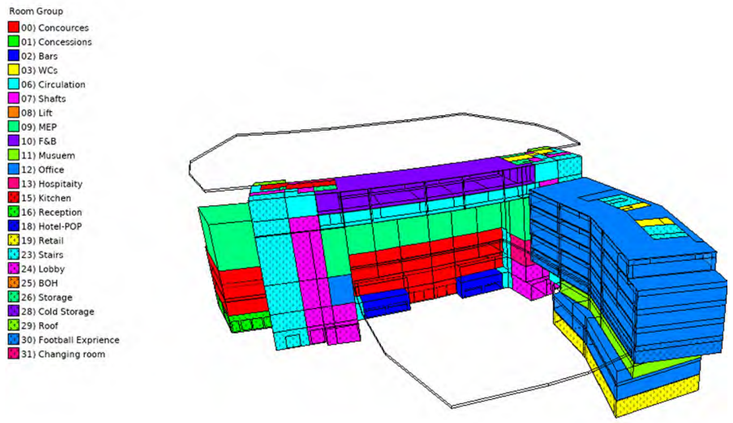
All Energy assessments are conducted via Dynamic Simulation Method.



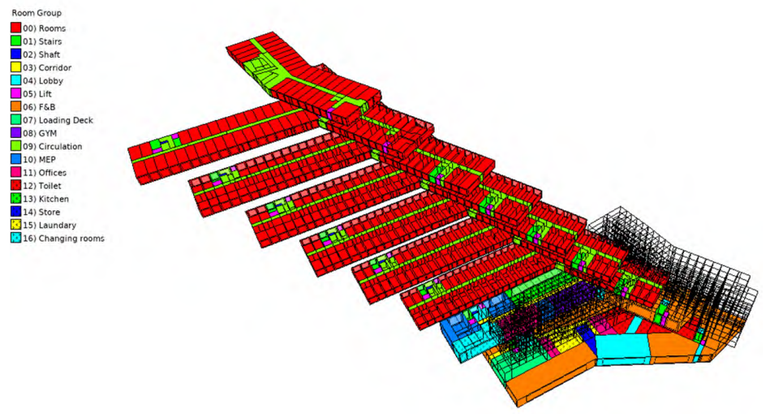
Thermal model -view 1



Thermal model -view 2



North Stand and the commercial building



Hotel thermal model

Energy Assessments Results

North Stand

The results shows that energy conservation measures at the Be-lean stage is compliant with the new part L emissions and primary energy rate targets.

Option	BER ($KgCO_2/m^2$)	Percentage reduction (%)	BPER (KWh/m^2)	Percentage reduction (%)
Part L 2021 (TER)	3.85	-	41.79	-
Be-Lean	3.82	0.78%	41.63	0.38%
Be-Clean	3.82	0.78%	41.63	0.38%
Be-Green	3.26	15.32%	35.29	15.55%

At the Be-Green level, the results shows that the proposed design achieves reduction in carbon emissions of 15.32% and reduction in the Primary Energy Rate of 15.55%

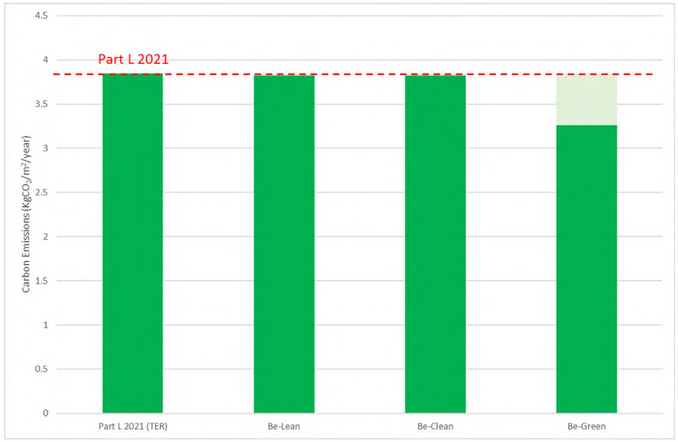
The shown charts present the energy assessment results. The figures also show how each option is compared to the net zero targets.

Based on the energy end use breakdown the following findings to be noted:

- 50% of the regulated energy (15% of the total energy) is generated using low carbon technology providing space heating and domestic hit water
- 11% of the regulated energy (4% of the total energy) end use is generated using photovoltaic .

Please note that the above percentages are based on the NCM (national Calculation Methodology) modelling assumption.

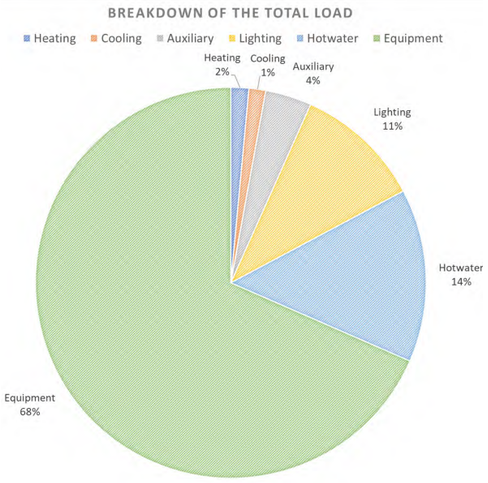
For more details please refer to the full BRUKL report in the Appendix



North Stand energy assessment results- Carbon emissions



North Stand energy assessment results- Primary



North Stand Energy End use breakdown

Hotel

The results shows that energy conservation measures at the Be-lean stage is effective for the building to comply with the new part L emissions and primary energy rate targets.

At the Be-Green level, the results shows that the proposed design achieves reduction in carbon emissions of 12.68% and reduction in the Primary Energy Rate of 12.85%.

Option	BER ($KgCO_2/m^2$)	Percentage reduction (%)	BPER (KWh/m^2)	Percentage reduction (%)
Part L 2021 (TER)	13.09		142.29	
Be-Lean	12.01	8.25%	130.41	8.35%
Be-Clean	12.01	8.25%	130.41	8.35%
Be-Green	11.43	12.68%	124.01	12.85%

The shown charts present the energy assessment results. The figures also show how each option is compared to the net zero targets.

Based on the energy end use breakdown the following findings to be noted:

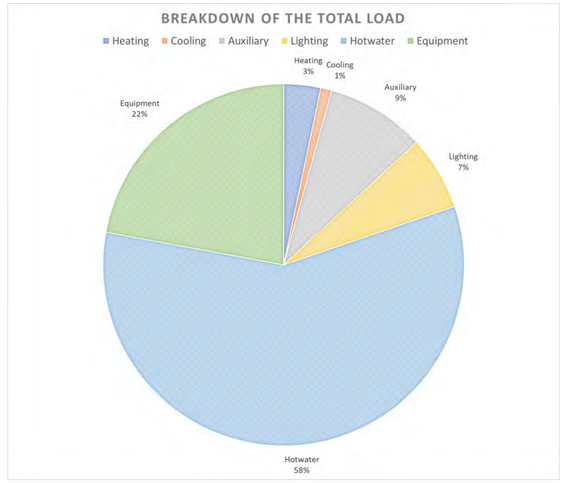
- 79% of the regulated energy (61% of the total energy) is generated using low carbon technology providing space heating and domestic hit water
- 6% of the regulated energy (5% of the total energy) end use is generated using photovoltaic .

Please note that the above percentages are based on the NCM (national Calculation Methodology) modelling assumption.

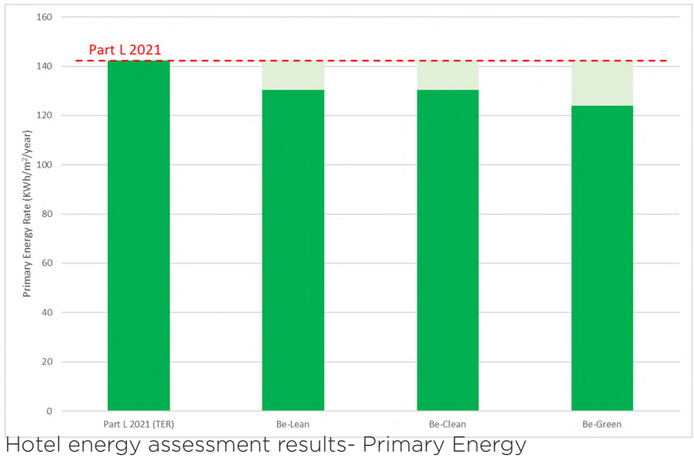
For more details please refer to the full BRUKL report in the Appendix



Hotel Energy assessment results- Carbon emissions



Hotel Energy End use breakdown



Hotel energy assessment results- Primary Energy rate

Commercial Building

The results shows that energy conservation measures at the Be-lean stage is effective for the building to comply with the new part L emissions and primary energy rate targets.

At the Be-Green level, the results shows that the proposed design achieves reduction in carbon emissions of 41.48% and reduction in the Primary Energy Rate of 43.29%.

Option	BER ($KgCO_2/m^2$)	Percentage reduction (%)	BPER (KWh/m^2)	Percentage reduction (%)
Part L 2021 (TER)	3.52		38.28	
Be-Lean	3.38	3.98%	36.41	4.89%
Be-Clean	3.38	3.98%	36.41	4.89%
Be-Green	2.06	41.48%	21.71	43.29%

The shown charts present the energy assessment results. The figures also show how each option is compared to the net zero targets.

Based on the energy end use breakdown the following to be noted:

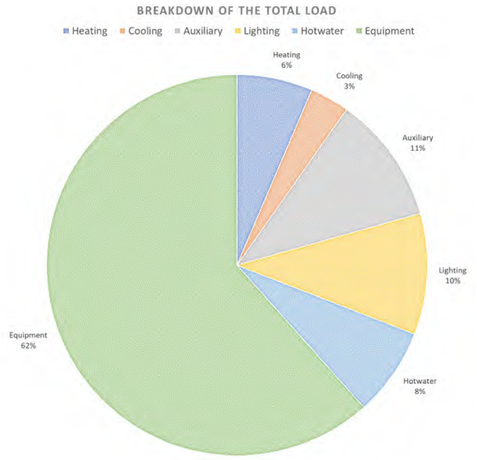
- 37% of the regulated energy (14% of the total energy) is generated using low carbon technology providing space heating and domestic hit water
- 24% of the regulated energy (9% of the total energy) end use is generated using photovoltaic .

Please note that the above percentages are based on the NCM (national Calculation Methodology) modelling assumption.

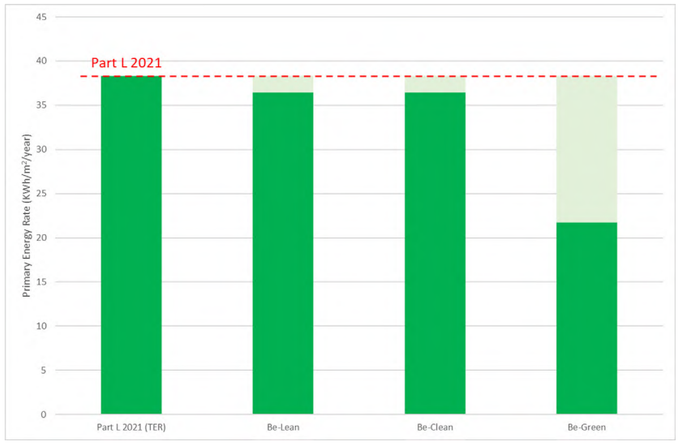
For more details please refer to the full BRUKL report in the Appendix



Commercial Building energy assessment results- Carbon emissions



Commercial Building Energy End use breakdown



Commercial Building energy assessment results- Primary Energy rate

BREEAM Energy Assessment

Bespoke North Stand +Commercial

As discussed with the BRE, it has been agreed to combine the commercial building and the North stand in one Bespoke Assessment. Accordingly, an energy assessment has been done combining the North stand and the commercial building in one model.

The energy assessment results shows that the combined North stand and commercial building achieves the targeted 3 energy conservation credits as part of ENE 01.
For more details

please refer to the full BRUKL report in the Appendix

Performance Parameter	Actual	Notional	Weighted EPR
Heating +Cooling demand (MJ/m2)	46.85	42.44	-0.1
Primary Energy (KWh/m^2)	29.72	39.96	0.15
Total Emissions (Kg/CO_2)	2.76	3.68	0.15
Sum EPR NC			0.2

North Stand and Commercial Building Combined energy assessment BREEAM score

Credit	EPR (NC)
1	0.06
2	0.12
3	0.18
4	0.24
5	0.3
6	0.36
7	0.42
8	0.48
9	0.54
10	0.6
11	0.66
12	0.72
13	0.78
14	0.84
15	0.9

Hotel (Excluding Shell and core podium F&B units)

The hotel will have a separate BREEAM assessment under Residential Institution Scheme excluding the shell core F&B units in the podium which shall have separate assessment under shell and core/ shell only retail assessment scheme.

The energy assessment results shows that the hotel only energy assessment achieves the 2 energy conservation credits as part of ENE 01.

For more details please refer to the full BRUKL report in the Appendix

Performance Parameter	Actual	Notional	Weighted EPR
Heating +Cooling demand (MJ/m^2)	64..9	62.63	-0.033
Primary Energy (KWh/m^2)	120.56	142.29	0.096
Total Emissions (Kg/CO_2)	11.12	13.09	0.097
Sum EPR NC			0.16

Hotel (Excluding Shell and core podium F&B units) energy assessment BREEAM score

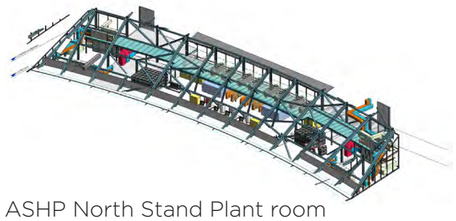
Credit	EPR (NC)
1	0.06
2	0.12
3	0.18
4	0.24
5	0.3
6	0.36
7	0.42
8	0.48
9	0.54
10	0.6
11	0.66
12	0.72
13	0.78
14	0.84
15	0.9

Electrification of energy sources and operational air quality enhancement
Electrification refers to the process of replacing technologies that use fossil fuels (coal, oil, and natural gas) with technologies that use electricity as a source of energy. Depending on the resources used to generate electricity, electrification can potentially reduce carbon dioxide (CO_2) emissions from the transportation and building sectors. Addressing emissions from these sectors is critical to decarbonizing the economy and, ultimately, mitigating the impacts of climate change as highlighted in the future building regulations.

With continuous decarbonization of the grid which increasingly relies on emission less energy sources as nuclear power and off and on shore renewable energy sources, technologies that use electricity as a fuel source result in lower carbon dioxide emissions on average than those that use fossil fuels directly. Additionally, the electricity grid is expected to become even cleaner over time as the aim is to increase the amount of electricity generated by zero-carbon sources. Therefore, the benefits associated with electrification will likely grow in the future as electricity generation becomes less carbon intensive.

Additionally, switching to electric heating and cooking technologies can have substantial air quality benefits. Some electric appliances can be better for indoor air quality than their fossil fuel-based counterparts—natural gas cooking stoves, for example, release carbon monoxide, nitrogen dioxide, and other harmful pollutants when in use.

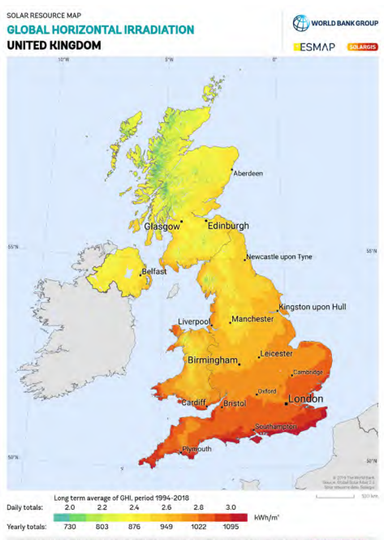
As one of the expected major energy end uses for the development, hot water generation resembled for long time a challenge to be electrified since the gas boiler provided unchallenged convenient and reliable source of hot water generation. Other electric sources were burdened by the hefty bills of using such solutions where Air source heat pumps usually backed up with electric immersion heaters or even other gas boiler to reach the required hot water supply temperature which compromises the overall gained efficiency of such system. However, multiple technologies nowadays resolved this dilemma with ASHP systems capable to generate hot water at the required supply temperature without the need of the backup heaters, keeping the efficiency advantage and providing a practical solution to achieve full electrification of the built energy sources.



ASHP North Stand Plant room

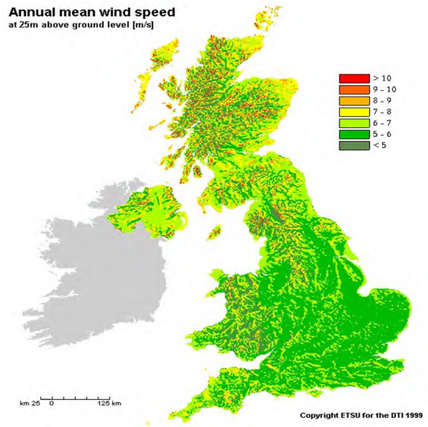
Low and Zero Carbon Technologies

Photovoltaic panels
Based on more Macro scale assessment for United Kingdom Global Solar irradiation, the Manchester is located in GHI region between 900 and 950 kWh/m2 as shown in the following figure.



The PV still considered to be viable option for such GHI range as an effective on-site energy generation source.

Wind Power
To evaluate the suitability for wind power generation it is necessary to undertake a full survey and analysis of the site to ascertain the likely wind speeds available to support the viability of wind generation.



British Wind Energy Association (BWEA) wind data base suggests that wind speed at the site would be around 4-6m/s at 25m could support small wind turbine, however, annual load generation will be relatively low. Based on Wind analysis section, the wind speed in the stadium area will not support wind turbine as effective renewable energy source. Installation of wind turbines would have a negative effect on the architectural character of the building. This issue aside, wind turbines can have a detrimental effect on telecommunications in the vicinity of their location. Given the surroundings of the stadium in the middle of urban residential areas which puts a limiting factor on location of the wind turbine installation. Wind patterns in urban areas can be very turbulent and are not the best conditions to yield a good output from small scale wind turbines. In addition, planning requirements from the local authority regarding potential noise from the wind generators would have to be considered. It is likely that during the day sound levels would not be noticeable but at night with lower background levels this could be invasive to the buildings.
It would therefore be reasonable to conclude that based on the above information, even without a technical review of the installation costs, the requirements for maintenance and the installation restraints are unlikely to support the installation of electrical wind generation for this development.

Hydrogen Fuel Cells
Hydrogen fuel cells have been considered for use within the building but have been discounted due to the current lack of a commercially viable source of hydrogen. Many current installations are known to be running on natural gas to generate the Hydrogen fuel until the hydrogen becomes available from sustainable non-fossil fuel-based source. Utilization of organic food decomposition and anaerobic digestion process to generate Biogas which can be used in generating Hydrogen fuel is other more environmentally friendly emission less process, however, the area footprint of such system is huge and will require specialist operation to maintain the process flow with expected complicated maintenance for such multiprocessor system.

There is currently no commercially available fuel cell technology in the European market.

Ground Source Heat Pump
Ground source systems provide the opportunity to obtain both heating and cooling via water to water or water to refrigerant heat pumps. This technology can reduce the demand for conventional energy and thus reduce overall CO2 emissions. They do however have limited effect in reducing CO2 emission levels compared to the other renewable energy technologies.
Geothermal technology can be utilised virtually anywhere in the UK and be installed under landscape areas and car parks. A more efficient and less expensive option is to utilise a nearby body of water for heat extraction/rejection. Geothermal systems provide the opportunity to connect to water-to-water heat pump units for heat rejection and to VRF heat pump units for cooling and heating.
VRF system heat pumps using inverter controls on the compressors can provide improved energy efficient operation, where the heating and cooling input are mixed so that the actual load is limited to the resultant difference thereby further reducing the energy input.
Installing a ground source system will require approval from the environment agency to pump heat in and out of the ground. As a large system would be required for the project, it is not known how the ground conditions will react to such a large system, and there are risks associated with ecology that will affect the size of system that will be possible.
The area requirements for the below grade pipe work will be constrained by the surrounding infrastructures for the surrounding residential area
It has been concluded that a GSHP is not viable due to ecological implications and Impracticality for the project.

Biomass Boilers
Biomass technology could be installed as part of the central heating provision. The most economical option and the best for reducing CO2 emission levels would normally be to install Biomass Boilers to act as the lead boiler to cater for the base hot water heating load with the remaining gas fueled boilers sized to meet the total heating load and to form a standby facility.
The Bio-energy boiler system would require the installation of additional components for the storage of the wood chips or pellets used as fuel, along with the necessary transportation components to link between the storage hoppers and the boiler.
Wood chips or pellets would need to be stored in external or internal hoppers. The amount of wood chips or pellets stored will affect the choice of the silo or bunker storage types. Storage systems require sufficient space for large delivery vehicle to ‘shoot’ the wood fuel directly into the storage facility.
The wood chips or pellets are transferred from the storage facility by screw or similar transportation system linking between the wood hoppers and the boiler house.

The waste combustion products from the boilers (in the form of ash) can either be removed manually or automatically by the use of screw feed units direct to a collection skip. This plant ash is an inert ash and can be used as fertiliser assuming that the wood is obtained from clean sources (i.e., nonindustrial, and not contaminated with plastics). The use of automatic removal of the plant ash will reduce maintenance costs but increase the initial capital installation costs.
Wood burning boilers have comparable combustion efficiencies as basic gas fired systems. The fluing requirements for modern wood fired boilers are comparable with those of gas fired systems and the emissions are similar to that of gas fired units. Where the heat output to water is above 300kW (400kW input) there is a requirement under the clean air regulations when using waste wood to install continuous flue monitoring of the waste gas products. These systems are relatively expensive to install and maintain.

Biomass Boilers can also operate on a modulating basis to vary the heat output. Boilers can operate as low as 30% of their maximum load they do, however require additional plant room area then the standard models.

The installation of Biomass Boiler with pellet storage as the main heating boiler is not a viable option when CHP plant is proposed, as the majority of the base heating would be provided by CHP.
Biomass boilers also cause other issues such as fuel storage, which need to be maintained in a dry storage area. With space being at a high premium in the project, it is not anticipated that biomass fuel store will be a provision that is easy to make.




Biomass Boiler

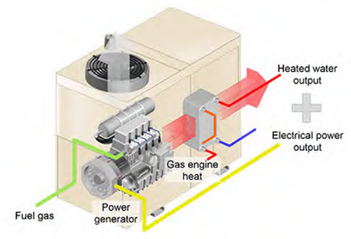
Biomass boilers will require the associated flues to terminate above the highest point of the building presenting obvious issues in this high-rise development. This will mean that the architectural character of the building will be fundamentally changed to these flue requirements.

Biomass is therefore discounted as a feasible and viable option for the project.

Solar Thermal, Hot Water Generation
The use of solar heating for hot water generation would require the installation of solar panels at roof level. Ideally the panels should be aligned in a southerly direction with a tilt of between 30° and 40°.
Solar thermal panels will also require to be mounted in areas that are unshaded. The potential, therefore, of incorporating solar thermal is limited as it would compete for roof space with the PVs system that would feed ASHP How water system generating 4 W of hot water for each W of generated electrical energy while Solar hot water system ideally generates 1 W for every 1 W of absorbed Solar energy. With minimum 4 to 1 advantage for ASHP hot water generation, expansion of electricity generating PVs is always superior to solar hot water solutions

CHP

Micro CHP system is one of the low carbon technology options However, it is one of the systems that is fed by mains gas to have both thermal and electrical power output. This one of low carbon technologies which are not encouraged to be adopted as preferred design option in built environment as it still uses main gas as its fuel source.



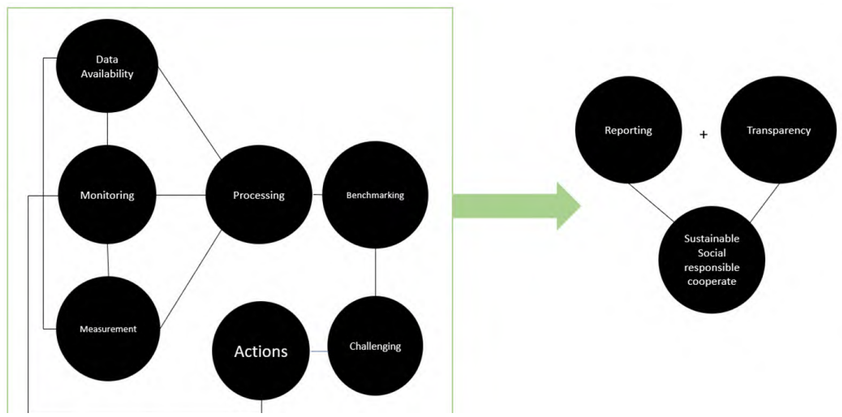
Micro CHP system

Metering

In order to effectively contribute to the "reduce" stage within the carbon hierarchy throughout the project lifetime, there shall be a measurement and monitoring framework to identify the potentials of carbon reduction opportunities related to incorporating rising technologies.

This is a crucial measure where smart metering can be integrated in BMS will facilitate:

1. Benchmark its operational carbon footprint
2. Identify operational opportunities to reduce carbon footprint
3. Assist in transparent carbon footprint reporting as part of offsetting framework to achieve carbon neutrality. This data can be essential in the Journey towards net zero where various operational and maintenance decisions can be taken to reduce the operational carbon emissions of the buildings. The data can be used in simulation models where cutting-edge technologies can be studied as they become available in the market to evaluate its sustainability benefits.



Metering and Monitoring role in Carbon footprint reporting

Energy Strategy Summary

1. The first step of the energy strategy is to effectively reduce the energy demand of the new buildings through the application multiple energy conservation measures (ECMs) such that the buildings will have less carbon emissions than the baseline building without onsite renewable energy generation. The main adopted ECMs can be summarized below:
   - Envelope with High thermal performance.
   - Efficient fans with low Specific Fan power (SPF) for AHUs, MVHRs and FCUs.
   - High performing High recovery for ventilation.
   - Demand Control ventilation for spaces with high occupancy density.
   - Efficient interior and exterior lighting power densities and controls.
   - Microscale Metering and Building management system
   - Electrification of energy end uses
2. The results shows for all buildings that the energy conservation measures at the Be-lean stage is effective for the building to comply with the new part L emissions and primary energy rate targets.
3. The second step of the strategy is to increase the carbon reduction through using low and zero carbon technologies. Based on the feasibility assessment conducted for these systems. The following system will the adopted:
4. A decentralized HVAC system approach based on VRF systems have been adopted for all elements in the development with advantage of having higher efficiency (Typically Less individual system capacity results Higher SCOP/SEER) and modularity that gives higher resilience.
5. The hot water generation for all high demanding application is based on ASHP for hot water generation. Wherever the demand for hot water is expected to be low, electric water heaters are proposed.
6. Photovoltaics on the buildings' roof. In principle any PV area added will further increase the carbon emissions reduction.
7. The Energy assessments results show that all buildings comply with Part L 2021 energy performance requirements based on the building elements performance requirements outlined in this section.
8. For BREEAM, the commercial building and the North stand will be assessed in one Bespoke Assessment. Accordingly, an energy assessment has been done combining the North stand and the commercial building in one model. The energy assessment results shows that the combined North stand and commercial building achieves the targeted 3 energy conservation credits as part of ENE 01.
9. The hotel will have a separate BREEAM assessment under Residential institution Scheme excluding the shell core F&B units in the podium. The energy assessment results shows that the hotel only energy assessment achieves the 2 energy conservation credits as part of ENE 01 which is 1 credit less than the targeted 3 ENE01 energy conservation credits. This is mainly because of the high glazing ratio for the application (hotel) that reaches 50% based on the latest facade design. This induces high heating demand for the rooms which compromises the Heating cooling demand energy performance ratio. Under BREEAM V6, the heating and cooling demand has been given higher weighting with more impact on the scope. This has been updated in the latest hotel BREEAM score sheet.
10. Sub Metering will be essential for effective measurement and monitoring of the project energy performance which can be used to identify the potentials of carbon reduction opportunities related to incorporating rising technologies.

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

MCFC North Stand-Be Lean

As designed

Date: Wed Feb 22 23:39:01 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certifier details

Name: ME-Engineers

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.19

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.19

BRUKL compliance module version: v6.1.e.0

Foundation area [m^2]: 881.51

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	3.85	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	3.82	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	41.79	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	41.63	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.2	0.2	SP00000C:Surf[1]
Floors	0.18	0.15	0.15	SP000000:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.15	0.15	SP00000D:Surf[1]
Windows** and roof windows	1.6	1.18	1.33	SP000032:Surf[2]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	1.42	1.42	SP000035:Surf[1]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

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

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

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

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

1- HVAC-Be-Lean

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3	3.75	0	1.5	0.85
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

1- DHW-ASHP-Be-Lean

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.1	-
Standard value	2*	N/A

* Standard shown is for all types except absorption and gas engine heat pumps.

2- DHW-Instantaneous at point of use

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m^2]**
Standard value	95	80	0.3
Storage	100	-	-
BOH	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Storage	100	-	-
Bars	100	-	-
Support Kitchen	100	-	-
Bars	100	-	-
Support Kitchen	100	-	-
Circulation	100	-	-
Corridor	100	-	-
Corridor	100	-	-
Corridor	100	-	-
Storage	100	-	-
Corridor	100	-	-
Lobby	100	-	-
BOH	100	-	-
BOH	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Corridor	100	-	-
Corridor	100	-	-
Concession	100	-	-
Toilets	100	-	-
Concession	100	-	-
BOH	100	-	-
BOH	100	-	-
Concession	100	-	-
Concession	100	-	-
Toilets	100	-	-
Toilets	100	-	-
BOH	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Toilets	100	-	-
BOH	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Concession	100	-	-
Concession	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Bars	100	-	-
Reception	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Corridor	100	-	-
Corridor	100	-	-
LIft Lobby	100	-	-
LIft Lobby	100	-	-
LIft Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Corridor	100	-	-
LIft Lobby	100	-	-
LIft Lobby	100	-	-
LIft Lobby	100	-	-
Stairs	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Stairs	100	-	-
Stairs	100	-	-
Concourse	100	-	-
Players Club	100	-	-
Concourse	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
Concource	100	-	-
BOH	100	-	-
BOH	100	-	-
Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Lobby	100	-	-
BOH	100	-	-
BOH	100	-	-
BOH	100	-	-
Bars	100	-	-
Storage	100	-	-
Storage	100	-	-
Bars	100	-	-
Storage	100	-	-
Storage	100	-	-
WCs	100	-	-
Concourse	100	-	-
WCs	100	-	-
City Kitchen	100	-	-
WCs	100	-	-
City Kitchen	100	-	-
WCs	100	-	-
Keg Room	100	-	-
WCs	100	-	-
Keg Room	100	-	-
WCs	100	-	-
City Bar	100	-	-
WCs	100	-	-
City Bar	100	-	-
WCs	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Hotel Suites	100	-	-
Hotel Suites	100	-	-
Hotel Suites	100	-	-
Hotel Suites	100	-	-
Hotel Suites	100	-	-
Corridor	100	-	-
Cleaners Cupboard	100	-	-
Pantry	100	-	-
Lift Lobby	100	-	-
WCs	100	-	-
Lift Lobby	100	-	-
Set up	100	-	-
TV Studio	100	-	-
Lift Lobby	100	-	-
WCs	100	-	-
VIP	100	-	-
Pantry	100	-	-
Cleaners Cupboard	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Lift Lobby	100	-	-
Support Storage	100	-	-
Cleaners Cupboard	100	-	-
Lift Lobby	100	-	-
Sky Bar	100	-	-
Corridor	100	-	-
WCs	100	-	-
Circulation	100	-	-
WCs	100	-	-
WCs	100	-	-
Circulation	100	-	-
Cloakroom	100	-	-
Plant Mezzanine	100	-	-
Corridor	100	-	-
Support Kitchen	100	-	-
Circulation	100	-	-
Support Storage	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Prayer Room	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Stair	100	-	-
Lift Lobby	100	-	-
Stair	100	-	-
Plant	100	-	-
Lift Lobby	100	-	-
Plant	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Wire & Sky	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Plantroom	100	-	-
Cloakroom	100	-	-
WCs	100	-	-
Stairs	100	-	-
First Aid	100	-	-
Bars	100	-	-
Bars	100	-	-
City Hall	100	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Bars	N/A	N/A
Support Kitchen	N/A	N/A
Bars	N/A	N/A
Support Kitchen	N/A	N/A
Concession	N/A	N/A
Concession	N/A	N/A
Concession	N/A	N/A
Concession	N/A	N/A
Concession	N/A	N/A
Concession	N/A	N/A
Bars	N/A	N/A
Reception	YES (+162.2%)	NO
Circulation	NO (-99.8%)	NO
Circulation	N/A	N/A
Concourse	YES (+149.7%)	NO
Players Club	N/A	N/A
Concourse	YES (+124%)	NO
Concource	N/A	N/A
Bars	N/A	N/A
Concource	N/A	N/A
Bars	N/A	N/A
Bars	N/A	N/A
Concourse	YES (+38.6%)	NO
City Kitchen	N/A	N/A
City Kitchen	N/A	N/A
City Bar	N/A	N/A
City Bar	N/A	N/A
Hotel Suites	N/A	N/A
Hotel Suites	N/A	N/A
Hotel Suites	N/A	N/A
Hotel Suites	N/A	N/A
Hotel Suites	N/A	N/A
Set up	N/A	N/A
TV Studio	N/A	N/A
VIP	N/A	N/A
Sky Bar	YES (+35.5%)	NO
Cloakroom	N/A	N/A
Support Kitchen	N/A	N/A
Prayer Room	N/A	N/A
Wire & Sky	YES (+200.4%)	NO
First Aid	N/A	N/A
Bars	NO (-5.6%)	NO
Bars	NO (-3.6%)	NO
City Hall	NO (-57.3%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	15409.3	15409.3
External area [m²]	22319.6	22319.6
Weather	MAN	MAN
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	5522.74	6648.32
Average U-value [W/m²K]	0.25	0.3
Alpha value* [%]	25	10

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
1	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
2	**Hotels**
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
97	**General Assembly and Leisure, Night Clubs, and Theatres**
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	1.77	1.46
Cooling	1.42	1.04
Auxiliary	3.28	4.68
Lighting	9.16	8.73
Hot water	12.56	12.37
Equipment*	58.54	58.54
TOTAL**	**28.19**	**28.28**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

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

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	34.85	31.93
Primary energy [kWh_{PE}/m²]	41.63	41.79
Total emissions [kg/m²]	3.82	3.85

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	68.3	53.6	6.2	5	9.2	3.07	3	3	3.75
	Notional	51.2	60.4	5.1	3.6	9.7	2.78	4.63	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

MCFC North Stand-Be Green

As designed

Date: Wed Feb 22 23:45:55 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certifier details

Name: ME-Engineers

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.19

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.19

BRUKL compliance module version: v6.1.e.0

Foundation area [m^2]: 881.51

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	3.85	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	3.26	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	41.79	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	35.29	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.2	0.2	SP00000C:Surf[1]
Floors	0.18	0.15	0.15	SP000000:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.15	0.15	SP00000D:Surf[1]
Windows** and roof windows	1.6	1.18	1.33	SP000032:Surf[2]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	1.42	1.42	SP000035:Surf[1]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

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

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

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

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

1- HVAC-Decentralized

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.2	5.2	0	1.5	0.85
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

1- HVAC-DHW-ASHP

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.2	-
Standard value	2*	N/A

* Standard shown is for all types except absorption and gas engine heat pumps.

2- DHW-Instantaneous at point of use

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m^2]**
Standard value	95	80	0.3
Storage	100	-	-
BOH	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Storage	100	-	-
Bars	100	-	-
Support Kitchen	100	-	-
Bars	100	-	-
Support Kitchen	100	-	-
Circulation	100	-	-
Corridor	100	-	-
Corridor	100	-	-
Corridor	100	-	-
Storage	100	-	-
Corridor	100	-	-
Lobby	100	-	-
BOH	100	-	-
BOH	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Corridor	100	-	-
Corridor	100	-	-
Concession	100	-	-
Toilets	100	-	-
Concession	100	-	-
BOH	100	-	-
BOH	100	-	-
Concession	100	-	-
Concession	100	-	-
Toilets	100	-	-
Toilets	100	-	-
BOH	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Toilets	100	-	-
BOH	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Concession	100	-	-
Toilets	100	-	-
Concession	100	-	-
Concession	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Bars	100	-	-
Reception	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Corridor	100	-	-
Corridor	100	-	-
LIft Lobby	100	-	-
LIft Lobby	100	-	-
LIft Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Corridor	100	-	-
LIft Lobby	100	-	-
LIft Lobby	100	-	-
LIft Lobby	100	-	-
Stairs	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Stairs	100	-	-
Stairs	100	-	-
Concourse	100	-	-
Players Club	100	-	-
Concourse	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
Concource	100	-	-
BOH	100	-	-
BOH	100	-	-
Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Lobby	100	-	-
BOH	100	-	-
BOH	100	-	-
Bars	100	-	-
BOH	100	-	-
Bars	100	-	-
Storage	100	-	-
Storage	100	-	-
Bars	100	-	-
Storage	100	-	-
Storage	100	-	-
WCs	100	-	-
Concourse	100	-	-
WCs	100	-	-
City Kitchen	100	-	-
WCs	100	-	-
City Kitchen	100	-	-
WCs	100	-	-
Keg Room	100	-	-
WCs	100	-	-
Keg Room	100	-	-
WCs	100	-	-
City Bar	100	-	-
WCs	100	-	-
City Bar	100	-	-
WCs	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Hotel Suites	100	-	-
Hotel Suites	100	-	-
Hotel Suites	100	-	-
Hotel Suites	100	-	-
Hotel Suites	100	-	-
Corridor	100	-	-
Cleaners Cupboard	100	-	-
Pantry	100	-	-
Lift Lobby	100	-	-
WCs	100	-	-
Lift Lobby	100	-	-
Set up	100	-	-
TV Studio	100	-	-
Lift Lobby	100	-	-
WCs	100	-	-
VIP	100	-	-
Pantry	100	-	-
Cleaners Cupboard	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Lift Lobby	100	-	-
Support Storage	100	-	-
Cleaners Cupboard	100	-	-
Lift Lobby	100	-	-
Sky Bar	100	-	-
Corridor	100	-	-
WCs	100	-	-
Circulation	100	-	-
WCs	100	-	-
WCs	100	-	-
Circulation	100	-	-
Cloakroom	100	-	-
Plant Mezzanine	100	-	-
Corridor	100	-	-
Support Kitchen	100	-	-
Circulation	100	-	-
Support Storage	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Prayer Room	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Stair	100	-	-
Lift Lobby	100	-	-
Stair	100	-	-
Plant	100	-	-
Lift Lobby	100	-	-
Plant	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Wire & Sky	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Plantroom	100	-	-
Cloakroom	100	-	-
WCs	100	-	-
Stairs	100	-	-
First Aid	100	-	-
Bars	100	-	-
Bars	100	-	-
City Hall	100	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Bars	N/A	N/A
Support Kitchen	N/A	N/A
Bars	N/A	N/A
Support Kitchen	N/A	N/A
Concession	N/A	N/A
Concession	N/A	N/A
Concession	N/A	N/A
Concession	N/A	N/A
Concession	N/A	N/A
Concession	N/A	N/A
Bars	N/A	N/A
Reception	YES (+162.2%)	NO
Circulation	NO (-99.8%)	NO
Circulation	N/A	N/A
Concourse	YES (+149.7%)	NO
Players Club	N/A	N/A
Concourse	YES (+124%)	NO
Concource	NO (-85.5%)	NO
Bars	N/A	N/A
Bars	N/A	N/A
Bars	N/A	N/A
Concourse	YES (+38.6%)	NO
City Kitchen	N/A	N/A
City Kitchen	N/A	N/A
City Bar	N/A	N/A
City Bar	N/A	N/A
Hotel Suites	N/A	N/A
Hotel Suites	N/A	N/A
Hotel Suites	N/A	N/A
Hotel Suites	N/A	N/A
Hotel Suites	N/A	N/A
Set up	N/A	N/A
TV Studio	N/A	N/A
VIP	N/A	N/A
Sky Bar	YES (+35.5%)	NO
Cloakroom	N/A	N/A
Support Kitchen	N/A	N/A
Prayer Room	N/A	N/A
Wire & Sky	YES (+200.4%)	NO
First Aid	N/A	N/A
Bars	NO (-5.6%)	NO
Bars	NO (-3.6%)	NO
City Hall	NO (-57.3%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	15409.3	15409.3
External area [m²]	22319.6	22319.6
Weather	MAN	MAN
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	5554.08	6648.32
Average U-value [W/m²K]	0.25	0.3
Alpha value* [%]	25	10

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
1	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
2	**Hotels**
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
97	**General Assembly and Leisure, Night Clubs, and Theatres**
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	1.27	1.46
Cooling	1.18	1.04
Auxiliary	3.28	4.68
Lighting	9	8.73
Hot water	12.26	12.37
Equipment*	58.54	58.54
TOTAL**	**26.99**	**28.28**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	3.07	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*3.07*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	34.9	31.93
Primary energy [kWh_{PE}/m²]	35.29	41.79
Total emissions [kg/m²]	3.26	3.85

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	68.6	53.4	4.4	4.1	9.2	4.29	3.61	4.2	5.2
	Notional	51.2	60.4	5.1	3.6	9.7	2.78	4.63	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

MCFC Commercial Building-Be Lean

As designed

Date: Wed Feb 22 06:58:23 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certifier details

Name: ME-Engineers

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.19

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.19

BRUKL compliance module version: v6.1.e.0

Foundation area [m^2]: 883.19

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	3.52	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	3.38	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	38.28	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	36.41	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.2	0.2	SP0000C0:Surf[2]
Floors	0.18	0.15	0.15	SP0000C0:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.15	0.15	SP0000F8:Surf[1]
Windows** and roof windows	1.6	1.24	1.24	SP0000C0:Surf[1]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

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

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

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

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

1- HVAC-Be-Lean

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3	3.75	0	1.5	0.85
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

1- DHW-Instantaneous at point of use

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m^2]**
Standard value	95	80	0.3
HV Dist./ENW&HV	100	-	-
Stairs	100	-	-
LV Distribution	100	-	-
Football Exprience	100	-	-
Storage	100	-	-
Lobby	100	-	-
Lobby	100	-	-
Retail	100	85	1.765
Storage	100	-	-
Toilets	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
Bridge	100	-	-
Retail offices	100	-	-
Stair	100	-	-
Office	100	-	-
Stair	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Stair	100	-	-
Stairs	100	-	-
Stairs	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Lobby	100	-	-
Stair	100	-	-
Lobby	100	-	-
Stair	100	-	-
Museum	100	85	2.329
WCs	100	-	-
Circulation	100	-	-
Storage	100	-	-
Stairs	100	-	-
Lobby	100	-	-
Stair	100	-	-
Kitchen	100	-	-
WC	100	-	-
WC	100	-	-
Football Exprience	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Office	100	-	-
WCs	100	-	-
WCs	100	-	-
Office	100	-	-
WCs	100	-	-
Office	100	-	-
Stair	100	-	-
Stair	100	-	-
WCs	100	-	-
WCs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Office	100	-	-
WCs	100	-	-
WCs	100	-	-
Office	100	-	-
Stair	100	-	-
Stair	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
WCs	100	-	-
WCs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
WCs	100	-	-
WCs	100	-	-
Office	100	-	-
Stair	100	-	-
Stair	100	-	-
Office	100	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Football Exprience	YES (+104.5%)	NO
Retail	NO (-6.1%)	NO
Retail offices	YES (+74.1%)	NO
Office	NO (-1.6%)	NO
Museum	NO (-35.8%)	NO
Kitchen	N/A	N/A
Football Exprience	YES (+3.8%)	NO
Office	NO (-56.9%)	YES
Office	NO (-38.2%)	YES
Office	NO (-57.3%)	YES
Office	NO (-37.3%)	YES
Office	NO (-56.2%)	YES
Office	NO (-37.7%)	YES
Office	NO (-33.3%)	YES
Office	NO (-47.6%)	YES

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	8714.8	8714.8
External area [m²]	7873.1	7873.1
Weather	MAN	MAN
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	4643.56	3568.97
Average U-value [W/m²K]	0.59	0.45
Alpha value* [%]	10.43	10

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

Building Use

% Area	Building Type
8	**Retail/Financial and Professional Services**
	Restaurants and Cafes/Drinking Establishments/Takeaways
75	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
17	**Non-residential Institutions: Libraries, Museums, and Galleries**
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	5.03	2.07
Cooling	2	2.45
Auxiliary	8.6	10.48
Lighting	5.14	7.53
Hot water	3.76	3.4
Equipment*	30.85	30.85
TOTAL**	**24.53**	**25.92**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

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

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	71.56	61.49
Primary energy [kWh_{PE}/m²]	36.41	38.28
Total emissions [kg/m²]	3.38	3.52

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Fan coil systems, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	61.4	26.8	6.2	2.5	10.3	2.75	3.02	3	3.75
	Notional	25.5	50.3	2.5	3	12.1	2.78	4.63	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

MCFC Commercial Building-Be Green

As designed

Date: Wed Feb 22 06:50:57 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certifier details

Name: ME-Engineers

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.19

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.19

BRUKL compliance module version: v6.1.e.0

Foundation area [m^2]: 883.19

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2annum$	3.17	
Building CO_2 emission rate (BER), $kgCO_2/m^2annum$	2.06	
Target primary energy rate (TPER), kWh_{PE}/m^2annum	34.48	
Building primary energy rate (BPER), kWh_{PE}/m^2annum	21.71	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.2	0.2	SP0000C0:Surf[2]
Floors	0.18	0.15	0.15	SP0000C0:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.15	0.15	SP0000F8:Surf[1]
Windows** and roof windows	1.6	1.24	1.24	SP0000C0:Surf[1]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

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

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

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

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

1- HVAC-Decentralized

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.2	5.2	0	1.5	0.85
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

1- DHW-Instantaneous at point of use

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m^2]**
Standard value	95	80	0.3
HV Dist./ENW&HV	100	-	-
Stairs	100	-	-
LV Distribution	100	-	-
Football Exprience	100	-	-
Storage	100	-	-
Lobby	100	-	-
Lobby	100	-	-
Retail	100	85	1.765
Storage	100	-	-
Toilets	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
Bridge	100	-	-
Retail offices	100	-	-
Stair	100	-	-
Office	100	-	-
Stair	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Stair	100	-	-
Stairs	100	-	-
Stairs	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Lobby	100	-	-
Stair	100	-	-
Lobby	100	-	-
Stair	100	-	-
Museum	100	85	2.329
WCs	100	-	-
Circulation	100	-	-
Storage	100	-	-
Stairs	100	-	-
Lobby	100	-	-
Stair	100	-	-
Kitchen	100	-	-
WC	100	-	-
WC	100	-	-
Football Exprience	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Office	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
Office	100	-	-
Stair	100	-	-
Stair	100	-	-
WCs	100	-	-
WCs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Office	100	-	-
WCs	100	-	-
WCs	100	-	-
Office	100	-	-
Stair	100	-	-
Stair	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
WCs	100	-	-
WCs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
WCs	100	-	-
WCs	100	-	-
Office	100	-	-
Stair	100	-	-
Stair	100	-	-
Office	100	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Football Exprience	YES (+104.5%)	NO
Retail	NO (-6.1%)	NO
Retail offices	YES (+74.1%)	NO
Office	NO (-1.6%)	NO
Museum	NO (-35.8%)	NO
Kitchen	N/A	N/A
Football Exprience	YES (+3.8%)	NO
Office	NO (-56.9%)	YES
Office	NO (-38.2%)	YES
Office	NO (-57.3%)	YES
Office	NO (-37.3%)	YES
Office	NO (-56.2%)	YES
Office	NO (-37.7%)	YES
Office	NO (-33.3%)	YES
Office	NO (-47.6%)	YES

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	8714.8	8714.8
External area [m²]	7873.1	7873.1
Weather	MAN	MAN
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	4643.56	3568.97
Average U-value [W/m²K]	0.59	0.45
Alpha value* [%]	10.43	10

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

Building Use

% Area	Building Type
8	**Retail/Financial and Professional Services**
	Restaurants and Cafes/Drinking Establishments/Takeaways
75	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
17	**Non-residential Institutions: Libraries, Museums, and Galleries**
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	3.22	2.07
Cooling	1.67	2.45
Auxiliary	5.44	7.91
Lighting	5.14	7.53
Hot water	3.76	3.4
Equipment*	30.85	30.85
TOTAL**	**19.25**	**23.34**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	4.69	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*4.69*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	71.56	61.49
Primary energy [kWh_{PE}/m²]	21.71	34.48
Total emissions [kg/m²]	2.06	3.17

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	61.4	26.8	4	2.1	6.4	4.29	3.61	4.2	5.2
	Notional	25.5	50.3	2.5	3	9	2.78	4.63	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

MCFC-Hotel-Be-Lean

As designed

Date: Wed Feb 22 07:37:37 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.19

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.19

BRUKL compliance module version: v6.1.e.0

Certifier details

Name: ME-Engineers

Telephone number: Phone

Address: Street Address, City, Postcode

Foundation area [m^2]: 1224.21

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	13.09	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	12.01	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	142.29	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	130.41	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.2	0.2	SP000000:Surf[2]
Floors	0.18	0.15	0.15	SP000000:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.15	0.15	SP000099:Surf[1]
Windows** and roof windows	1.6	1.34	1.34	SP000000:Surf[1]
Rooflights***	2.2	1.39	1.39	SP0000AA:Surf[1]
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

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

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

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

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

1- HVAC-Be-Lean-Podium

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3	3.75	0	1.5	0.85
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

2- HVAC-Be-Lean

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3	3.75	0	1.2	0.85
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

1- DHW-ASHP-Be lean

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.1	-
Standard value	2*	N/A

* Standard shown is for all types except absorption and gas engine heat pumps.

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m^2]**
Standard value	95	80	0.3
Lift Lobby	100	85	1.588
Lift Lobby	100	85	1.588
Stair	100	-	-
Lift Lobby	100	85	1.588
Lift Lobby	100	85	1.588
Stair	100	-	-
Lift Lobby	100	85	1.588
Stair	100	-	-
Lobby	100	85	1.588
Lobby	100	85	1.588
Lobby	100	85	1.588
Stair	100	-	-
Lift Lobby	100	85	1.588
Lift Lobby	100	85	1.588

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Stair	100	-	-
Lift Lobby	100	85	1.588
Stair	100	-	-
Lobby	100	85	1.588
Lobby	100	85	1.588
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
BOH Corridor	100	-	-
BOH Corridor	100	-	-
Front Office	100	-	-
Lift Lobby	100	85	1.588
Laundry	100	-	-
Luggage Store	100	-	-
Corridor	100	-	-
Corridor	100	-	-
City Square Corridor	100	-	-
City Square Toilet	100	-	-
City Square Toilet	100	-	-
Lobby	100	85	1.588
Lobby	100	85	1.588
Lobby Toilets	100	-	-
Security	100	-	-
Lobby	100	85	1.588
Corridor	100	-	-
Lobby	100	85	1.588
BOH	100	-	-
Staff Facilities	100	-	-
Corridor	100	-	-
MEP	100	-	-
Gym	100	-	-
Gym BOH	100	-	-
Office	100	-	-
Kitchen	100	-	-
Lift Lobby	100	85	1.588
Circulation	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Presidential Suite	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
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Guest Rooms	100	-	-
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Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guestrooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-

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General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
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Guestrooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
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Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
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Circulation	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
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Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Lift Lobby	YES (+18.1%)	NO
Lift Lobby	N/A	N/A
Lift Lobby	N/A	N/A
Lift Lobby	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Lift Lobby	N/A	N/A
Lobby	N/A	N/A
Lobby	N/A	N/A
Lobby	YES (+116%)	NO
Lift Lobby	N/A	N/A
Lift Lobby	N/A	N/A
Lift Lobby	N/A	N/A
Lobby	N/A	N/A
Lobby	NO (-0.3%)	NO
BOH Corridor	N/A	N/A
BOH Corridor	N/A	N/A
Front Office	N/A	N/A
Lift Lobby	YES (+28.2%)	NO
Laundry	N/A	N/A
Corridor	YES (+5.5%)	NO
Corridor	YES (+79.5%)	NO
City Square Corridor	YES (+98%)	NO
Lobby	YES (+84.6%)	NO
Lobby	N/A	N/A
Security	N/A	N/A
Lobby	YES (+41.4%)	NO
Corridor	NO (-94.7%)	NO
Lobby	NO (-24.6%)	NO
BOH	N/A	N/A
Staff Facilities	N/A	N/A
Corridor	N/A	N/A
MEP	N/A	N/A
Gym	YES (+23.8%)	NO
Gym BOH	YES (+32.2%)	NO
Office	YES (+34%)	NO
Kitchen	N/A	N/A
Lift Lobby	N/A	N/A
Guest Rooms	NO (-31.1%)	YES
Presidential Suite	NO (-32.8%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-72.3%)	YES
Guestrooms	NO (-14.2%)	YES
Guestrooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.3%)	YES
Guestrooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.6%)	YES
Guest Rooms	NO (-14.7%)	YES
Guest Rooms	NO (-15.2%)	YES
Guest Rooms	NO (-17%)	YES
Guest Rooms	NO (-17.9%)	YES
Guest Rooms	NO (-81.2%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-43.9%)	YES
Guest Rooms	NO (-47.3%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-16.9%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.7%)	YES
Guest Rooms	NO (-22.2%)	YES
Guest Rooms	NO (-74.6%)	YES
Guest Rooms	NO (-47.6%)	YES
Guest Rooms	NO (-21.4%)	YES
Guest Rooms	NO (-84.5%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.4%)	YES
Guest Rooms	NO (-49.5%)	YES
Guest Rooms	NO (-49.6%)	YES
Guest Rooms	NO (-49.7%)	YES
Guest Rooms	NO (-23.2%)	YES
Guest Rooms	NO (-49.9%)	YES
Guest Rooms	NO (-50%)	YES
Guest Rooms	NO (-22.7%)	YES
Guest Rooms	NO (-23.3%)	YES
Guest Rooms	NO (-50.6%)	YES
Guest Rooms	NO (-50.8%)	YES
Guest Rooms	NO (-51.5%)	YES
Guest Rooms	NO (-24.4%)	YES
Guest Rooms	NO (-24.9%)	YES
Guest Rooms	NO (-26.1%)	YES
Guest Rooms	NO (-51.6%)	YES
Guest Rooms	NO (-51.8%)	YES
Guest Rooms	NO (-29.2%)	YES
Guest Rooms	NO (-31.2%)	YES
Guest Rooms	NO (-52.7%)	YES
Guest Rooms	NO (-35.9%)	YES
Guest Rooms	NO (-53.3%)	YES
Guest Rooms	NO (-52.8%)	YES
Guest Rooms	NO (-39.6%)	YES
Guest Rooms	NO (-55.2%)	YES
Guest Rooms	NO (-52.8%)	YES
Guest Rooms	NO (-55.8%)	YES
Guest Rooms	NO (-56.4%)	YES
Guest Rooms	NO (-79.6%)	YES
Guestrooms	NO (-32.9%)	YES
Guestrooms	NO (-33.2%)	YES
Guest Rooms	NO (-33.3%)	YES
Guest Rooms	NO (-34.7%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-35.7%)	YES
Guest Rooms	NO (-36.9%)	YES
Guest Rooms	NO (-38.4%)	YES
Guest Rooms	NO (-41.6%)	YES
Guest Rooms	NO (-44.9%)	YES
Guestrooms	NO (-14%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-75.6%)	YES
Guest Rooms	NO (-24.9%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-24.9%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-17.1%)	YES
Guest Rooms	NO (-17.1%)	YES
Guest Rooms	NO (-17.1%)	YES
Guest Rooms	NO (-17.3%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14%)	YES
Guest Rooms	NO (-14%)	YES
Guest Rooms	NO (-14%)	YES
Guest Rooms	NO (-14%)	YES
Guestrooms	NO (-14%)	YES
Guest Rooms	NO (-14%)	YES
Guestrooms	NO (-30.9%)	YES
Guest Rooms	NO (-32.3%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guestrooms	NO (-37%)	YES
Guest Rooms	NO (-72.3%)	YES
Guestrooms	NO (-14.2%)	YES
Guestrooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.2%)	YES
Guestrooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.7%)	YES
Guest Rooms	NO (-15.2%)	YES
Guest Rooms	NO (-17%)	YES
Guest Rooms	NO (-17.9%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-80.8%)	YES
Guest Rooms	NO (-43.7%)	YES
Guest Rooms	NO (-46%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-16.9%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.7%)	YES
Guest Rooms	NO (-22.1%)	YES
Guest Rooms	NO (-74.6%)	YES
Guest Rooms	NO (-47%)	YES
Guest Rooms	NO (-21.3%)	YES
Guest Rooms	NO (-84.5%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.4%)	YES
Guest Rooms	NO (-49.5%)	YES
Guest Rooms	NO (-23.1%)	YES
Guest Rooms	NO (-49.7%)	YES
Guest Rooms	NO (-49.9%)	YES
Guest Rooms	NO (-22.3%)	YES
Guest Rooms	NO (-22.6%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-50.6%)	YES
Guest Rooms	NO (-50.8%)	YES
Guest Rooms	NO (-23.9%)	YES
Guest Rooms	NO (-24.6%)	YES
Guest Rooms	NO (-25.3%)	YES
Guest Rooms	NO (-51.5%)	YES
Guest Rooms	NO (-51.7%)	YES
Guest Rooms	NO (-28.3%)	YES
Guest Rooms	NO (-30.9%)	YES
Guest Rooms	NO (-52.3%)	YES
Guest Rooms	NO (-34.6%)	YES
Guest Rooms	NO (-53%)	YES
Guest Rooms	NO (-52.6%)	YES
Guest Rooms	NO (-39.4%)	YES
Guest Rooms	NO (-54.9%)	YES
Guest Rooms	NO (-52.7%)	YES
Guest Rooms	NO (-55.7%)	YES
Guest Rooms	NO (-56.4%)	YES
Guest Rooms	NO (-79.5%)	YES
Guestrooms	NO (-32.8%)	YES
Guestrooms	NO (-33.2%)	YES
Guest Rooms	NO (-32.7%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-33.7%)	YES
Guest Rooms	NO (-34.5%)	YES
Guest Rooms	NO (-35.8%)	YES
Guest Rooms	NO (-37%)	YES
Guest Rooms	NO (-40.5%)	YES
Guest Rooms	NO (-43.7%)	YES
Guest Rooms	NO (-72.3%)	YES
Guestrooms	NO (-14.1%)	YES
Guestrooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.2%)	YES
Guestrooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.6%)	YES
Guest Rooms	NO (-15.1%)	YES
Guest Rooms	NO (-17%)	YES
Guest Rooms	NO (-17.9%)	YES
Guest Rooms	NO (-79.8%)	YES
Guest Rooms	NO (-43%)	YES
Guest Rooms	NO (-44.5%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.8%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-21.9%)	YES
Guest Rooms	NO (-74.6%)	YES
Guest Rooms	NO (-45.7%)	YES
Guest Rooms	NO (-21.1%)	YES
Guest Rooms	NO (-84.3%)	YES
Guest Rooms	NO (-48.9%)	YES
Guest Rooms	NO (-49.1%)	YES
Guest Rooms	NO (-49.2%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-22.9%)	YES
Guest Rooms	NO (-49.5%)	YES
Guest Rooms	NO (-49.7%)	YES
Guest Rooms	NO (-22%)	YES
Guest Rooms	NO (-22.2%)	YES
Guest Rooms	NO (-49.9%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-50.7%)	YES
Guest Rooms	NO (-23.1%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-23.9%)	YES
Guest Rooms	NO (-24.6%)	YES
Guest Rooms	NO (-50.8%)	YES
Guest Rooms	NO (-51.3%)	YES
Guest Rooms	NO (-27%)	YES
Guest Rooms	NO (-29.9%)	YES
Guest Rooms	NO (-52.1%)	YES
Guest Rooms	NO (-33.2%)	YES
Guest Rooms	NO (-52.7%)	YES
Guest Rooms	NO (-52%)	YES
Guest Rooms	NO (-38.7%)	YES
Guest Rooms	NO (-54.5%)	YES
Guest Rooms	NO (-52.6%)	YES
Guest Rooms	NO (-55.4%)	YES
Guest Rooms	NO (-56.3%)	YES
Guest Rooms	NO (-79.5%)	YES
Guestrooms	NO (-32.7%)	YES
Guestrooms	NO (-33.1%)	YES
Guest Rooms	NO (-32.5%)	YES
Guest Rooms	NO (-32.7%)	YES
Guest Rooms	NO (-33.5%)	YES
Guest Rooms	NO (-34.2%)	YES
Guest Rooms	NO (-35.7%)	YES
Guest Rooms	NO (-38.5%)	YES
Guest Rooms	NO (-42%)	YES
Guest Rooms	NO (-72.2%)	YES
Guestrooms	NO (-14.1%)	YES
Guestrooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.1%)	YES
Guestrooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-15.1%)	YES
Guest Rooms	NO (-17%)	YES
Guest Rooms	NO (-17.8%)	YES
Guest Rooms	NO (-78.7%)	YES
Guest Rooms	NO (-40%)	YES
Guest Rooms	NO (-43.6%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-17.4%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-21.5%)	YES
Guest Rooms	NO (-74.6%)	YES
Guest Rooms	NO (-43.8%)	YES
Guest Rooms	NO (-21.1%)	YES
Guest Rooms	NO (-84.1%)	YES
Guest Rooms	NO (-48%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-48.6%)	YES
Guest Rooms	NO (-48.8%)	YES
Guest Rooms	NO (-49%)	YES
Guest Rooms	NO (-22.7%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.5%)	YES
Guest Rooms	NO (-21.6%)	YES
Guest Rooms	NO (-21.8%)	YES
Guest Rooms	NO (-49.6%)	YES
Guest Rooms	NO (-50.1%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-22.5%)	YES
Guest Rooms	NO (-23.1%)	YES
Guest Rooms	NO (-23.7%)	YES
Guest Rooms	NO (-50.6%)	YES
Guest Rooms	NO (-50.8%)	YES
Guest Rooms	NO (-25.6%)	YES
Guest Rooms	NO (-27.7%)	YES
Guest Rooms	NO (-51.4%)	YES
Guest Rooms	NO (-31.2%)	YES
Guest Rooms	NO (-52.2%)	YES
Guest Rooms	NO (-51.8%)	YES
Guest Rooms	NO (-36.5%)	YES
Guest Rooms	NO (-53.6%)	YES
Guest Rooms	NO (-52.2%)	YES
Guest Rooms	NO (-55.2%)	YES
Guest Rooms	NO (-56.1%)	YES
Guest Rooms	NO (-79.4%)	YES
Guestrooms	NO (-32.4%)	YES
Guestrooms	NO (-32.8%)	YES
Guest Rooms	NO (-32.4%)	YES
Guest Rooms	NO (-32.4%)	YES
Guest Rooms	NO (-32.5%)	YES
Guest Rooms	NO (-32.9%)	YES
Guest Rooms	NO (-33.8%)	YES
Guest Rooms	NO (-36%)	YES
Guest Rooms	NO (-40%)	YES
Guest Rooms	NO (-72.2%)	YES
Guestrooms	NO (-14%)	YES
Guestrooms	NO (-14%)	YES
Guest Rooms	NO (-14.1%)	YES
Guestrooms	NO (-14.1%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-15%)	YES
Guest Rooms	NO (-16.9%)	YES
Guest Rooms	NO (-17.7%)	YES
Guest Rooms	NO (-77.6%)	YES
Guest Rooms	NO (-34.4%)	YES
Guest Rooms	NO (-40%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-17.4%)	YES
Guest Rooms	NO (-17.4%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-21.4%)	YES
Guest Rooms	NO (-74.5%)	YES
Guest Rooms	NO (-40.6%)	YES
Guest Rooms	NO (-21%)	YES
Guest Rooms	NO (-84.1%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-48.2%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-22.7%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-48.6%)	YES
Guest Rooms	NO (-21.4%)	YES
Guest Rooms	NO (-21.4%)	YES
Guest Rooms	NO (-48.9%)	YES
Guest Rooms	NO (-49.4%)	YES
Guest Rooms	NO (-49.7%)	YES
Guest Rooms	NO (-21.6%)	YES
Guest Rooms	NO (-22.1%)	YES
Guest Rooms	NO (-22.6%)	YES
Guest Rooms	NO (-50.1%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-24%)	YES
Guest Rooms	NO (-25.4%)	YES
Guest Rooms	NO (-51%)	YES
Guest Rooms	NO (-28.2%)	YES
Guest Rooms	NO (-51.7%)	YES
Guest Rooms	NO (-51.1%)	YES
Guest Rooms	NO (-33%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-52.9%)	YES
Guest Rooms	NO (-51.2%)	YES
Guest Rooms	NO (-54.4%)	YES
Guest Rooms	NO (-55.8%)	YES
Guest Rooms	NO (-79.2%)	YES
Guestrooms	NO (-31.7%)	YES
Guestrooms	NO (-32.1%)	YES
Guest Rooms	NO (-31.8%)	YES
Guest Rooms	NO (-32%)	YES
Guest Rooms	NO (-32.1%)	YES
Guest Rooms	NO (-32.3%)	YES
Guest Rooms	NO (-32.5%)	YES
Guest Rooms	NO (-33.3%)	YES
Guest Rooms	NO (-36.7%)	YES
Guest Rooms	NO (-14%)	YES
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.8%)	YES
Guest Rooms	NO (-16.8%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-76%)	YES
Guest Rooms	NO (-27.8%)	YES
Guest Rooms	NO (-30.2%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-17.2%)	YES
Guest Rooms	NO (-17.3%)	YES
Guest Rooms	NO (-17.4%)	YES
Guest Rooms	NO (-20.9%)	YES
Guest Rooms	NO (-74.5%)	YES
Guest Rooms	NO (-34.4%)	YES
Guest Rooms	NO (-20.9%)	YES
Guest Rooms	NO (-84.1%)	YES
Guest Rooms	NO (-47.8%)	YES
Guest Rooms	NO (-47.8%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-22.5%)	YES
Guest Rooms	NO (-48%)	YES
Guest Rooms	NO (-48.2%)	YES
Guest Rooms	NO (-21%)	YES
Guest Rooms	NO (-21.1%)	YES
Guest Rooms	NO (-48.4%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-48.7%)	YES
Guest Rooms	NO (-48.8%)	YES
Guest Rooms	NO (-21.3%)	YES
Guest Rooms	NO (-21.7%)	YES
Guest Rooms	NO (-21.8%)	YES
Guest Rooms	NO (-48.9%)	YES
Guest Rooms	NO (-49.2%)	YES
Guest Rooms	NO (-22.3%)	YES
Guest Rooms	NO (-23.1%)	YES
Guest Rooms	NO (-49.9%)	YES
Guest Rooms	NO (-24.6%)	YES
Guest Rooms	NO (-50.9%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-27.9%)	YES
Guest Rooms	NO (-51.6%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-53.1%)	YES
Guest Rooms	NO (-55.3%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.2%)	YES
Guest Rooms	NO (-31.5%)	YES
Guest Rooms	NO (-31.8%)	YES
Guest Rooms	NO (-33.2%)	YES
Guest Rooms	NO (-24.9%)	YES
Guest Rooms	NO (-51.5%)	YES
Guest Rooms	NO (-51.1%)	YES
Guest Rooms	NO (-50.6%)	YES
Guest Rooms	NO (-49.2%)	YES
Guest Rooms	NO (-46.7%)	YES
Guest Rooms	NO (-39.3%)	YES

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	14459.6	14459.6
External area [m²]	10027	10027
Weather	MAN	MAN
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	4556.53	4512.32
Average U-value [W/m²K]	0.45	0.45
Alpha value* [%]	10.7	10

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
100	**Hotels**
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	5	4.63
Cooling	1.1	0.98
Auxiliary	9.1	12.3
Lighting	6.05	7.75
Hot water	66.99	70.63
Equipment*	17.34	17.34
TOTAL**	**88.23**	**96.29**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

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

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	64.9	62.63
Primary energy [kWh_{PE}/m²]	130.41	142.29
Total emissions [kg/m²]	12.01	13.09

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	43.7	86.5	4	9.2	14.9	3.07	2.6	3	3.75
	Notional	23	133.5	2.3	8	17	2.78	4.63	----	----
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	75.6	3.1	6.9	0.3	9.8	3.03	2.63	3	3.75
	Notional	66.2	5.3	6.6	0.3	14.3	2.78	4.63	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

MCFC-Hotel-Be-Green

As designed

Date: Tue Feb 21 14:20:43 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certifier details

Name: ME-Engineers

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.19

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.19

BRUKL compliance module version: v6.1.e.0

Foundation area [m^2]: 1464.42

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2annum$	13.23	
Building CO_2 emission rate (BER), $kgCO_2/m^2annum$	11.43	
Target primary energy rate (TPER), kWh_{PE}/m^2annum	143.83	
Building primary energy rate (BPER), kWh_{PE}/m^2annum	124.01	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.2	0.2	SP000000:Surf[2]
Floors	0.18	0.15	0.15	SP000000:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.15	0.15	SP000096:Surf[13]
Windows** and roof windows	1.6	1.34	1.34	SP000000:Surf[1]
Rooflights***	2.2	1.39	1.39	SP0000AA:Surf[1]
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

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

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

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

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

1- HVAC-Decentralized-Podium

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.2	5.2	0	1.5	0.85
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

2- HVAC-Decentralized

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.2	5.2	0	1.2	0.85
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

1- DHW-ASHP

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.2	-
Standard value	2*	N/A

* Standard shown is for all types except absorption and gas engine heat pumps.

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m^2]**
Standard value	95	80	0.3
Lift Lobby	100	85	1.588
Lift Lobby	100	85	1.588
Stair	100	-	-
Lift Lobby	100	85	1.588
Lift Lobby	100	85	1.588
Stair	100	-	-
Lift Lobby	100	85	1.588
Stair	100	-	-
Lobby	100	85	1.588
Lobby	100	85	1.588
Lobby	100	85	1.588
Stair	100	-	-
Lift Lobby	100	85	1.588
Lift Lobby	100	85	1.588

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Stair	100	-	-
Lift Lobby	100	85	1.588
Stair	100	-	-
Lobby	100	85	1.588
Lobby	100	85	1.588
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
City Square F&B	100	85	1.765
BOH Corridor	100	-	-
BOH Corridor	100	-	-
Front Office	100	-	-
Lift Lobby	100	85	1.588
Front Office	100	-	-
Lift Lobby	100	85	1.588
City Square F&B	100	85	1.765
City Square F&B	100	85	1.765
Laundry	100	-	-
Luggage Store	100	-	-
City Square F&B	100	85	1.765
Corridor	100	-	-
Corridor	100	-	-
P & R	100	85	1.765
City Square Corridor	100	-	-
City Square F&B	100	85	1.765
City Square Toilet	100	-	-
City Square Toilet	100	-	-
Lobby	100	85	1.588
Lobby	100	85	1.588
Lobby Toilets	100	-	-
Security	100	-	-
Lobby	100	85	1.588
All Day Dining	100	85	1.765
Corridor	100	-	-
Lobby	100	85	1.588
BOH	100	-	-
Staff Facilities	100	-	-
Corridor	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
MEP	100	-	-
Gym	100	-	-
Gym BOH	100	-	-
Office	100	-	-
Kitchen	100	-	-
Lift Lobby	100	85	1.588
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Presidential Suite	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
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Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
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Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
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Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
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Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
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Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
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Circulation	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Lift Lobby	YES (+18.1%)	NO
Lift Lobby	N/A	N/A
Lift Lobby	N/A	N/A
Lift Lobby	N/A	N/A
Lift Lobby	N/A	N/A
Lobby	N/A	N/A
Lobby	N/A	N/A
Lobby	YES (+116%)	NO
Lift Lobby	N/A	N/A
Lift Lobby	N/A	N/A
Lift Lobby	N/A	N/A
Lobby	N/A	N/A
Lobby	NO (-0.3%)	NO
City Square F&B	YES (+58.9%)	NO
BOH Corridor	N/A	N/A
BOH Corridor	N/A	N/A
Front Office	N/A	N/A
Lift Lobby	YES (+28.2%)	NO
Front Office	N/A	N/A
Lift Lobby	YES (+28.2%)	NO
City Square F&B	NO (-7.6%)	NO
City Square F&B	YES (+32.2%)	NO
Laundry	N/A	N/A
City Square F&B	YES (+55.6%)	NO
Corridor	YES (+5.5%)	NO
Corridor	YES (+79.5%)	NO
P & R	NO (-21.3%)	NO
City Square Corridor	YES (+98%)	NO
City Square F&B	YES (+13.2%)	NO
Lobby	YES (+84.6%)	NO
Lobby	N/A	N/A
Security	N/A	N/A
Lobby	YES (+41.4%)	NO
All Day Dining	YES (+69.4%)	NO
Corridor	NO (-94.7%)	NO
Lobby	NO (-24.6%)	NO
BOH	N/A	N/A
Staff Facilities	N/A	N/A
Corridor	N/A	N/A
MEP	N/A	N/A
Gym	YES (+23.8%)	NO
Gym BOH	YES (+32.2%)	NO
Office	YES (+34%)	NO
Kitchen	N/A	N/A
Lift Lobby	NO (-99.6%)	NO
Guest Rooms	NO (-31.1%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Presidential Suite	NO (-32.8%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-72.3%)	YES
Guestrooms	NO (-14.2%)	YES
Guestrooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.3%)	YES
Guestrooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.6%)	YES
Guest Rooms	NO (-14.7%)	YES
Guest Rooms	NO (-15.2%)	YES
Guest Rooms	NO (-17%)	YES
Guest Rooms	NO (-17.9%)	YES
Guest Rooms	NO (-81.2%)	YES
Guest Rooms	NO (-43.9%)	YES
Guest Rooms	NO (-47.3%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-16.9%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.7%)	YES
Guest Rooms	NO (-22.2%)	YES
Guest Rooms	NO (-74.6%)	YES
Guest Rooms	NO (-47.6%)	YES
Guest Rooms	NO (-21.4%)	YES
Guest Rooms	NO (-84.5%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.4%)	YES
Guest Rooms	NO (-49.5%)	YES
Guest Rooms	NO (-49.6%)	YES
Guest Rooms	NO (-49.7%)	YES
Guest Rooms	NO (-23.2%)	YES
Guest Rooms	NO (-49.9%)	YES
Guest Rooms	NO (-50%)	YES
Guest Rooms	NO (-22.7%)	YES
Guest Rooms	NO (-23.3%)	YES
Guest Rooms	NO (-50.6%)	YES
Guest Rooms	NO (-50.8%)	YES
Guest Rooms	NO (-51.5%)	YES
Guest Rooms	NO (-24.4%)	YES
Guest Rooms	NO (-24.9%)	YES
Guest Rooms	NO (-26.1%)	YES
Guest Rooms	NO (-51.6%)	YES
Guest Rooms	NO (-51.8%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-29.2%)	YES
Guest Rooms	NO (-31.2%)	YES
Guest Rooms	NO (-52.7%)	YES
Guest Rooms	NO (-35.9%)	YES
Guest Rooms	NO (-53.3%)	YES
Guest Rooms	NO (-52.8%)	YES
Guest Rooms	NO (-39.6%)	YES
Guest Rooms	NO (-55.2%)	YES
Guest Rooms	NO (-52.8%)	YES
Guest Rooms	NO (-55.8%)	YES
Guest Rooms	NO (-56.4%)	YES
Guest Rooms	NO (-79.6%)	YES
Guestrooms	NO (-32.9%)	YES
Guestrooms	NO (-33.2%)	YES
Guest Rooms	NO (-33.3%)	YES
Guest Rooms	NO (-34.7%)	YES
Guest Rooms	NO (-35.7%)	YES
Guest Rooms	NO (-36.9%)	YES
Guest Rooms	NO (-38.4%)	YES
Guest Rooms	NO (-41.6%)	YES
Guest Rooms	NO (-44.9%)	YES
Guestrooms	NO (-14%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-75.6%)	YES
Guest Rooms	NO (-24.9%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-24.9%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-17.1%)	YES
Guest Rooms	NO (-17.1%)	YES
Guest Rooms	NO (-17.1%)	YES
Guest Rooms	NO (-17.3%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14%)	YES
Guest Rooms	NO (-14%)	YES
Guest Rooms	NO (-14%)	YES
Guest Rooms	NO (-14%)	YES
Guestrooms	NO (-14%)	YES
Guest Rooms	NO (-14%)	YES
Guestrooms	NO (-30.9%)	YES
Guest Rooms	NO (-32.3%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guestrooms	NO (-37%)	YES
Guest Rooms	NO (-72.3%)	YES
Guestrooms	NO (-14.2%)	YES
Guestrooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.2%)	YES
Guestrooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.7%)	YES
Guest Rooms	NO (-15.2%)	YES
Guest Rooms	NO (-17%)	YES
Guest Rooms	NO (-17.9%)	YES
Guest Rooms	NO (-80.8%)	YES
Guest Rooms	NO (-43.7%)	YES
Guest Rooms	NO (-46%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-16.9%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.7%)	YES
Guest Rooms	NO (-22.1%)	YES
Guest Rooms	NO (-74.6%)	YES
Guest Rooms	NO (-47%)	YES
Guest Rooms	NO (-21.3%)	YES
Guest Rooms	NO (-84.5%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.4%)	YES
Guest Rooms	NO (-49.5%)	YES
Guest Rooms	NO (-23.1%)	YES
Guest Rooms	NO (-49.7%)	YES
Guest Rooms	NO (-49.9%)	YES
Guest Rooms	NO (-22.3%)	YES
Guest Rooms	NO (-22.6%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-50.6%)	YES
Guest Rooms	NO (-50.8%)	YES
Guest Rooms	NO (-23.9%)	YES
Guest Rooms	NO (-24.6%)	YES
Guest Rooms	NO (-25.3%)	YES
Guest Rooms	NO (-51.5%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-51.7%)	YES
Guest Rooms	NO (-28.3%)	YES
Guest Rooms	NO (-30.9%)	YES
Guest Rooms	NO (-52.3%)	YES
Guest Rooms	NO (-34.6%)	YES
Guest Rooms	NO (-53%)	YES
Guest Rooms	NO (-52.6%)	YES
Guest Rooms	NO (-39.4%)	YES
Guest Rooms	NO (-54.9%)	YES
Guest Rooms	NO (-52.7%)	YES
Guest Rooms	NO (-55.7%)	YES
Guest Rooms	NO (-56.4%)	YES
Guest Rooms	NO (-79.5%)	YES
Guestrooms	NO (-32.8%)	YES
Guestrooms	NO (-33.2%)	YES
Guest Rooms	NO (-32.7%)	YES
Guest Rooms	NO (-33.7%)	YES
Guest Rooms	NO (-34.5%)	YES
Guest Rooms	NO (-35.8%)	YES
Guest Rooms	NO (-37%)	YES
Guest Rooms	NO (-40.5%)	YES
Guest Rooms	NO (-43.7%)	YES
Guest Rooms	NO (-72.3%)	YES
Guestrooms	NO (-14.1%)	YES
Guestrooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.2%)	YES
Guestrooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.6%)	YES
Guest Rooms	NO (-15.1%)	YES
Guest Rooms	NO (-17%)	YES
Guest Rooms	NO (-17.9%)	YES
Guest Rooms	NO (-79.8%)	YES
Guest Rooms	NO (-43%)	YES
Guest Rooms	NO (-44.5%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.8%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-21.9%)	YES
Guest Rooms	NO (-74.6%)	YES
Guest Rooms	NO (-45.7%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-21.1%)	YES
Guest Rooms	NO (-84.3%)	YES
Guest Rooms	NO (-48.9%)	YES
Guest Rooms	NO (-49.1%)	YES
Guest Rooms	NO (-49.2%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-22.9%)	YES
Guest Rooms	NO (-49.5%)	YES
Guest Rooms	NO (-49.7%)	YES
Guest Rooms	NO (-22%)	YES
Guest Rooms	NO (-22.2%)	YES
Guest Rooms	NO (-49.9%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-50.7%)	YES
Guest Rooms	NO (-23.1%)	YES
Guest Rooms	NO (-23.9%)	YES
Guest Rooms	NO (-24.6%)	YES
Guest Rooms	NO (-50.8%)	YES
Guest Rooms	NO (-51.3%)	YES
Guest Rooms	NO (-27%)	YES
Guest Rooms	NO (-29.9%)	YES
Guest Rooms	NO (-52.1%)	YES
Guest Rooms	NO (-33.2%)	YES
Guest Rooms	NO (-52.7%)	YES
Guest Rooms	NO (-52%)	YES
Guest Rooms	NO (-38.7%)	YES
Guest Rooms	NO (-54.5%)	YES
Guest Rooms	NO (-52.6%)	YES
Guest Rooms	NO (-55.4%)	YES
Guest Rooms	NO (-56.3%)	YES
Guest Rooms	NO (-79.5%)	YES
Guestrooms	NO (-32.7%)	YES
Guestrooms	NO (-33.1%)	YES
Guest Rooms	NO (-32.5%)	YES
Guest Rooms	NO (-32.7%)	YES
Guest Rooms	NO (-33.5%)	YES
Guest Rooms	NO (-34.2%)	YES
Guest Rooms	NO (-35.7%)	YES
Guest Rooms	NO (-38.5%)	YES
Guest Rooms	NO (-42%)	YES
Guest Rooms	NO (-72.2%)	YES
Guestrooms	NO (-14.1%)	YES
Guestrooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.1%)	YES
Guestrooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.3%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-15.1%)	YES
Guest Rooms	NO (-17%)	YES
Guest Rooms	NO (-17.8%)	YES
Guest Rooms	NO (-78.7%)	YES
Guest Rooms	NO (-40%)	YES
Guest Rooms	NO (-43.6%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-17.4%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-21.5%)	YES
Guest Rooms	NO (-74.6%)	YES
Guest Rooms	NO (-43.8%)	YES
Guest Rooms	NO (-21.1%)	YES
Guest Rooms	NO (-84.1%)	YES
Guest Rooms	NO (-48%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-48.6%)	YES
Guest Rooms	NO (-48.8%)	YES
Guest Rooms	NO (-49%)	YES
Guest Rooms	NO (-22.7%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.5%)	YES
Guest Rooms	NO (-21.6%)	YES
Guest Rooms	NO (-21.8%)	YES
Guest Rooms	NO (-49.6%)	YES
Guest Rooms	NO (-50.1%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-22.5%)	YES
Guest Rooms	NO (-23.1%)	YES
Guest Rooms	NO (-23.7%)	YES
Guest Rooms	NO (-50.6%)	YES
Guest Rooms	NO (-50.8%)	YES
Guest Rooms	NO (-25.6%)	YES
Guest Rooms	NO (-27.7%)	YES
Guest Rooms	NO (-51.4%)	YES
Guest Rooms	NO (-31.2%)	YES
Guest Rooms	NO (-52.2%)	YES
Guest Rooms	NO (-51.8%)	YES
Guest Rooms	NO (-36.5%)	YES
Guest Rooms	NO (-53.6%)	YES
Guest Rooms	NO (-52.2%)	YES
Guest Rooms	NO (-55.2%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-56.1%)	YES
Guest Rooms	NO (-79.4%)	YES
Guestrooms	NO (-32.4%)	YES
Guestrooms	NO (-32.8%)	YES
Guest Rooms	NO (-32.4%)	YES
Guest Rooms	NO (-32.4%)	YES
Guest Rooms	NO (-32.5%)	YES
Guest Rooms	NO (-32.9%)	YES
Guest Rooms	NO (-33.8%)	YES
Guest Rooms	NO (-36%)	YES
Guest Rooms	NO (-40%)	YES
Guest Rooms	NO (-72.2%)	YES
Guestrooms	NO (-14%)	YES
Guestrooms	NO (-14%)	YES
Guest Rooms	NO (-14.1%)	YES
Guestrooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-15%)	YES
Guest Rooms	NO (-16.9%)	YES
Guest Rooms	NO (-16.9%)	YES
Guest Rooms	NO (-17.7%)	YES
Guest Rooms	NO (-77.6%)	YES
Guest Rooms	NO (-34.4%)	YES
Guest Rooms	NO (-40%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-17.4%)	YES
Guest Rooms	NO (-17.4%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-21.4%)	YES
Guest Rooms	NO (-74.5%)	YES
Guest Rooms	NO (-40.6%)	YES
Guest Rooms	NO (-21%)	YES
Guest Rooms	NO (-84.1%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-48.2%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-22.7%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-48.6%)	YES
Guest Rooms	NO (-21.4%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-21.4%)	YES
Guest Rooms	NO (-48.9%)	YES
Guest Rooms	NO (-49.4%)	YES
Guest Rooms	NO (-49.7%)	YES
Guest Rooms	NO (-21.6%)	YES
Guest Rooms	NO (-22.1%)	YES
Guest Rooms	NO (-22.6%)	YES
Guest Rooms	NO (-50.1%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-24%)	YES
Guest Rooms	NO (-25.4%)	YES
Guest Rooms	NO (-51%)	YES
Guest Rooms	NO (-28.2%)	YES
Guest Rooms	NO (-51.7%)	YES
Guest Rooms	NO (-51.1%)	YES
Guest Rooms	NO (-33%)	YES
Guest Rooms	NO (-52.9%)	YES
Guest Rooms	NO (-51.2%)	YES
Guest Rooms	NO (-54.4%)	YES
Guest Rooms	NO (-55.8%)	YES
Guest Rooms	NO (-79.2%)	YES
Guestrooms	NO (-31.7%)	YES
Guestrooms	NO (-32.1%)	YES
Guest Rooms	NO (-31.8%)	YES
Guest Rooms	NO (-32%)	YES
Guest Rooms	NO (-32.1%)	YES
Guest Rooms	NO (-32.3%)	YES
Guest Rooms	NO (-32.5%)	YES
Guest Rooms	NO (-33.3%)	YES
Guest Rooms	NO (-36.7%)	YES
Guest Rooms	NO (-14%)	YES
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.8%)	YES
Guest Rooms	NO (-16.8%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-76%)	YES
Guest Rooms	NO (-27.8%)	YES
Guest Rooms	NO (-30.2%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-17.2%)	YES
Guest Rooms	NO (-17.3%)	YES
Guest Rooms	NO (-17.4%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-20.9%)	YES
Guest Rooms	NO (-74.5%)	YES
Guest Rooms	NO (-34.4%)	YES
Guest Rooms	NO (-20.9%)	YES
Guest Rooms	NO (-84.1%)	YES
Guest Rooms	NO (-47.8%)	YES
Guest Rooms	NO (-47.8%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-22.5%)	YES
Guest Rooms	NO (-48%)	YES
Guest Rooms	NO (-48.2%)	YES
Guest Rooms	NO (-21%)	YES
Guest Rooms	NO (-21.1%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-48.7%)	YES
Guest Rooms	NO (-48.8%)	YES
Guest Rooms	NO (-21.3%)	YES
Guest Rooms	NO (-21.7%)	YES
Guest Rooms	NO (-21.8%)	YES
Guest Rooms	NO (-48.9%)	YES
Guest Rooms	NO (-49.2%)	YES
Guest Rooms	NO (-48.9%)	YES
Guest Rooms	NO (-49.2%)	YES
Guest Rooms	NO (-22.3%)	YES
Guest Rooms	NO (-23.1%)	YES
Guest Rooms	NO (-49.9%)	YES
Guest Rooms	NO (-24.6%)	YES
Guest Rooms	NO (-50.9%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-27.9%)	YES
Guest Rooms	NO (-51.6%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-53.1%)	YES
Guest Rooms	NO (-55.3%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.2%)	YES
Guest Rooms	NO (-31.5%)	YES
Guest Rooms	NO (-31.8%)	YES
Guest Rooms	NO (-33.2%)	YES
Guest Rooms	NO (-24.9%)	YES
Guest Rooms	NO (-51.5%)	YES
Guest Rooms	NO (-51.1%)	YES
Guest Rooms	NO (-50.6%)	YES
Guest Rooms	NO (-49.2%)	YES
Guest Rooms	NO (-46.7%)	YES
Guest Rooms	NO (-39.3%)	YES

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	73.8	3.2	4.8	0.2	9.8	4.24	3.65	4.2	5.2
	Notional	64.6	5.4	6.5	0.3	14.3	2.78	4.63	----	----
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	71.7	59.4	4.6	4.6	16.5	4.29	3.61	4.2	5.2
	Notional	36.1	86.6	3.6	5.2	17.6	2.78	4.63	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

MCFC North Stand-BREEAM Combined — As designed

Date: Wed Feb 22 06:46:56 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certifier details

Name: ME-Engineers

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.19

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.19

BRUKL compliance module version: v6.1.e.0

Foundation area [m^2]: 1434.13

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	3.68	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	2.76	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	39.96	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	29.72	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.2	0.2	FF000000:Surf[1]
Floors	0.18	0.15	0.15	FT000002:Surf[14]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.15	0.15	FF000002:Surf[16]
Windows** and roof windows	1.6	1.21	1.24	FF000000:Surf[0]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	1.43	1.43	SP00003A:Surf[4]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

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

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	3.03

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

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

1- HVAC-Decentralized

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.2	5.2	0	1.5	0.85
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

1- DHW-Instantaneous at point of use

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	N/A

2- HVAC-DHW-ASHP

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.2	0.005
Standard value	2*	N/A

* Standard shown is for all types except absorption and gas engine heat pumps.

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m^2]**
Standard value	95	80	0.3
Office	100	-	-
Office	100	-	-
Office	100	-	-
Office	100	-	-
Office	100	-	-
First Aid	100	-	-
WC	100	-	-
WC	100	-	-
Football Exprience	100	-	-
Museum	100	85	2.329
WCs	100	-	-
Circulation	100	-	-
Storage	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Lift Lobby	100	-	-
Plantroom	100	-	-
Lobby	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Storage	100	-	-
Lobby	100	-	-
Retail	100	85	1.765
Storage	100	-	-
Retail offices	100	-	-
Storage	100	-	-
Bars	100	-	-
Office	100	-	-
Circulation	100	-	-
Corridor	100	-	-
Bars	100	-	-
WCs	100	-	-
Cloakroom	100	-	-
WCs	100	-	-
Circulation	100	-	-
Cloakroom	100	-	-
Plant Mezzanine	100	-	-
Corridor	100	-	-
Support Kitchen	100	-	-
Circulation	100	-	-
Support Storage	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Office	100	-	-
HV Dist./ENW&HV	100	-	-
Toilets	100	-	-
Stairs	100	-	-
LV Distribution	100	-	-
WCs	100	-	-
WCs	100	-	-
Football Exprience	100	-	-
WCs	100	-	-
WCs	100	-	-
Bridge	100	-	-
BOH	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Toilets	100	-	-
Concession	100	-	-
BOH	100	-	-
BOH	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Concession	100	-	-
Concession	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Toilets	100	-	-
LIft Lobby	100	-	-
LIft Lobby	100	-	-
LIft Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Storage	100	-	-
Concourse	100	-	-
Storage	100	-	-
Concourse	100	-	-
Office	100	-	-
Players Club	100	-	-
Concourse	100	-	-
WCs	100	-	-
Bars	100	-	-
Stairs	100	-	-
Lobby	100	-	-
BOH	100	-	-
BOH	100	-	-
Bars	100	-	-
Support Kitchen	100	-	-
Concourse	100	-	-
WCs	100	-	-
City Kitchen	100	-	-
WCs	100	-	-
City Kitchen	100	-	-
WCs	100	-	-
Bars	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Hotel Suites	100	-	-
Hotel Suites	100	-	-
Hotel Suites	100	-	-
Hotel Suites	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Support Kitchen	100	-	-
Lift Lobby	100	-	-
WCs	100	-	-
VIP	100	-	-
Pantry	100	-	-
Cleaners Cupboard	100	-	-
Office	100	-	-
Lift Lobby	100	-	-
Sky Bar	100	-	-
Corridor	100	-	-
WCs	100	-	-
Circulation	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-
Stair	100	-	-
Storage	100	-	-
Plant	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Corridor	100	-	-
Lobby	100	-	-
BOH	100	-	-
BOH	100	-	-
Corridor	100	-	-
Corridor	100	-	-
Concession	100	-	-
Concession	100	-	-
Concession	100	-	-
Toilets	100	-	-
Toilets	100	-	-
BOH	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Toilets	100	-	-
BOH	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Bars	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Reception	100	-	-
Toilets	100	-	-
Toilets	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Corridor	100	-	-
Corridor	100	-	-
Stairs	100	-	-
Corridor	100	-	-
LIft Lobby	100	-	-
LIft Lobby	100	-	-
LIft Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
Concource	100	-	-
BOH	100	-	-
BOH	100	-	-
Lobby	100	-	-
Stairs	100	-	-
Storage	100	-	-
Storage	100	-	-
Bars	100	-	-
Storage	100	-	-
Storage	100	-	-
WCs	100	-	-
Keg Room	100	-	-
WCs	100	-	-
Keg Room	100	-	-
WCs	100	-	-
City Bar	100	-	-
WCs	100	-	-
City Bar	100	-	-
WCs	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Hotel Suites	100	-	-
Corridor	100	-	-
Cleaners Cupboard	100	-	-
Pantry	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Lift Lobby	100	-	-
WCs	100	-	-
Lift Lobby	100	-	-
Set up	100	-	-
TV Studio	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Lift Lobby	100	-	-
Support Storage	100	-	-
Cleaners Cupboard	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Corridor	100	-	-
Corridor	100	-	-
Lift Lobby	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Prayer Room	100	-	-
Lift Lobby	100	-	-
Lift Lobby	100	-	-
Stair	100	-	-
Plant	100	-	-
Lift Lobby	100	-	-
Stair	100	-	-
Stair	100	-	-
Stair	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Lobby	100	-	-
Stair	100	-	-
Stair	100	-	-
Stair	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stair	100	-	-
Stair	100	-	-
Stairs	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Stairs	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stair	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Stair	100	-	-
Lobby	100	-	-
Stair	100	-	-
Stairs	100	-	-
Lobby	100	-	-
Stair	100	-	-
Stair	100	-	-
Stairs	100	-	-
Stairs	100	-	-
Stair	100	-	-
WCs	100	-	-
Stair	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
Kitchen	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
WCs	100	-	-
Wire & Sky	100	-	-
City Hall	100	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Office	NO (-71.9%)	YES
Office	NO (-57.3%)	YES
Office	NO (-70.9%)	YES
Office	NO (-57.5%)	YES
Office	NO (-54.4%)	YES
First Aid	N/A	N/A
Football Exprience	YES (+12.3%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Museum	NO (-27.6%)	NO
Circulation	YES (+107.9%)	NO
Lobby	N/A	N/A
Lobby	YES (+157.2%)	NO
Retail	YES (+2.1%)	NO
Retail offices	YES (+97.8%)	NO
Bars	NO (-27.6%)	NO
Office	NO (-57.8%)	YES
Bars	NO (-21.9%)	NO
Cloakroom	N/A	N/A
Support Kitchen	N/A	N/A
Office	NO (-64.5%)	YES
Stairs	N/A	N/A
Football Exprience	YES (+132.3%)	NO
Bridge	NO (-100%)	NO
Concession	N/A	N/A
Concession	N/A	N/A
Concession	N/A	N/A
Concourse	YES (+136.7%)	NO
Office	YES (+7.5%)	NO
Players Club	N/A	N/A
Concourse	YES (+114.8%)	NO
Bars	N/A	N/A
Bars	N/A	N/A
Bars	N/A	N/A
Support Kitchen	N/A	N/A
Concourse	YES (+31.7%)	NO
City Kitchen	N/A	N/A
City Kitchen	N/A	N/A
Bars	N/A	N/A
Hotel Suites	N/A	N/A
Hotel Suites	N/A	N/A
Hotel Suites	N/A	N/A
Hotel Suites	N/A	N/A
Support Kitchen	N/A	N/A
VIP	N/A	N/A
Office	NO (-72.1%)	YES
Sky Bar	YES (+29.3%)	NO
Concession	N/A	N/A
Concession	N/A	N/A
Concession	N/A	N/A
Bars	N/A	N/A
Reception	YES (+150.1%)	NO
Circulation	NO (-99.8%)	NO
Circulation	N/A	N/A
Concource	N/A	N/A
Bars	N/A	N/A
City Bar	N/A	N/A
City Bar	N/A	N/A
Hotel Suites	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Set up	N/A	N/A
TV Studio	N/A	N/A
Prayer Room	N/A	N/A
Stair	YES (+109.1%)	NO
Stair	N/A	N/A
Stair	N/A	N/A
Stairs	YES (+171.2%)	NO
Stairs	N/A	N/A
Lobby	YES (+155.8%)	NO
Stair	YES (+153%)	NO
Stair	N/A	N/A
Stair	N/A	N/A
Stairs	N/A	N/A
Stairs	N/A	N/A
Stair	N/A	N/A
Stair	N/A	N/A
Stairs	N/A	N/A
Stairs	N/A	N/A
Stairs	N/A	N/A
Stairs	N/A	N/A
Stair	YES (+158.1%)	NO
Circulation	YES (+159.3%)	NO
Circulation	YES (+177.7%)	NO
Stair	YES (+175.4%)	NO
Lobby	YES (+97.8%)	NO
Stair	YES (+96.7%)	NO
Stairs	N/A	N/A
Lobby	N/A	N/A
Stair	N/A	N/A
Stair	N/A	N/A
Stairs	N/A	N/A
Stairs	N/A	N/A
Stair	N/A	N/A
Kitchen	N/A	N/A
Wire & Sky	YES (+188.4%)	NO
City Hall	NO (-63.6%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	24124.1	24124.1
External area [m²]	30192.7	30192.7
Weather	MAN	MAN
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	10111	10217.3
Average U-value [W/m²K]	0.33	0.34
Alpha value* [%]	10.28	10

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

Building Use

% Area	Building Type
3	**Retail/Financial and Professional Services**
	Restaurants and Cafes/Drinking Establishments/Takeaways
28	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
2	**Hotels**
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
6	**Non-residential Institutions: Libraries, Museums, and Galleries**
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
62	**General Assembly and Leisure, Night Clubs, and Theatres**
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	1.74	1.64
Cooling	1.39	1.56
Auxiliary	4.06	5.81
Lighting	8.15	8.77
Hot water	9.36	9.26
Equipment*	50.24	50.24
TOTAL**	**24.69**	**27.04**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	4.57	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*4.57*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	46.85	42.44
Primary energy [kWh_{PE}/m²]	29.72	39.96
Total emissions [kg/m²]	2.76	3.68

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	56.5	42	3.7	2.9	7.5	4.29	4	4.2	5.2
	Notional	34.5	54.8	3.4	3.3	9.2	2.78	4.63	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

MCFC-Hotel-Be-BREEAM Hotel

As designed

Date: Wed Feb 22 07:27:03 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certifier details

Name: ME-Engineers
Telephone number: Phone
Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache
Calculation engine version: 7.0.19
Interface to calculation engine: IES Virtual Environment
Interface to calculation engine version: 7.0.19
BRUKL compliance module version: v6.1.e.0

Foundation area [m^2]: 1224.21

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	13.09	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	11.12	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	142.29	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	120.56	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.2	0.2	SP000000:Surf[2]
Floors	0.18	0.15	0.15	SP000000:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.15	0.15	SP000099:Surf[1]
Windows** and roof windows	1.6	1.34	1.34	SP000000:Surf[1]
Rooflights***	2.2	1.39	1.39	SP0000AA:Surf[1]
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.
^ For fire doors, limiting U-value is 1.8 W/m^2K

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

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

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

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

1- HVAC-Decentralized-Podium

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.2	5.2	0	1.5	0.85
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

2- HVAC-Decentralized

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.2	5.2	0	1.2	0.85
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

1- DHW-ASHP

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.2	-
Standard value	2*	N/A

* Standard shown is for all types except absorption and gas engine heat pumps.

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m^2]**
Standard value	95	80	0.3
Lift Lobby	100	85	1.588
Lift Lobby	100	85	1.588
Stair	100	-	-
Lift Lobby	100	85	1.588
Lift Lobby	100	85	1.588
Stair	100	-	-
Lift Lobby	100	85	1.588
Stair	100	-	-
Lobby	100	85	1.588
Lobby	100	85	1.588
Lobby	100	85	1.588
Stair	100	-	-
Lift Lobby	100	85	1.588
Lift Lobby	100	85	1.588

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Stair	100	-	-
Lift Lobby	100	85	1.588
Stair	100	-	-
Lobby	100	85	1.588
Lobby	100	85	1.588
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
BOH Corridor	100	-	-
BOH Corridor	100	-	-
Front Office	100	-	-
Lift Lobby	100	85	1.588
Laundry	100	-	-
Luggage Store	100	-	-
Corridor	100	-	-
Corridor	100	-	-
City Square Corridor	100	-	-
City Square Toilet	100	-	-
City Square Toilet	100	-	-
Lobby	100	85	1.588
Lobby	100	85	1.588
Lobby Toilets	100	-	-
Security	100	-	-
Lobby	100	85	1.588
Corridor	100	-	-
Lobby	100	85	1.588
BOH	100	-	-
Staff Facilities	100	-	-
Corridor	100	-	-
MEP	100	-	-
Gym	100	-	-
Gym BOH	100	-	-
Office	100	-	-
Kitchen	100	-	-
Lift Lobby	100	85	1.588
Circulation	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Presidential Suite	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Guestrooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
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Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
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General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
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Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guestrooms	100	-	-
Guestrooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Circulation	100	-	-
Stairs	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Circulation	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
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Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-
Guest Rooms	100	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Lift Lobby	YES (+18.1%)	NO
Lift Lobby	N/A	N/A
Lift Lobby	N/A	N/A
Lift Lobby	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Lift Lobby	N/A	N/A
Lobby	N/A	N/A
Lobby	N/A	N/A
Lobby	YES (+116%)	NO
Lift Lobby	N/A	N/A
Lift Lobby	N/A	N/A
Lift Lobby	N/A	N/A
Lobby	N/A	N/A
Lobby	NO (-0.3%)	NO
BOH Corridor	N/A	N/A
BOH Corridor	N/A	N/A
Front Office	N/A	N/A
Lift Lobby	YES (+28.2%)	NO
Laundry	N/A	N/A
Corridor	YES (+5.5%)	NO
Corridor	YES (+79.5%)	NO
City Square Corridor	YES (+98%)	NO
Lobby	YES (+84.6%)	NO
Lobby	N/A	N/A
Security	N/A	N/A
Lobby	YES (+41.4%)	NO
Corridor	NO (-94.7%)	NO
Lobby	NO (-24.6%)	NO
BOH	N/A	N/A
Staff Facilities	N/A	N/A
Corridor	N/A	N/A
MEP	N/A	N/A
Gym	YES (+23.8%)	NO
Gym BOH	YES (+32.2%)	NO
Office	YES (+34%)	NO
Kitchen	N/A	N/A
Lift Lobby	N/A	N/A
Guest Rooms	NO (-31.1%)	YES
Presidential Suite	NO (-32.8%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-72.3%)	YES
Guestrooms	NO (-14.2%)	YES
Guestrooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.3%)	YES
Guestrooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.6%)	YES
Guest Rooms	NO (-14.7%)	YES
Guest Rooms	NO (-15.2%)	YES
Guest Rooms	NO (-17%)	YES
Guest Rooms	NO (-17.9%)	YES
Guest Rooms	NO (-81.2%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-43.9%)	YES
Guest Rooms	NO (-47.3%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-16.9%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.7%)	YES
Guest Rooms	NO (-22.2%)	YES
Guest Rooms	NO (-74.6%)	YES
Guest Rooms	NO (-47.6%)	YES
Guest Rooms	NO (-21.4%)	YES
Guest Rooms	NO (-84.5%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.4%)	YES
Guest Rooms	NO (-49.5%)	YES
Guest Rooms	NO (-49.6%)	YES
Guest Rooms	NO (-49.7%)	YES
Guest Rooms	NO (-23.2%)	YES
Guest Rooms	NO (-49.9%)	YES
Guest Rooms	NO (-50%)	YES
Guest Rooms	NO (-22.7%)	YES
Guest Rooms	NO (-23.3%)	YES
Guest Rooms	NO (-50.6%)	YES
Guest Rooms	NO (-50.8%)	YES
Guest Rooms	NO (-51.5%)	YES
Guest Rooms	NO (-24.4%)	YES
Guest Rooms	NO (-24.9%)	YES
Guest Rooms	NO (-26.1%)	YES
Guest Rooms	NO (-51.6%)	YES
Guest Rooms	NO (-51.8%)	YES
Guest Rooms	NO (-29.2%)	YES
Guest Rooms	NO (-31.2%)	YES
Guest Rooms	NO (-52.7%)	YES
Guest Rooms	NO (-35.9%)	YES
Guest Rooms	NO (-53.3%)	YES
Guest Rooms	NO (-52.8%)	YES
Guest Rooms	NO (-39.6%)	YES
Guest Rooms	NO (-55.2%)	YES
Guest Rooms	NO (-52.8%)	YES
Guest Rooms	NO (-55.8%)	YES
Guest Rooms	NO (-56.4%)	YES
Guest Rooms	NO (-79.6%)	YES
Guestrooms	NO (-32.9%)	YES
Guestrooms	NO (-33.2%)	YES
Guest Rooms	NO (-33.3%)	YES
Guest Rooms	NO (-34.7%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-33.7%)	YES
Guest Rooms	NO (-34.5%)	YES
Guest Rooms	NO (-35.8%)	YES
Guest Rooms	NO (-37%)	YES
Guest Rooms	NO (-40.5%)	YES
Guest Rooms	NO (-43.7%)	YES
Guest Rooms	NO (-72.3%)	YES
Guestrooms	NO (-14.1%)	YES
Guestrooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.2%)	YES
Guestrooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.6%)	YES
Guest Rooms	NO (-15.1%)	YES
Guest Rooms	NO (-17%)	YES
Guest Rooms	NO (-17.9%)	YES
Guest Rooms	NO (-79.8%)	YES
Guest Rooms	NO (-43%)	YES
Guest Rooms	NO (-44.5%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.8%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.8%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-21.9%)	YES
Guest Rooms	NO (-74.6%)	YES
Guest Rooms	NO (-45.7%)	YES
Guest Rooms	NO (-21.1%)	YES
Guest Rooms	NO (-84.3%)	YES
Guest Rooms	NO (-48.9%)	YES
Guest Rooms	NO (-49.1%)	YES
Guest Rooms	NO (-49.2%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-22.9%)	YES
Guest Rooms	NO (-49.5%)	YES
Guest Rooms	NO (-49.7%)	YES
Guest Rooms	NO (-22%)	YES
Guest Rooms	NO (-22.2%)	YES
Guest Rooms	NO (-49.9%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-50.7%)	YES
Guest Rooms	NO (-23.1%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-23.9%)	YES
Guest Rooms	NO (-24.6%)	YES
Guest Rooms	NO (-50.8%)	YES
Guest Rooms	NO (-51.3%)	YES
Guest Rooms	NO (-27%)	YES
Guest Rooms	NO (-29.9%)	YES
Guest Rooms	NO (-52.1%)	YES
Guest Rooms	NO (-33.2%)	YES
Guest Rooms	NO (-52.7%)	YES
Guest Rooms	NO (-52%)	YES
Guest Rooms	NO (-38.7%)	YES
Guest Rooms	NO (-54.5%)	YES
Guest Rooms	NO (-52.6%)	YES
Guest Rooms	NO (-55.4%)	YES
Guest Rooms	NO (-56.3%)	YES
Guest Rooms	NO (-79.5%)	YES
Guestrooms	NO (-32.7%)	YES
Guestrooms	NO (-33.1%)	YES
Guest Rooms	NO (-32.5%)	YES
Guest Rooms	NO (-32.7%)	YES
Guest Rooms	NO (-33.5%)	YES
Guest Rooms	NO (-34.2%)	YES
Guest Rooms	NO (-35.7%)	YES
Guest Rooms	NO (-38.5%)	YES
Guest Rooms	NO (-42%)	YES
Guest Rooms	NO (-72.2%)	YES
Guestrooms	NO (-14.1%)	YES
Guestrooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.1%)	YES
Guestrooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-15.1%)	YES
Guest Rooms	NO (-17%)	YES
Guest Rooms	NO (-17.8%)	YES
Guest Rooms	NO (-78.7%)	YES
Guest Rooms	NO (-40%)	YES
Guest Rooms	NO (-43.6%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-17.4%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-33.7%)	YES
Guest Rooms	NO (-34.5%)	YES
Guest Rooms	NO (-35.8%)	YES
Guest Rooms	NO (-37%)	YES
Guest Rooms	NO (-40.5%)	YES
Guest Rooms	NO (-43.7%)	YES
Guest Rooms	NO (-72.3%)	YES
Guestrooms	NO (-14.1%)	YES
Guestrooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.2%)	YES
Guestrooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-14.6%)	YES
Guest Rooms	NO (-15.1%)	YES
Guest Rooms	NO (-17%)	YES
Guest Rooms	NO (-17.9%)	YES
Guest Rooms	NO (-79.8%)	YES
Guest Rooms	NO (-43%)	YES
Guest Rooms	NO (-44.5%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.8%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.8%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-21.9%)	YES
Guest Rooms	NO (-74.6%)	YES
Guest Rooms	NO (-45.7%)	YES
Guest Rooms	NO (-21.1%)	YES
Guest Rooms	NO (-84.3%)	YES
Guest Rooms	NO (-48.9%)	YES
Guest Rooms	NO (-49.1%)	YES
Guest Rooms	NO (-49.2%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-22.9%)	YES
Guest Rooms	NO (-49.5%)	YES
Guest Rooms	NO (-49.7%)	YES
Guest Rooms	NO (-22%)	YES
Guest Rooms	NO (-22.2%)	YES
Guest Rooms	NO (-49.9%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-50.7%)	YES
Guest Rooms	NO (-23.1%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-23.9%)	YES
Guest Rooms	NO (-24.6%)	YES
Guest Rooms	NO (-50.8%)	YES
Guest Rooms	NO (-51.3%)	YES
Guest Rooms	NO (-27%)	YES
Guest Rooms	NO (-29.9%)	YES
Guest Rooms	NO (-52.1%)	YES
Guest Rooms	NO (-33.2%)	YES
Guest Rooms	NO (-52.7%)	YES
Guest Rooms	NO (-52%)	YES
Guest Rooms	NO (-38.7%)	YES
Guest Rooms	NO (-54.5%)	YES
Guest Rooms	NO (-52.6%)	YES
Guest Rooms	NO (-55.4%)	YES
Guest Rooms	NO (-56.3%)	YES
Guest Rooms	NO (-79.5%)	YES
Guestrooms	NO (-32.7%)	YES
Guestrooms	NO (-33.1%)	YES
Guest Rooms	NO (-32.5%)	YES
Guest Rooms	NO (-32.7%)	YES
Guest Rooms	NO (-33.5%)	YES
Guest Rooms	NO (-34.2%)	YES
Guest Rooms	NO (-35.7%)	YES
Guest Rooms	NO (-38.5%)	YES
Guest Rooms	NO (-42%)	YES
Guest Rooms	NO (-72.2%)	YES
Guestrooms	NO (-14.1%)	YES
Guestrooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.1%)	YES
Guestrooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.4%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-15.1%)	YES
Guest Rooms	NO (-17%)	YES
Guest Rooms	NO (-17.8%)	YES
Guest Rooms	NO (-78.7%)	YES
Guest Rooms	NO (-40%)	YES
Guest Rooms	NO (-43.6%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-16.6%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-17.4%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-17.6%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-21.5%)	YES
Guest Rooms	NO (-74.6%)	YES
Guest Rooms	NO (-43.8%)	YES
Guest Rooms	NO (-21.1%)	YES
Guest Rooms	NO (-84.1%)	YES
Guest Rooms	NO (-48%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-48.6%)	YES
Guest Rooms	NO (-48.8%)	YES
Guest Rooms	NO (-49%)	YES
Guest Rooms	NO (-22.7%)	YES
Guest Rooms	NO (-49.3%)	YES
Guest Rooms	NO (-49.5%)	YES
Guest Rooms	NO (-21.6%)	YES
Guest Rooms	NO (-21.8%)	YES
Guest Rooms	NO (-49.6%)	YES
Guest Rooms	NO (-50.1%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-22.5%)	YES
Guest Rooms	NO (-23.1%)	YES
Guest Rooms	NO (-23.7%)	YES
Guest Rooms	NO (-50.6%)	YES
Guest Rooms	NO (-50.8%)	YES
Guest Rooms	NO (-25.6%)	YES
Guest Rooms	NO (-27.7%)	YES
Guest Rooms	NO (-51.4%)	YES
Guest Rooms	NO (-31.2%)	YES
Guest Rooms	NO (-52.2%)	YES
Guest Rooms	NO (-51.8%)	YES
Guest Rooms	NO (-36.5%)	YES
Guest Rooms	NO (-53.6%)	YES
Guest Rooms	NO (-52.2%)	YES
Guest Rooms	NO (-55.2%)	YES
Guest Rooms	NO (-56.1%)	YES
Guest Rooms	NO (-79.4%)	YES
Guestrooms	NO (-32.4%)	YES
Guestrooms	NO (-32.8%)	YES
Guest Rooms	NO (-32.4%)	YES
Guest Rooms	NO (-32.4%)	YES
Guest Rooms	NO (-32.5%)	YES
Guest Rooms	NO (-32.9%)	YES
Guest Rooms	NO (-33.8%)	YES
Guest Rooms	NO (-36%)	YES
Guest Rooms	NO (-40%)	YES
Guest Rooms	NO (-72.2%)	YES
Guestrooms	NO (-14%)	YES
Guestrooms	NO (-14%)	YES
Guest Rooms	NO (-14.1%)	YES
Guestrooms	NO (-14.1%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.5%)	YES
Guest Rooms	NO (-15%)	YES
Guest Rooms	NO (-16.9%)	YES
Guest Rooms	NO (-17.7%)	YES
Guest Rooms	NO (-77.6%)	YES
Guest Rooms	NO (-34.4%)	YES
Guest Rooms	NO (-40%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-16.7%)	YES
Guest Rooms	NO (-17.4%)	YES
Guest Rooms	NO (-17.4%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-21.4%)	YES
Guest Rooms	NO (-74.5%)	YES
Guest Rooms	NO (-40.6%)	YES
Guest Rooms	NO (-21%)	YES
Guest Rooms	NO (-84.1%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-48.2%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-22.7%)	YES
Guest Rooms	NO (-48.4%)	YES
Guest Rooms	NO (-48.6%)	YES
Guest Rooms	NO (-21.4%)	YES
Guest Rooms	NO (-21.4%)	YES
Guest Rooms	NO (-48.9%)	YES
Guest Rooms	NO (-49.4%)	YES
Guest Rooms	NO (-49.7%)	YES
Guest Rooms	NO (-21.6%)	YES
Guest Rooms	NO (-22.1%)	YES
Guest Rooms	NO (-22.6%)	YES
Guest Rooms	NO (-50.1%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-24%)	YES
Guest Rooms	NO (-25.4%)	YES
Guest Rooms	NO (-51%)	YES
Guest Rooms	NO (-28.2%)	YES
Guest Rooms	NO (-51.7%)	YES
Guest Rooms	NO (-51.1%)	YES
Guest Rooms	NO (-33%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-52.9%)	YES
Guest Rooms	NO (-51.2%)	YES
Guest Rooms	NO (-54.4%)	YES
Guest Rooms	NO (-55.8%)	YES
Guest Rooms	NO (-79.2%)	YES
Guestrooms	NO (-31.7%)	YES
Guestrooms	NO (-32.1%)	YES
Guest Rooms	NO (-31.8%)	YES
Guest Rooms	NO (-32%)	YES
Guest Rooms	NO (-32.1%)	YES
Guest Rooms	NO (-32.3%)	YES
Guest Rooms	NO (-32.5%)	YES
Guest Rooms	NO (-33.3%)	YES
Guest Rooms	NO (-36.7%)	YES
Guest Rooms	NO (-14%)	YES
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.1%)	YES
Guest Rooms	NO (-14.2%)	YES
Guest Rooms	NO (-14.3%)	YES
Guest Rooms	NO (-14.8%)	YES
Guest Rooms	NO (-16.8%)	YES
Guest Rooms	NO (-17.6%)	YES
Guest Rooms	NO (-76%)	YES
Guest Rooms	NO (-27.8%)	YES
Guest Rooms	NO (-30.2%)	YES
Guest Rooms	NO (-73%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.4%)	YES
Guest Rooms	NO (-16.5%)	YES
Guest Rooms	NO (-17.2%)	YES
Guest Rooms	NO (-17.3%)	YES
Guest Rooms	NO (-17.4%)	YES
Guest Rooms	NO (-20.9%)	YES
Guest Rooms	NO (-74.5%)	YES
Guest Rooms	NO (-34.4%)	YES
Guest Rooms	NO (-20.9%)	YES
Guest Rooms	NO (-84.1%)	YES
Guest Rooms	NO (-47.8%)	YES
Guest Rooms	NO (-47.8%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-22.5%)	YES
Guest Rooms	NO (-48%)	YES
Guest Rooms	NO (-48.2%)	YES
Guest Rooms	NO (-21%)	YES
Guest Rooms	NO (-21.1%)	YES
Guest Rooms	NO (-48.4%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Guest Rooms	NO (-48.7%)	YES
Guest Rooms	NO (-48.8%)	YES
Guest Rooms	NO (-21.3%)	YES
Guest Rooms	NO (-21.7%)	YES
Guest Rooms	NO (-21.8%)	YES
Guest Rooms	NO (-48.9%)	YES
Guest Rooms	NO (-49.2%)	YES
Guest Rooms	NO (-22.3%)	YES
Guest Rooms	NO (-23.1%)	YES
Guest Rooms	NO (-49.9%)	YES
Guest Rooms	NO (-24.6%)	YES
Guest Rooms	NO (-50.9%)	YES
Guest Rooms	NO (-50.4%)	YES
Guest Rooms	NO (-27.9%)	YES
Guest Rooms	NO (-51.6%)	YES
Guest Rooms	NO (-47.9%)	YES
Guest Rooms	NO (-53.1%)	YES
Guest Rooms	NO (-55.3%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.1%)	YES
Guest Rooms	NO (-31.2%)	YES
Guest Rooms	NO (-31.5%)	YES
Guest Rooms	NO (-31.8%)	YES
Guest Rooms	NO (-33.2%)	YES
Guest Rooms	NO (-24.9%)	YES
Guest Rooms	NO (-51.5%)	YES
Guest Rooms	NO (-51.1%)	YES
Guest Rooms	NO (-50.6%)	YES
Guest Rooms	NO (-49.2%)	YES
Guest Rooms	NO (-46.7%)	YES
Guest Rooms	NO (-39.3%)	YES

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	14459.6	14459.6
External area [m²]	10027	10027
Weather	MAN	MAN
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	4556.53	4512.32
Average U-value [W/m²K]	0.45	0.45
Alpha value* [%]	10.7	10

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
100	**Hotels**
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	3.57	4.63
Cooling	0.8	0.98
Auxiliary	9.1	12.3
Lighting	6.05	7.75
Hot water	68.31	70.63
Equipment*	17.34	17.34
TOTAL**	**87.82**	**96.29**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	6.21	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*6.21*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	64.9	62.63
Primary energy [kWh_{PE}/m²]	120.56	142.29
Total emissions [kg/m²]	11.12	13.09

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	75.6	3.1	5	0.2	9.8	4.24	3.65	4.2	5.2
	Notional	66.2	5.3	6.6	0.3	14.3	2.78	4.63	----	----
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	43.7	86.5	2.8	6.7	14.9	4.29	3.61	4.2	5.2
	Notional	23	133.5	2.3	8	17	2.78	4.63	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

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Project North Stand Manchester

Carbon Life Cycle Assessment

24 February 2023

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Document QA Information

Project No.	053810
Project Title	Project North Stand Manchester
Document Title	Carbon Life Cycle Assessment Analysis
Revision	02
Purpose	
Publish Date	24/02/2023

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PURPOSE

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Purpose

- This pack has been produced to:

1. Summarise the estimated embodied carbon impact of the individual buildings which will form the Etihad North Stand Project;
2. Facilitate conversations and inform decision making related to material specifications and opportunities for reducing embodied carbon on the Scheme;
3. Feed into the Sustainability Statement for planning; and
4. Inform Manchester City Football Club (MCFC) carbon reporting.

The scope of the document includes Embodied Carbon A-C calculated using OneClick Lifecycle Assessment (LCA) as per Royal Institute of Chartered Surveyors (RICS) guidance.



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CONTEXT

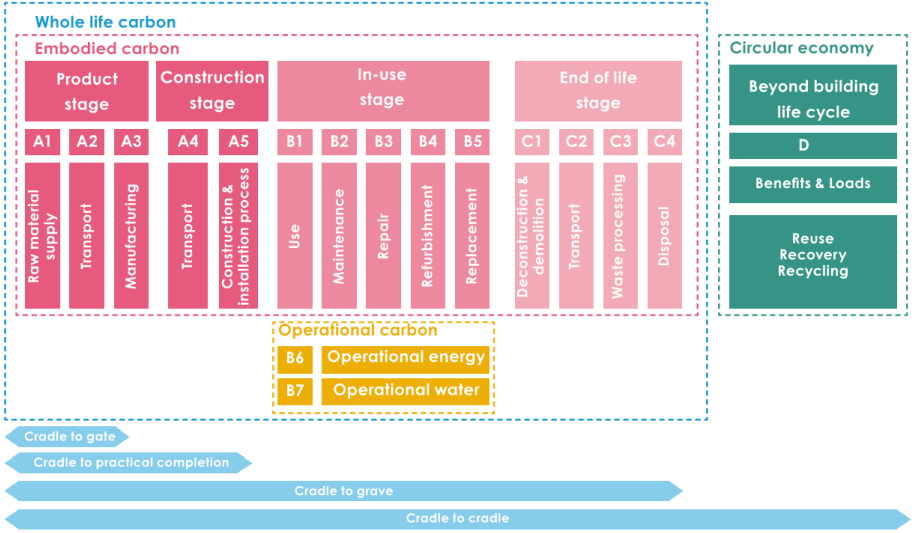
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What is Embodied Carbon and what have we considered?

- **Embodied Carbon** refers to the emissions associated to modules A1-C4 (excluding B6 & B7) of the building lifecycle;
- This takes into consideration all the steps that lead from **raw material through manufacture, distribution and usage to final disposal;**
- A **LCA** is a standardized, science-based tool for quantifying the impact of a material, in order to assess lifetime environmental impact; and
- For this assessment we have considered the emissions attributed to modules **A-C (excluding B6,B7).**

Scope of assessment and source of information:

- Substructure – Buro Happold;
- Superstructure – Buro Happold;
- Roof – Buro Happold;
- Façade – Populous;
- Internal Walls & Doors – Populous;
- Finishes – Populous; and
- MEP – ME Engineering.



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ASSUMPTIONS AND EXCLUSIONS

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Assumptions and Exclusions

Assumptions

- **General**
  - All buildings assumed to be equally serviced as MEP information was received on a whole scheme basis and the split of systems is unknown.
- **North Stand**
  - Doors - assumed typical array from another commercial project in OneClick, rescaled.
- **Commercial**
  - Finishes & doors - assumed typical array from another commercial project in OneClick, rescaled to floor area; and
  - Typical concrete flat roof build-up assumed as no finalised detail available at this stage.
- **Hotel**
  - Finishes & doors - assumed typical array from another residential project in OneClick, rescaled to floor area; and
  - Typical concrete flat roof build-up assumed as no finalised detail available at this stage.

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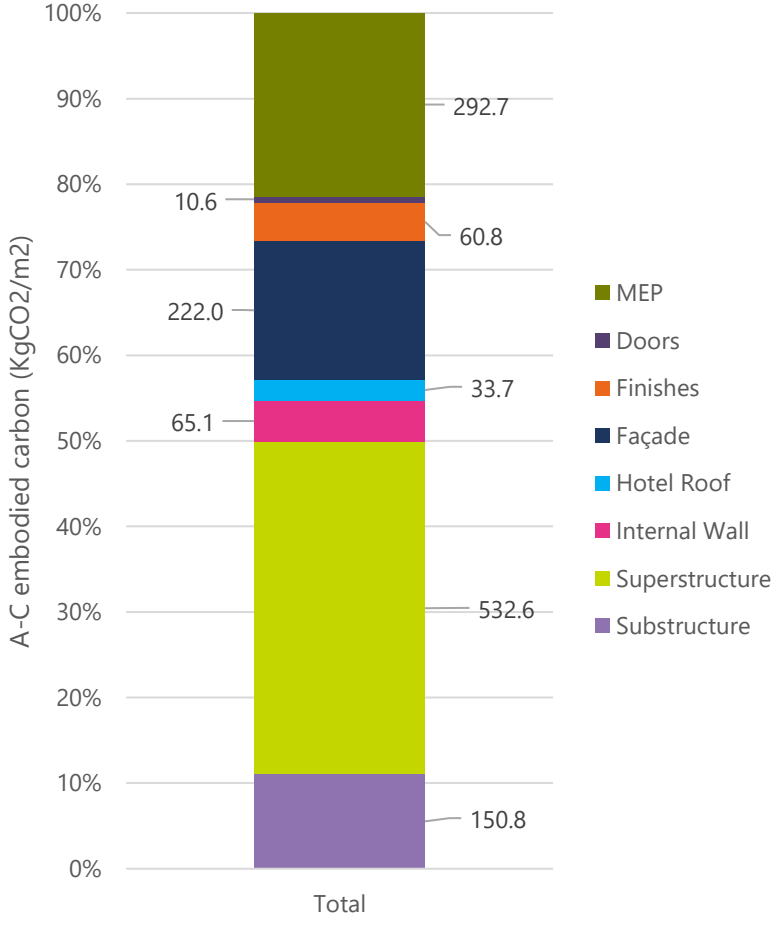
RESULTS

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Whole Scheme – 1368 kgCO2e/m2

- The graph on the left shows the detailed breakdown of the embodied carbon impact of the whole scheme on a per m^2 basis.
- As expected, the structure, façade and MEP systems are the most impactful elements, with doors finishes and internal walls being less impactful which falls in line with LETI general embodied benchmarks.
- The impact of the MEP for the entire scheme is around 292kgCO2/m2. Further details on the split of equipment between buildings has proven difficult to attain due to the complexity of the systems, therefore we have used this average per m^2 split for each building assuming they are equally serviced.

Building element	A-C (tCO2e)
Substructure	5958
Superstructure	21038
Internal Wall	2573
Stand roof	1333
Façade	8771
Finishes	2402
Doors	419
MEP	11563
Total	**54056**



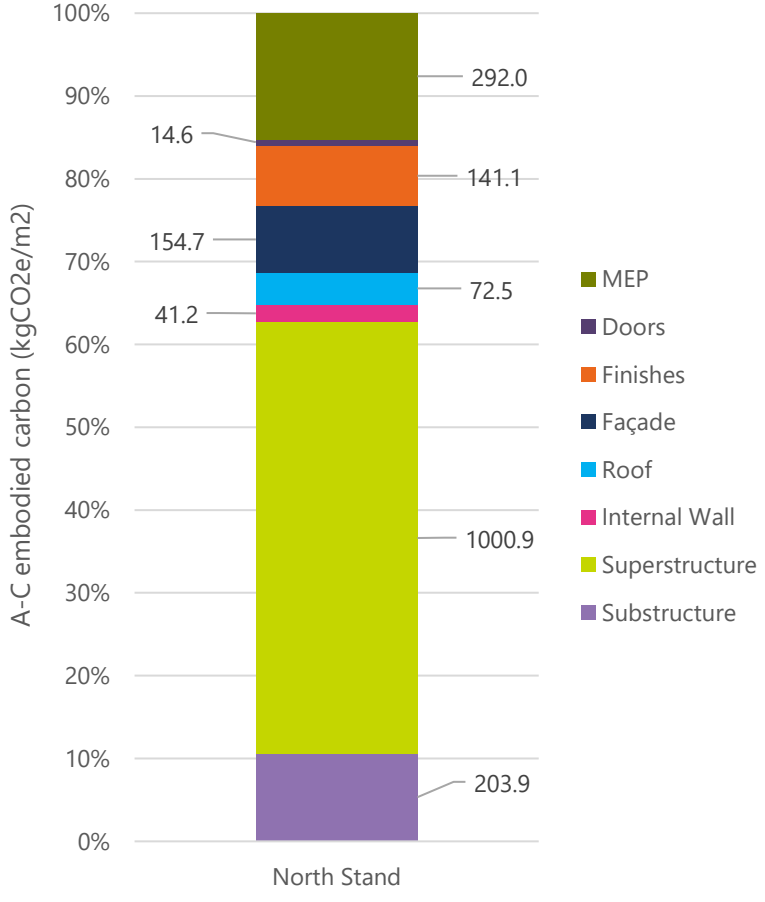
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North Stand – 1921 KgCO2e/m2

- A large proportion of the embodied carbon for the stand is attributed to **superstructure (approx. 63%).** This seems a large proportion; however, it should be noted that although a lot of the original structure will be retained, **this assessment only takes into account the materials which will be added, of which a large amount is concrete required in addition to the existing superstructure.**
- It should also be noted that it is difficult to benchmark a stadium on a per m^2 basis, as most of the embodied carbon is in the supporting structure for the roof but the floor area does not increase with this, ie. **the ratio of floor area to superstructure for a stadium is very different to that of any other building typology, therefore Kg/ m^2 figure will always seem higher in comparison** to other building assessments, and against industry benchmarks.
- The table below shows the impact per element for the Stand in **tonnes of CO2.**

Building element	A-C (tCO2e)
Substructure	2916
Superstructure	14313
Internal Wall	589
Roof	1037
Façade	2212
Finishes	2017
Doors	209
MEP	3854
Total	**27149**



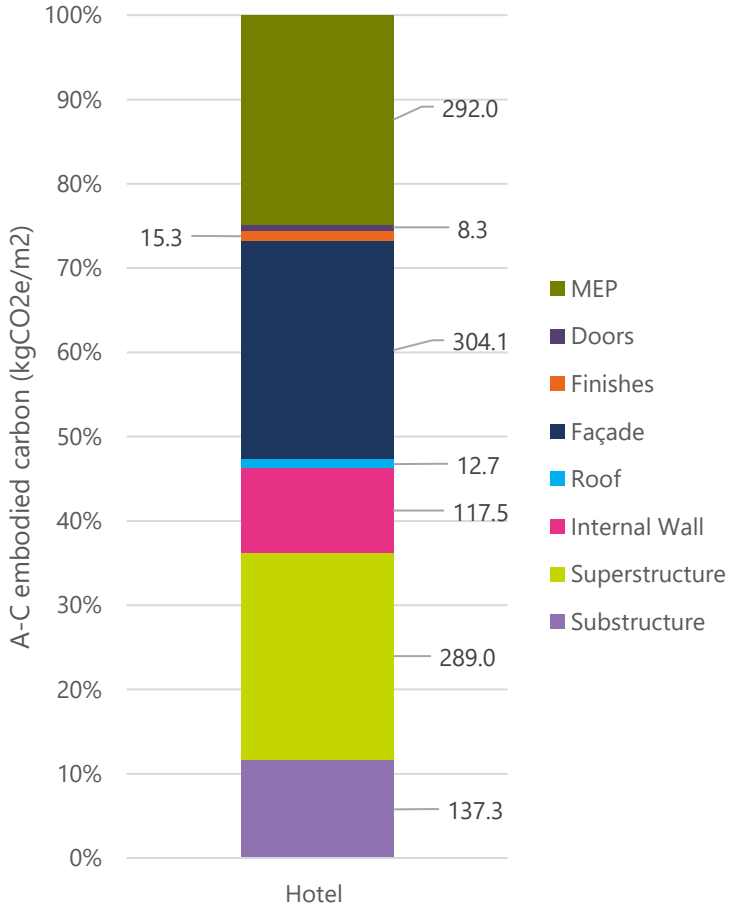
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Hotel – 1176 KgCO2e/m2

- As expected, the **Superstructure, MEP and Façade** are the most contributing elements.
- However, it should be noted that **the split of curtain walling to masonry cladding for the Hotel building is based on an assumed 50/50 ratio** as this information was not available at the time of the assessment. Upon later stage assessment, this figure will likely decrease.
- The table below shows the impact of each element **in tonnes of CO2.**

Building Element	A-C (tCO2e)
Substructure	2265
Superstructure	4769
Internal Wall	1938
Stand roof	210
Façade	5017
Finishes	252
Doors	137
MEP	3854
Total	**18442**



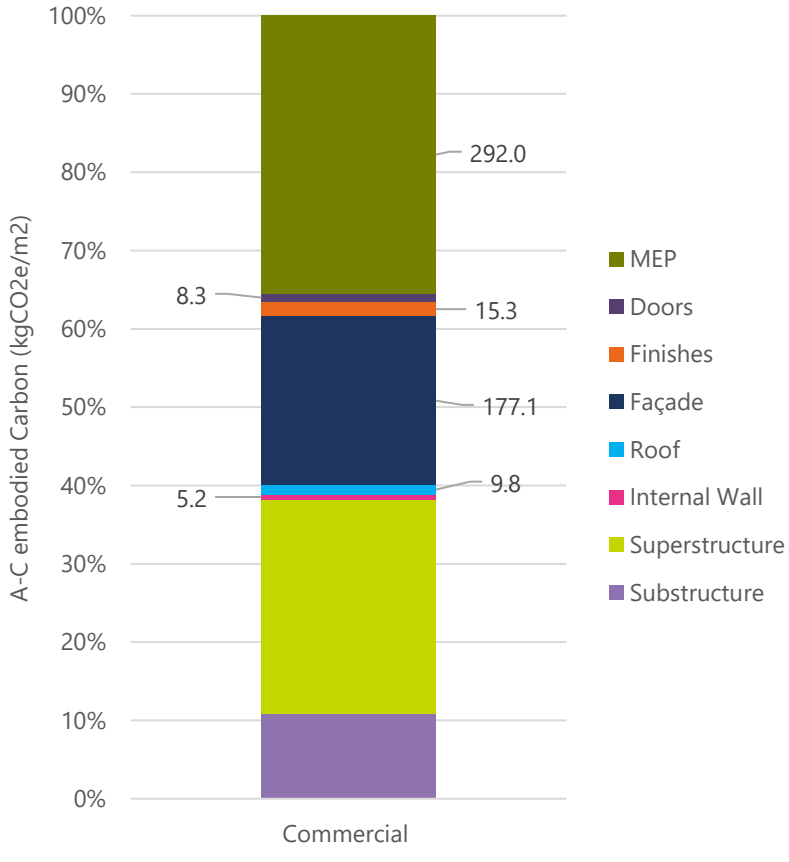
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Commercial – 822 KgCO2e/m2

- The MEP for the commercial building seems to be significantly more contributing than the other buildings. This is because **the whole scheme MEP average has been applied to each building**, however it takes up a larger proportion of the commercial building on a percentile basis as the other elements of the building are less impactful. **In reality the impact of the MEP systems in the commercial building will likely be a lot less**, however it proved difficult to split the data on a pro-rata basis that would both take into account the scale of each building and the degree of services without knowing how the systems are divided.

- The percentage elemental split is comparable to the hotel building, but with **lower impact internal walls as would be expected from a commercial building with more open plan spaces**. The façade is slightly less impactful on the commercial building due to the differences in the ratio of curtain walling to masonry cladding.

Building Element	A-C (tCO2e)
Substructure	777
Superstructure	1956
Internal Wall	46
Roof	85
Façade	1541
Finishes	133
Doors	72
MEP	3854
Total	**8464**



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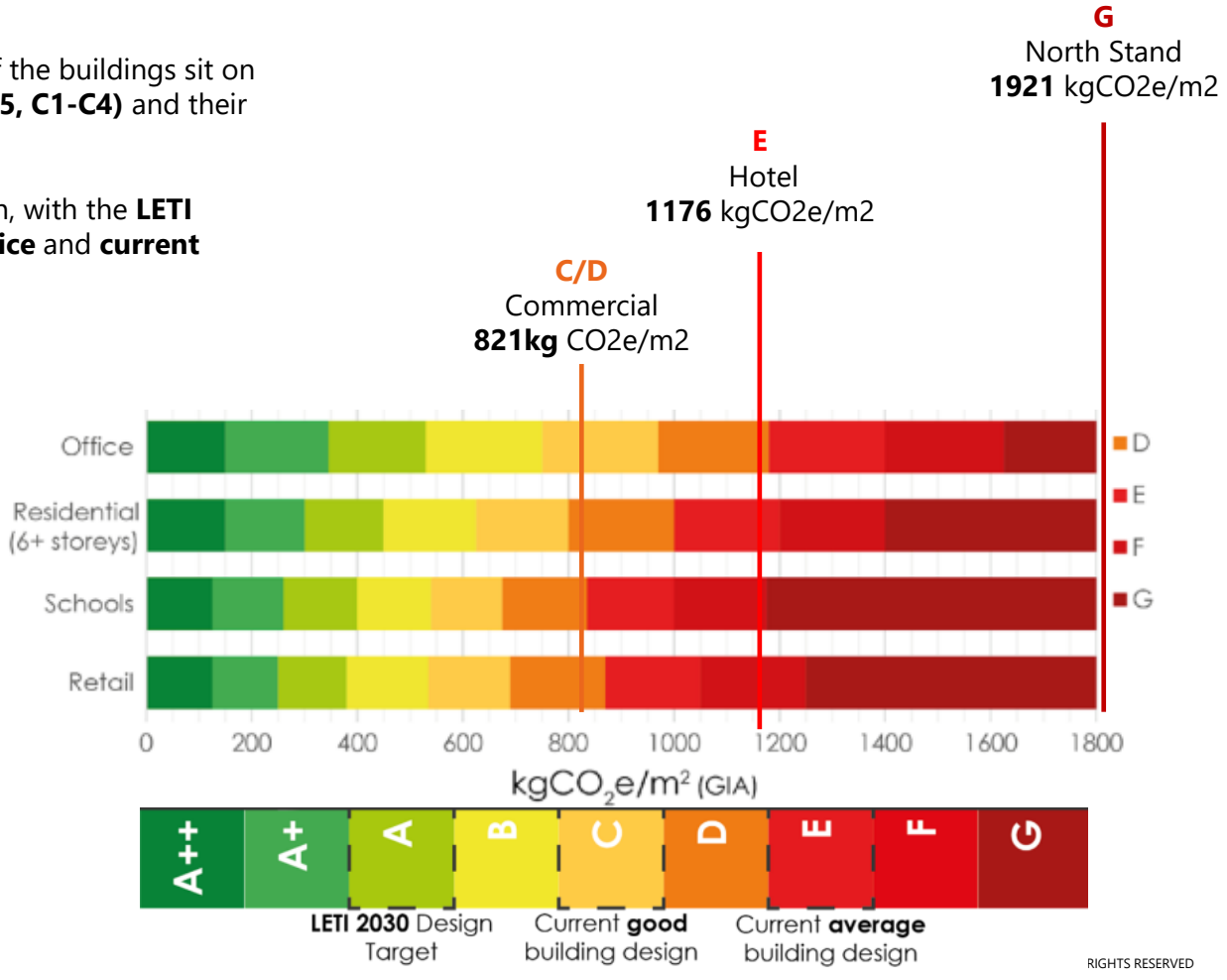
Alignment with LETI Embodied Carbon Targets

The diagram below shows where each of the buildings sit on the **LETI Embodied Carbon scale (A1-B5, C1-C4)** and their equivalent letter rating.

The letter scale is shown below the graph, with the **LETI 2030** design target**, current good practice** and **current average** highlighted**.**

The commercial building falls at the lower end of current 'good' design, and the Hotel falls within the current 'average' design.

However, the stand itself falls at the end of the scale, scoring a 'G'. This is to be expected, as **stadium projects are an anomaly in terms of embodied carbon, especially on a per m² basis** as the majority of the embodied carbon sits in the substructure/superstructure to support the roof and people load, which results in a much more intensive per m² figure.



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MANCHESTER CITY

Manchester City

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mancity.com
facebook.com/mancity
twitter.com/mancity
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youtube.com/mancity

Planning Application Number: N/A

Value of scheme (nearest £1m): Confidential

Expected start and end date construction phase (mm/yy to mm/yy): 09/23 to 07/26

Expected start date operation / end use phase if applicable (mm/yy to mm/yy): 07/25

Undertaking to Manchester City Council

General

MCFC, it's partners and contractors will work to maximise local labour, training and apprenticeship opportunities created by the development. This applies to the construction phase and the end use operation phase.

Construction phase

Working to the local plan as outlined in Game Plan, Manchester City FC's sustainability agenda and through its Sustainability and City in the Community programmes, MCFC will look to maximise its links with local Charities and youth organisations to drive both social and economic benefit for local people.

Bespoke programmes will target and engage people across all age groups, ranging from those with specific support requirements to offering alternative pathways into professional construction service careers via the PlanBEE apprenticeship. This is in line with the 'Our Manchester Strategy', the city's economic development plan and is also consistent with our successful approach to previous developments.

In conjunction with the local employment programmes referenced above, where possible, we will seek to maximise local procurement of goods, equipment and services, to maximise the positive impact on the regional economy.

We are committed to Manchester, taking our place in meeting the overall ambition for a thriving city and helping to build the anticipated talent, flair and community that we aspire to be. We recognise the opportunity that the proposed investment offers to our community.

End use / Operation phase

We are committed to employing locally; 23.8 % of Manchester City's employees live within the City of Manchester, of which 15.4% live within the immediate catchment. The remainder is made up of 74.8 % from Greater Manchester, with only 1.4% travelling from outside Greater Manchester.

The nature of this development, in conjunction with both the existing stadium and Coop Live arena bring a consistency of use to the Etihad Campus which might peak during event days, but remains constant throughout the year. This presents a range of opportunities for permanent employment which will be targeted at local people.

As part of the proposed development, plans for a 'Service Sector Training and Skills Academy' are being explored, working in partnership with Manchester City Council and an education provider.

At present, formal education routes available for people who aspire to build a career in the hospitality sector, particularly those which offer real life practical experience as part of gaining qualifications, are low in number.

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MANCHESTER CITY

Manchester City

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facebook.com/mancity
twitter.com/mancity
instagram.com/mancity
youtube.com/mancity

Our plans would ensure that the hospitality sector expertise required to manage our entertainment destination would be drawn from local neighbourhoods. We would support the development of skilled and qualified local people, who would be empowered to create an exceptional fan and visitor experience at the Etihad Campus, adopting hospitality as a career of choice.

By offering distinctive learning and training opportunities, connected to Manchester City Football Club and City Football Group, there is a huge opportunity to encourage and inspire people of all ages.

In addition to young people who would like to start their career journey, we believe there would also be many opportunities for people of all ages to retrain and enter the profession at other levels.

Scope of Agreement

We will work with Manchester's Work and Skills Team to develop specific targets for local employment, apprenticeships and local spend which are deliverable and deliver demonstrable benefit to the local community. We have a track record of delivering for our community and a commitment to ensure the opportunity presented by this development builds on that legacy.

We are committed to sustained engagement with the MCC Work and Skills Team through the process and will deliver a final report which details our performance against the targets we set.

Authorised Signatory

Name: DANNY WILSON

Position in Organisation: MANAGING DIRECTOR - OPERATIONS

Name Organisation: Manchester City Football Club

Signed:

Date: 13.4.23

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Deloitte.



North Stand Project, Manchester

Social Value Toolkit

April 2023

Contents

1. Introduction 1
2. Approach to Social Value – Construction Phase 5
3. Approach to Social Value – Operational Phase 8
4. Summary Error! Bookmark not defined.

1. Introduction

1.1. This Social Value Toolkit ("the Statement") accompanies an application for Full Planning Permission submitted to Manchester City Council (MCC) for the expansion of the Etihad Stadium North Stand in East Manchester.

1.2. It should be read in conjunction with the Sustainability Statement (prepared by BuroHappold), Local Benefits Proposal (prepared by the Applicant) and the Economic Impact Assessment (prepared by Amion) which are submitted in support of the application.

1.3. The application proposals comprise several interrelated elements as follows. These are collectively designed to create a best-in-class fan experience and year-round entertainment and leisure destination at the Etihad Stadium (the "Proposed Development").

- Expansion of the Etihad Stadium North Stand to provide an additional net capacity of 7,910 and an increase in the overall stadium capacity of up to 61,958 and noting that this capacity figure is within the ambit of an extant Planning Permission for expansion of the Stadium (62,170), including its north stand, which was granted in 2014.
- Associated hospitality and concourse facilities and an ancillary TV Studio.
- Creation of a roof walk attraction comprising walkways and platforms on the roof of the Etihad Stadium North Stand.
- A nine-storey, 391-bed hotel, with a restaurant at Level 1 and a further 10 suites within the proposed expanded North Stand which are flexible for use as hotel or hospitality space.
- A further eight storey-building comprising:
    - A new club shop and ticket office at Ground Floor and Level 1;
    - A museum at Level 2 which links directly into the proposed North Stand;
    - An interactive visitor experience venue at Level 3; and,
    - 4,000 sq. m. of workspace at Levels 4, 5, 6 and 7.
- City Square, a significant new covered outdoor fan zone and flexible event space located between the proposed hotel and the further eight-storey building, with year-round food and beverage (F&B) facilities provided at the ground and first floor of the proposed North Stand and interrelated adjoining buildings.
- Creation of new public realm, including a mix of both hard and soft landscaping, including places to sit and dwell alongside planters and trees.
- Other associated works, including the creation of a new tree lined access road which will be provided to service the Proposed Development via an existing junction with Alan Turing Way, and a pick-up and drop-off area northeast of the hotel.

1.4. The Applicant is Manchester City Football Club Ltd (the "Applicant").

1.5. The application site (the "Site") comprises 3.5ha and is bounded by Joe Mercer Way and the Etihad Campus Metrolink Stop to the north, the National Squash Centre to the west, and the Co-op Live construction site compound as well as Alan Turing Way to the east. The remainder of the existing Etihad Stadium is to the south.

Manchester's Social Value Objectives

1.6. The remainder of this Statement describes how the Proposed Development responds to MCC's Social Value Policy (June 2022) which sets out what MCC is seeking to achieve for Manchester's residents and neighbourhoods in this regard, drawing on the following priority actions:

- Maximise new job creation, increasing overall labour demand in the city, and ensure residents are supported into these opportunities;
- Support unemployed Manchester residents to re-enter work as quickly as possible - especially priority cohorts;
- Support and strengthen organisations that make a positive contribution to Manchester and retain money in the local economy, including through use of local, Manchester-based supply chains;
- Support Manchester's transition to a zero-carbon city;
- Ensure 'good employment' is central to any opportunities. MCC particularly encourages organisations to commit to the Greater Manchester Good Employment Charter, including paying all staff at least the Real Living Wage;
- Focus charitable giving on We Love MCR, Young Manchester and Big Change;
- Facilitate donations of surplus food through the Food Response Team and Council's website to ensure food can be distributed to those who need it and reduce food waste;
- Build an understanding of the diversity of the supply chain, particularly how black, Asian and minority ethnic communities and women are represented both in the workforce and in company ownership; and,
- Establish the required processes to make use of the Social Value fund and realign to the recovery priorities.

1.7. In addition, the Proposed Development will draw on the following six social value objectives set out within MCC's 'Social Value Toolkit for Suppliers':

- Promote employment and economic sustainability – tackle unemployment and facilitate the development of residents' skills.
- Raise the living standards of local residents – working towards living wage, maximise employee access to entitlements such as childcare and encourage suppliers to source labour from within Greater Manchester.
- Promote participation and citizen engagement - encourage resident participation and promote active citizenship.
- Build the capacity and sustainability of the voluntary and community sector– practical support for local voluntary and community groups.
- Promote equity and fairness – target effort towards those in the greatest need or facing the greatest disadvantage and tackle deprivation across the borough.
- Promote environmental sustainability – reduce wastage, limit energy consumption and procure materials from sustainable sources.

The Etihad Campus

1.8. As the Etihad Campus embarks on the next key phase of its transformation to a world-class destination amidst increasing public awareness of the climate and biodiversity crisis, it recognises the opportunity for it to play its full part in exemplifying sustainable development. To guide this, The Campus Strategic Sustainability Framework was produced by Hillbreak in 2020.

1.9. This strategic vision document outlines the over-arching direction for the development and stewardship of The Campus. It sets out key principles for embedding sustainability into every aspect of it and it acts as the lead framework document providing an umbrella for all other strategies and proposals.

1.10. A key theme underpinning the vision for the Etihad Campus is as follows: "Vibrant and Inclusive - the Campus works for everyone and provides unrivalled education, training and employment opportunities for local residents."

1.11. A Review of Progress against the strategic pillars within the Strategic Sustainability Framework has been measured and published in April 2023. Positive actions against the "*Vibrant and Inclusive*" pillar, since 2020, have been identified as follows:

- Manchester City Football Club has, through the City Football Academy development programme, achieved >80% of its overall supply chain expenditure within Greater Manchester.
- 280 apprenticeships and traineeships have been created.
- The Campus partners have begun to facilitate the transfer of apprenticeships between projects, thereby deepening and extending the impact of these opportunities.
- Extensive engagement has taken place with 361 local residents on major initiatives, including plans to manage and mitigate matchday parking from neighbouring areas.
- Ongoing quarterly engagement takes place with local businesses and regular engagement by Manchester City Football Club through the Man City Neighbourhood Forum (MCNF) takes place as part of its commitment to delivering social value in the community. This has been a longstanding commitment with the 20th anniversary Neighbours' Meeting being held in October 2021.

Manchester City Football Club

1.12. Manchester City Football Club is committed to delivering social value to local communities.

1.13. Since 2004, Manchester City Football Club and City Football Group have actively collaborated with the local community to measure its social, environmental, and economic impact and the Club has worked closely with city officials, residents, and businesses to transform its stadium into a positive landmark and symbol of regeneration in the area.

1.14. Manchester City Football Club has prioritised respecting local tradition and heritage while promoting enthusiasm for a better future through sustainable transport initiatives, promoting access to local services and amenities, supporting local economic development, and community involvement in local decision-making. Manchester City Football Club's commitment to sustainability and community engagement has helped build a positive legacy for the Club and the wider community.

1.15. The development of East Manchester to date has not only delivered significant physical regeneration but has also created significant socio-economic value to the local area.

1.16. The existing economic impact of the stadium and Manchester City Football Club is considered within the Economic Impact Assessment by Amion, submitted in support of this application. This estimates that the current City Football Group operations at the Campus supports 2,776 jobs including full time, part time and casual work. This equates to around 1,100 FTE jobs.

1.17. The report also estimates that through taking account of existing on-site employment; off-site visitor expenditure employment; indirect supply chain employment; and induced employment, it is estimated that Manchester City Football Club's existing operations already support 4,180 full time equivalent jobs within Greater Manchester (or 7,400 full time, part time and casual jobs).

1.18. In addition to these employment impacts, together with their partners, Manchester City Football Club and City Football Group have also led a number of initiatives which have delivered significant socio-economic value to the local area:

- Beswick Hub - together with their partners, City Football Group supported on the delivery of Beswick Hub, which supports 100 FTE jobs across the three facilities within the Hub (in addition to 2,000 construction phase jobs). The facilities perform a vital role for the local community as follows:

    - The East Manchester Leisure Centre is a state-of-the-art and affordable community facility with a gym, fitness class studio and two swimming pools. The East Manchester Leisure Centre helps over 1,500 Adults and Children learn to love the water each week on the Swim School Programme. It is also home to the City of Manchester Water Polo Team, Manchester Sharks LGBTQ Polo Team and is used as the main training facility for the GB National Water Polo Squad.
    - MIHP was founded by Manchester City Council, Sport England and City Football Group, and is operated by Nuffield Health. The partnership brings together leaders from both elite and community sport, healthcare and local government to deliver cutting-edge facilities to the local community. MIHP provides access to Nuffield Health's network of leading consultants to benefit from their expertise and experience in fitness and sport.
    - Connell Co-op College is a successful and very popular option for many Manchester students. In total, 92% of Connell's students are from Manchester postcodes - and 73% have gone straight to university. Manchester City has supported the learning aims of the College including sustainable futures events and careers.
- Sporting achievements – There are many examples of local young people being helped on their way to achieving global sporting accolades who have benefited from access to facilities across the Etihad Campus. The Regional Athletics Arena has trained athletes who have competed on the world stage, including at the Birmingham Commonwealth Games, the European Championships in Munich, the World Championships in Oregon, and the Tokyo Olympics 2021.
- City in the Community – Manchester City Football Club's charity has worked with close to 20,000 local people of all ages throughout the 2021/22 season, empowering healthier lives through football, totalling over 22,000 community sessions and averaging 29 hours per participant. Manchester City Football Club continue to support local people to develop core skills that will help their future careers.
- 'Marketplace' – A major jobs fair hosted at the Etihad Stadium by Manchester City Football Club and Manchester City Council, working with over 170 organisations to match local people with job opportunities and showcase routes into new careers and training courses. Over 260 people were offered immediate job opportunities as a direct result of attending the event.
- Playing a role in Manchester's emergency response to the Covid pandemic – under the Club's stewardship, the Etihad Campus was transformed to provide space for the training of nursing staff and a rest and relaxation centre for NHS staff. The Etihad Campus was also used as a testing centre and a Covid vaccination centre, supporting thousands of Greater Manchester residents.

2. Approach to Social Value – Construction Phase

2.1. Social value has formed a key part of conversations with prospective contractors. Manchester City Football Club has identified potential contractors to deliver the North Stand Proposals, who have a demonstrable track record of unlocking a wide range of social value through the construction phase.

Construction Phase Employment

2.2. The construction project will inject £191.1m of GVA into the Greater Manchester economy over the course of three years (£84.6m into Manchester) and could provide 2,678 gross jobs. This is the equivalent of 890 people being employed full time for three years.

2.3. The construction activity from the implementation of the project also provides a real opportunity to increase skills in the area and could provide between 7,000 and 7,500 person weeks of training. In terms of apprenticeships, the construction project could result in up to 78 apprenticeship opportunities over the course of the construction phase.

Approach to Social Value

Laing O'Rouke

2.4. Discussions have taken place with Laing O'Rourke (LOR) as a potential contractor. LOR's approach would include:

- A bespoke social value plan developed and delivered by the contractor's Social Value Advisor, drawing on their extensive existing network to truly reach out and integrate with local initiatives in both neighbouring communities and the wider city.
- An employment drop-in centre, to be provided on site, for local members of the public who would like to enquire about training and employment opportunities.
- An educational engagement programme for local schools, colleges and universities, offing site visits, career talks, STEM activities and work experience placements.
- Collaboration with agencies and charities that focus on helping hard to reach groups and disadvantaged individuals back into employment and housing in order to support social mobility.
- Corporate volunteering days delivered to local charity and community groups, donating both labour and materials in kind.
- Setting and delivering against local spend targets; working with Manchester Work and Skills team and Greater Manchester Chamber of Commerce.
- Use of the Thrive platform to monitor and report on return on social investment, aligning with the Impact Evaluation Standards (IES) framework.

2.5. The estimated return on social investment based on the above list is **£85 million, including social and local economic benefits.**

Sisk

2.6. Discussions have taken place with Sisk as a potential contractor. Sisk's approach would include:

- Collaborating with the other proposed partner contractor (LOR) to establish a relationship that maximises local impact.

- A bespoke social value plan that targets deprived members of the local community as well as the wider Manchester and Greater Manchester region. The plan would be developed by the Regional Social Value and Stakeholder Manager and delivered by Sisk's project expert.
- The social value plan would include:
    - Employment and skills outreach into the community with local charity, and JobCentre partners.
    - Work seeker work placements, local training, and Sector Based Work Academy programmes to fill vacancies.
    - Entry level jobs filled with individuals from the local wards, targeting 30% of new starters from within Manchester.
    - STEM, Career, and employability skills courses, for local schools, colleges, and universities.
    - Mentoring and work placements for students over 16 years old.
- Targeted support for charities, volunteer and social enterprises using local knowledge, from research, surveys and guidance from the client and local authority.
- Setting and delivering against local spend and labour targets.
- Use of the Social Value Portal to monitor and report on return on social investment, aligning with the National Themes Outcomes and Measures (TOMs) framework.

2.7. The social value add on the above bullets is £26m.

2.8. Both LOR's and Sisk's social value plans are bespoke to each project, meaning they are further developed with their partners to ensure that maximum added value is being delivered on the project. They believe that collaboration is paramount and establish Social Value partnership groups with representatives from local organisations who they believe are critical in ensuring projects are not only successful but leave lasting legacies for the communities in which they work.

2.9. Both LOR and SISK are partners of the Considerate Constructors Scheme.

Social Value Target

2.10. The potential contractors have reviewed the social value at the adjacent Manchester City Football Academy and they are committed to emulating and improving on these for the Proposed Development.

2.11. Table 2.1 sets out the proposed Social Value targets for the construction phase.

Table 2. 1 Proposed Construction Phase Social Value Targets

Benchmark:	Proposed: North Stand Project	
Manchester City Football Club City Football Academy	LOR	SISK
89 Local residents who worked on the project were previously unemployed	**25** new employment opportunities for local residents, with a Manchester first, GM second approach	**20** new employment opportunities for local residents, with a Manchester first, GM second approach
50 Apprentices worked on the project	**50** local apprentices (25 new, 25 sustained) with LOR and supply chain, with a Manchester first, GM second approach	**14** new local recruited apprentices between SISK and the supply chain, with a Manchester first, GM second approach, and a further **14** sustained
13,385 Training hours	**200** training weeks for LOR staff, workforce and community	**100** training weeks for SISK staff, workforce and community
109 People gained qualifications whilst working on the project	Employability support for **100** local people	**200** hours of employability skills training for local people (attendees x duration)
2395 Students involved in educational events	**50** education activities, benefiting **2,000** local students	**30** education activities, benefiting circa **1,000** local students
33 Work experience placements	**25** work experience placements for local students and people facing barriers to employment	**20** work experience placements for local students and people facing barriers to employment
£53k Worth of labour and materials to local projects	**25** community activities to benefit local community groups and charities	**10** community-based events and activities to support local organisations and people.
58 Site visits by students and community groups	**30** Site visits for students and community groups.	**14** Site visits for students and community groups.
1050 Members of the workforce from the local area with 2100 from Greater Manchester	**50%** local (Manchester and GM) working with MCC for a Manchester first approach wherever possible.	**50%** local (Manchester and GM) working with MCC for a Manchester first approach wherever possible.
80% of the project's value was spent with local businesses	**50%** local construction spend (Manchester and GM) working with MCC for a Manchester first approach wherever possible.	**50%** local construction spend (Manchester and GM) working with MCC for a Manchester first approach wherever possible.

3. Approach to Social Value – Operational Phase

3.1. Manchester City Football Club has developed a distinctive North Stand Development proposition that will affirm the Etihad Campus' positioning as an icon of global excellence in sports and entertainment, where all Manchester residents can share in its success.

3.2. As part of this, Manchester City Football Club is committed to delivering social value to local communities and want those who live and work in the area to benefit from being in the proximity of a sports, leisure and entertainment destination of national significance.

Employment and Economic Sustainability / Raising the Living Standards of Local Residents

3.3. The nature of the Proposed Development brings a consistency of use to the Etihad Campus, which might peak during event days, but remains constant throughout the year. This presents a range of opportunities for permanent, long term employment within the operational uses, which will be targeted at local people.

3.4. It is estimated that the Proposed Development will support a total of 12,300 jobs in the Greater Manchester economy (7,141 full time equivalents). This represents an increase of 2,925 jobs (1,795 full time equivalents) in Greater Manchester with 1,112 jobs taken by residents of Manchester (682 full time equivalents).

3.5. Total attendance including matchdays, concerts and non-matchdays will increase from 2.66m per annum to 2.93m and the additional visitors will spend an extra £35.8m within Greater Manchester's visitor economy each year.

3.6. Overall, it is estimated that the project will inject an additional £71.7m of GVA into the Greater Manchester economy each year.

3.7. Manchester City Football Club is committed to ensuring as many jobs as possible go to local people and will look to implement strategies which support the hiring of people who live within walking distance.

3.8. Manchester City Football Club would ensure that new employment opportunities arising from the Proposed Development are accessible to East Manchester residents and support the retention and attraction of talent to the city.

3.9. The range of employment opportunities within the hotel and wider amenity uses include:

- Catering and service
- Hospitality
- Event management
- Customer Care
- Cleaning
- Stewarding and security
- Facilities management
- Hotel management

3.10. Manchester City Football Club has also committed to providing a range of employment, skills and training initiatives to maximise the accessibility of employment opportunities to local residents within

the City. As part of the Proposed Development, plans for a 'Service Sector Training and Skills Academy' are actively being explored, working in partnership with Manchester City Council and a proven education provider.

3.11. At present, formal education routes available for people who aspire to build a career in the hospitality sector, particularly those which offer real life practical experience as part of gaining qualifications, are low in number. Manchester City Football Club's plans would ensure that the hospitality sector expertise required to manage the new entertainment destination at the Campus would be drawn from local neighbourhoods, and Manchester City Football Club would support the development of skilled and qualified local people, who would be empowered to create an exceptional fan and visitor experience at the Etihad Campus, adopting hospitality as a career of choice. By offering distinctive learning and training opportunities connected to Manchester City Football Club and City Football Group, there is a huge opportunity to encourage and inspire people of all ages.

Promote Participation and Citizen Engagement

3.12. Manchester City Football Club actively collaborate with the local community to measure its social, environmental, and economic impact. The Club has worked closely with city officials, residents, and businesses to transform its stadium into a positive landmark and symbol of regeneration in the area. Manchester City Football Club has prioritised respecting local tradition and heritage while promoting enthusiasm for a better future through sustainable transport initiatives, promoting access to local services and amenities, supporting local economic development, and community involvement in local decision-making. Manchester City Football Club's commitment to sustainability and community engagement has helped build a positive legacy for the Club and the wider community.

3.13. Manchester City Football Club has established and successful ongoing routes of communication with the local East Manchester community, including meeting with local residents' representatives and key agencies on a quarterly basis to share and exchange information and knowledge, to understand and address issues and challenges, to promote best practice and maximise participation amongst local people – both in and with Manchester City, but also more widely across a range of community priorities and place-making.

3.14. Local people have been involved in shaping the North Stand proposals from the very beginning. The two stage consultation strategy was developed to provide meaningful opportunities for local people to engage with the Applicant and shape the development proposals, as well as what they mean to the local area. Manchester City Football Club intends to maintain communication with the local community throughout the build and operational phases of the project, including direct phone and email address for anyone to contact the Club and their contractors directly.

3.15. The Proposed Development aims to implement pride of place for its local community through the following measures:

- Creating a high quality and inspirational environment to engender a sense of pride and ownership within the local community.
- Designing the space with the local community in mind, incorporating elements that reflect the area's history, culture, and identity.
- Using sustainable materials and environmentally friendly practices to show the city's commitment to a greener future.
- Encouraging local businesses and artists to contribute to the development, showcasing the talents and diversity of the community.
- Reaching out to the community to facilitate events and initiatives that promote a sense of belonging and inclusivity.
- Fostering partnerships with local organisations and charities to support social initiatives and community-driven projects that benefit the area.

3.16. As noted above, Manchester City Football Club already host regular community engagement meetings to allow the community to express their opinions and shape future development in and around the

campus. These will continue beyond the completion of this project as the campus continues to develop, further demonstrating the Club's commitment to inclusivity and the local community.

Build the Capacity and Sustainability of the Voluntary and Community Sector

3.17. As established above, Manchester City Football Club is a key part of the local community. City in the Community is Manchester City Football Club's charity, supporting people across Greater Manchester by empowering healthier lives through football.

3.18. Between 2018 and 2022, City in the Community has delivered 11,273 hours of programmes (7,002 from the City Football Academy and 4,271 from the Etihad Stadium) to 78,488 participants, together with outreach activities in Greater Manchester schools.

3.19. Youth-led programmes place physical and mental wellbeing at their core, whilst also creating healthy future and healthy communities:

- The 'Primary Stars' programme is delivered in schools across Greater Manchester and is designed to increase teachers' confidence and competence when delivering PE and School Sport, and to increase children's engagement and enjoyment in this area.
- Pathways to employment include the 'City Inspires' which aims to support secondary school learners who are at risk of not reaching their potential and 'City Careers' an eight-week employability programme working on employability skills and with the opportunity to gain qualifications.
- The BTEC scheme which offers places to male and female participants without trials, and the Foundation and BSc in Community Football Coaching is delivered in partnership with Manchester Metropolitan University.
- In partnership with Hays, 92:30 is a long-term Volunteer Programme providing skills, experiences, qualifications, and pathways into employment both within City in the Community and across its network of partner organisations.

Promote Equity and Fairness

3.20. The Proposed Development will affirm the Etihad Campus' positioning as an icon of global excellence in sports and entertainment, where all Manchester residents can share in its success.

3.21. In addition to the learning, skills and capacity building programmes outlined above, City in the Community offer a range of programmes which are designed to encourage and support all those who wish to participate:

- 'City Play' is a bespoke nursery programme for children aged between 2 and 5 years, augmented by 'City Play Together' which encourages parents to join in towards a heathier and active lifestyle.
- The 'City Girls' project aims to provide safe spaces for girls to improve their physical and mental wellbeing and develop their leadership skills.
- 'Soccer Schools' participants are provided with free full day structured coaching sessions as well as free food provision at all sites to tackle holiday hunger in the most deprived areas of the city.
- 'Kicks' is an outreach programme which provides free evening, weekend and school holiday provision for those living in areas of social deprivation, whilst providing positive activities where there is a gap in provision.
- 'Kicks Targeted' delivered bespoke mentoring for young people between 8-19 years who are at risk of being affected by Serious Youth Violence.
- 'One City Disability' provides opportunity for participants to take part in free football and sporting provision relevant to their specific disability.
- In partnership with the NHS, 'City Thrive' embeds a mental health curriculum across all City in the Community programmes.

- The ‘Military Vets’ project helps armed forces personnel stay active during and after transition to civilian life.
- City in the Community provides two free Walking Football sessions per week aimed at engaging older participants in regular activity.
- ‘Reminiscity’ was launched to create a dementia safe environment for participants to enjoy social and physical activity, through the conduit of football and Manchester City Football Club, to promote active and engaged lifestyles in the face of the challenges dementia can bring.

3.22. The Proposed Development will create a significant number of new jobs in Manchester and Greater Manchester and many of these jobs will be taken up by local residents, helping to generate increased economic activity, retain skilled people within the area and bring more people into employment through accessible pathways.

3.23. In addition, there are many examples of local young people being helped on their way to achieving global sporting accolades who have benefited from access to the world-leading co-location of facilities at the Etihad Campus, together with the educational and physical activity pathways offered by the key stakeholder. These include:

- Jona Efoloko is a member of Sale Harriers and a former Loreto High School student. His junior achievements include World U20 Champion and European U18 Champion in 200m. In 2022 he won gold medals for 100m relay at the European Championships in Munich and the Commonwealth Games in Birmingham before achieving a bronze in the same event at the World Championships in Eugene Oregon. Previously a keen footballer, Jona’s talent was spotted at school, and he was then invited to train with Sale Harriers at the Regional Arena at the Etihad Campus.
- Abigail Irozuru is a member of Sale Harriers who specialises in Long Jump. Manchester born and raised, she began participating in athletics as a 14-year-old, leading to an invitation to start training at the Regional Arena on the Etihad Campus. Her most recent achievements include competing at the Tokyo Olympics in 2021, where she placed 9th.
- Aimee Pratt was 13 when she was introduced to athletics through the Diane Modahl Sports Foundation at her school, Wright Robinson College. She then joined Sale Harriers, training regularly at the Regional Arena, Etihad Campus under coach Vicente Modahl. The 3000m steeplechaser competed in her first Olympics in 2021 and reached the finals of the Commonwealth Games (4th) and World Championships (7th) in 2022.

Promoting Environmental Sustainability

3.24. The Etihad Campus aspires to be a pioneer for the whole of Manchester in pursuing its twin objective of realising locally inclusive, globally competitive economic growth, whilst simultaneously transforming to a zero-carbon campus by 2030. Significant progress has already been made by Manchester City Football Club / City Football Group towards this goal, as detailed within the accompanying Sustainability Statement.

3.25. The Proposed Development will promote sustainability and be at the forefront of energy efficiency and best practice low carbon design, aligning with the ambitious sustainability aspirations of Manchester City Football Club and the Etihad Campus, as set out in the Etihad Campus Strategic Sustainability Framework 2020.

3.26. Manchester City Football Club acknowledges that sustainability is an ongoing journey and is committed to continuously evaluating and improving sustainability practices.

3.27. The Proposed Development has been designed to accord with the Etihad Campus Strategic Sustainability Framework and to demonstrate an incremental improvement in the sustainable operational performance of the Campus’ facilities as they come onstream. It will actively contribute towards Manchester City Football Club / City Football Group’s stated intention to be net zero carbon by 2030, eight years in advance of Manchester City Council’s aim to be net zero carbon by 2038.

3.28. Therefore, the Proposed Development incorporates sustainability best practices to ensure that the development and its operations are environmentally sustainable in the long term, including measures to minimise the impacts associated with operational energy, staff and travel, as well as operational waste.

4. Summary

4.1. As described in this Statement, Manchester City Football Club is committed to delivering social value to local communities, and for those who live and work in the area to benefit from having a sports, leisure and entertainment destination of national significance nearby.

4.2. East Manchester has witnessed a remarkable transformation in the 20 years since the Commonwealth Games were held at the City of Manchester Stadium (now the Etihad Stadium) in 2002. It now stands as a beacon of community achievement and development and an economic engine for Manchester, for the benefit of the city region and nationally.

4.3. The development of East Manchester to date has not only delivered significant physical regeneration, but also created significant socio-economic value to the local area. It is estimated that the Campus currently supports 2,776 jobs onsite (c.1,100 FTE jobs) and a further 4,180 FTE jobs within Greater Manchester.

4.4. The Proposed Development will build on Manchester City Football Club's journey to date, delivering social value to local communities and benefits to those who live and work nearby. Table 4.1 summarises how the Proposed Development responds to MCC's six Social Value Objectives.

Table 4.1 Assessment of the Proposed Development against Social Value Objectives

Social Value Objective	Applicant's Commitment
Promote Employment and Economic Sustainability	The nature of the Proposed Development brings a consistency of use to the Etihad Campus, which might peak during event days, but remains constant throughout the year. This presents a range of opportunities for permanent, long term employment within the operational uses, which will be targeted at local people. It is estimated that the Proposed Development will support: • Construction Phase up to 2,678 gross jobs (the equivalent of 890 people being employed full time for three years). The Applicant will encourage its construction partners to use a significant amount of local labour, engage with well-established local supply chains and create meaningful apprenticeships (39 new, 39 sustained) and training opportunities for local people. • Operational Phase a total of 12,300 jobs in the Greater Manchester economy (7,141 full time equivalents) - an increase of 2,925 jobs (1,795 full time equivalents) in Greater Manchester with 1,112 jobs taken by residents of Manchester (682 full time equivalents). Overall, it is estimated that the project will inject an additional £71.7m of GVA into the Greater Manchester economy each year.
Raise the living standards of local residents	Manchester City Football Club is committed to ensuring as many jobs as possible go to local people and will look to implement strategies which support the hiring of people who live within walking distance. Manchester City Football Club has also committed to providing a range of employment, skills and training initiatives to maximise the accessibility of employment opportunities to local residents within the City. As part of the Proposed Development, plans for a 'Service Sector Training and Skills Academy' are being actively explored, working in partnership with Manchester City Council and a proven education provider.

Social Value Objective	Applicant's Commitment
Promote participation and citizen engagement	Manchester City Football Club has established and successful ongoing routes of communication with the local East Manchester community, including meeting with local residents' representatives and key agencies on a quarterly basis to share and exchange information and knowledge, to understand and address issues and challenges, to promote best practice and maximise participation amongst local people – both in and with Manchester City, but also more widely across a range of community priorities and place-making. Local people have been involved in shaping the North Stand proposals. The two stage consultation strategy was developed to provide meaningful opportunities for local people to engage with the Applicant and shape the development proposals, as well as what they mean to the local area. Manchester City Football Club intends to maintain communication with the local community throughout the build and operational phases of the project, including direct phone and email address for anyone to contact the Club and their contractors directly.
Build capacity and sustainability of the Voluntary and Community Sector	Manchester City Football Club is a key part of the local community. City in the Community is Manchester City Football Club's charity, supporting people across Greater Manchester by empowering healthier lives through football. Youth-led programmes place physical and mental wellbeing at their core, whilst also creating healthy future and healthy communities: • The 'Primary Stars' programme is delivered in schools across Greater Manchester and is designed to increase teachers' confidence and competence when delivering PE and School Sport, and to increase children's engagement and enjoyment in this area. • Pathways to employment include the 'City Inspires' which aims to support secondary school learners who are at risk of not reaching their potential and 'City Careers' an eight-week employability programme working on employability skills and with the opportunity to gain qualifications. • The BTEC scheme which offers places to male and female participants without trials, and the Foundation and BSc in Community Football Coaching is delivered in partnership with Manchester Metropolitan University. • In partnership with Hays, 92:30 is a long-term Volunteer Programme providing skills, experiences, qualifications, and pathways into employment both within City in the Community and across its network of partner organisations.
Promote equity and fairness	In addition to the learning, skills and capacity building programmes outlined above, City in the Community offer a range of programmes which are designed to encourage and support all those who wish to participate. In addition, there are many examples of local young people being helped on their way to achieving global sporting accolades who have benefited from access to facilities across the Etihad Campus, and the presence of a world class sporting destination on their doorstep provides opportunities to introduce young people to sport.
Promote environmental sustainability	The Etihad Campus aspires to be a pioneer for the whole of Manchester in pursuing its twin objective of realising locally inclusive, globally-competitive economic growth, whilst simultaneously transforming to a zero-carbon campus by 2030. Significant progress has already been made by Manchester City Football Club / City Football Group towards this goal.

Social Value Objective	Applicant's Commitment
	Manchester City Football Club acknowledges that sustainability is an ongoing journey and is committed to continuously evaluating and improving sustainability practices. The Proposed Development will promote sustainability and be at the forefront of energy efficiency and best practice low carbon design, aligning with the ambitious sustainability aspirations of Manchester City Football Club and the Etihad Campus, as set out in the Etihad Campus Strategic Sustainability Framework 2020. It will actively contribute towards Manchester City Football Club / City Football Group's stated intention to be net zero carbon by 2030.

4.5. The Proposed Development will deliver significant positive benefits for Manchester's residents and neighbourhoods through creating Social Value.

Deloitte.

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Manchester City Football Club

North Stand Development

Economic Impact Assessment

April 2023

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Manchester City Football Club

North Stand Development

Economic Impact Assessment

April 2023

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1 Introduction

1.1 Overview

AMION Consulting has been commissioned by Manchester City Football Club ('MCFC') to examine the economic benefits that might be derived from the North Stand development which includes:

- an improved North Stand with an additional 7,910 seats (including 750 in the new Sky Bar);
- a new 401-bed hotel integrated into the North Stand;
- a new corporate hire and entertainment venue with a capacity of up to 1,250 (City Hall);
- an improved 'City Square' for pre and post-match entertainment and other non-matchday events with 2,300 square metres of new food and beverage outlets (open to the public);
- a new 4,180 square metre commercial workspace with spaces let to start-ups, scale-ups and SMEs;
- a new museum and club shop replacing existing facilities;
- a new interactive (high-wire) visitor attraction; and
- improvements to public realm.

In preparing this report, AMION Consulting has received trading data and business information from MCFC on a confidential basis and has held a number of working sessions with MCFC and its project advisors.

This report deals, specifically, with the additional impacts arising from the North Stand development. However, it should be stated that this particular development is another milestone in the creation of MCFC's longer term ambition (which is shared by the local authority) to create a world-class entertainment district in East Manchester. The hotel, new entertainment spaces, visitor attractions and food and beverage opportunities will combine with the new Co-Op Live Arena to create a critical mass that will deliver long-term meaningful impact in jobs, skills development and business growth.

The approach to the assessment of benefits has been developed in line with best practice guidance, including the HM Treasury Green Book (*Appraisal and Evaluation in Central Government*) and the Homes England Additionality Guide (formerly Homes and Communities Agency).

The North Stand development will contribute to the growth of jobs and GVA[1] in a number of ways:

- by creating temporary employment linked to the construction project;
- by employing more staff (directly and through third parties) on-site to operate the expanded facilities;

[1] GVA is a measure of the economic value of goods and services produced in an area. It is defined by the Office for National Statistics (ONS) as "… the difference between the value of goods and services produced and the cost of raw materials and other inputs which are used up in production."

- by attracting visitors whose off-site visitor expenditure will create jobs in other businesses in Greater Manchester;
- by MCFC incurring additional operating expenditure which will create employment in the supply chain in Greater Manchester; and
- by new employees spending their wages on goods and services in the economy (induced effects).

The assessment has sought to estimate both the gross and net additional impact of the programme, at the Greater Manchester level, in line with appraisal guidance.

1.2 Assessment of additionality

Of key importance in assessing the impact of the project on the local and wider economy is the extent to which new activity is truly additional. Furthermore, it is important to understand who is likely to benefit from the impacts generated. In order to assess the net additional impact of the proposals and overall anticipated additionality of the project, the following factors have therefore been considered:

- **leakage** – the extent to which economic outputs benefit those outside of Greater Manchester;
- **displacement** – the extent to which the project displaces economic activity elsewhere in Greater Manchester;
- **multiplier effects** – further economic activity associated with additional local income and local supplier purchases; and
- **deadweight** – economic activity that will occur even if the project does not go ahead.

1.3 This report

This report continues in four sections, as follows:

- Section 2 – estimates the existing economic impact of the Etihad Stadium and on-site operations;
- Section 3 – provides an assessment of the additional economic benefits that will be created through the project;
- Section 4 – sets out details of the wider social impacts of MCFC and the City Football Group activities; and
- Section 5 – provides a summary of the overall impacts.

2 Existing Economic Impact

2.1 On-site employment

City Football Group is already a significant employer with 891 people employed in Manchester in a variety of full-time and part-time roles (845 FTE). On matchdays and event days, an additional 1,885 people are employed through a number of third parties including stewards, catering staff, cleaning staff and car parking staff which equates to 255 full time equivalents.

Based on information provided by MCFC, it is estimated that current operations support 2,776 jobs including full time, part time and casual work. This equates to around **1,100 full time equivalent jobs (FTE) on site.**

2.2 Employment through off-site visitor expenditure

In addition to existing employment, City Football Group creates economic impact by attracting visitors to Manchester who spend with other businesses (hotels, bars, shops, taxis etc.) which in turn, creates and supports employment.

In a typical season, the Etihad Stadium has an aggregate football attendance of around 1.41m. On average, around 96% of attendees are home fans with around 61,000 away fans visiting the Etihad Stadium in a typical year. However, data provided by MCFC shows that a significant proportion of home fans live outside of Greater Manchester and many travel from overseas.

Table 2.1: Origin of visitors to football fixtures at the Etihad Stadium

	Home fans	Away fans	Total
From Greater Manchester	798,000	2,600	800,600
From rest of UK	475,000	50,500	525,500
From overseas	79,000	7,900	86,900
Total	**1,352,000**	**61,000**	**1,413,000**

In addition to football attendance, the Etihad Stadium hosts a number of music concerts in the summer months. MCFC budgets for a minimum of four concerts per summer but in some years, the stadium has hosted as many as eight concerts. Five is considered typical in a year and, depending on who is touring, an attendance of 50,000 per concert is expected. Analysis of the concerts in 2022 shows the following origin of visitors.

Table 2.2: Origin of visitors to music concerts at the Etihad Stadium	
From Greater Manchester	60,000
From rest of UK	187,000
From overseas	3,000
Total	**250,000**

In total therefore, a typical season would see approximately 1.66m visitors to the Etihad Stadium.

Data from Visit Britain[2] suggests that day visitors to Manchester spend £43.07 per head whilst overnight leisure visitors spend an average of £228.25 per trip. Meanwhile, ONS[3] data suggests that overseas visitors to Manchester spend an average of £430.56 per trip.

In estimating off-site visitor expenditure, it has been assumed that:

- all visitors from Greater Manchester are day visitors;
- 80% of visitors from the rest of UK are day visitors and 20% stay in Manchester; and
- all visitors from overseas stay in Manchester.

After accounting for fan expenditure within the Etihad Stadium (food, beverage, merchandise and programmes) it is estimated that the 1.66m annual visitors to the Etihad Stadium generate £109.6m of off-site visitor expenditure each year. This £109.6m of off-site visitor expenditure has been converted to FTE jobs by employing a metric derived from a Deloitte study[4] on behalf of Visit Britain in 2013 which asserts that £54,000 of visitor expenditure is required to support 1 FTE job. After inflating this figure to 2022 prices, it is estimated that visitors to the Etihad Stadium support **1,580 full time equivalent jobs** elsewhere in the Greater Manchester visitor economy (2,370 jobs when part time and casual work is included).

2.3 Indirect and induced employment

City Football Group buys goods and services from other businesses which creates further rounds of indirect employment.

In addition, employees use their wages and salaries to purchase additional goods and services which creates further rounds of employment. This is known as the induced effect.

To take account of the indirect and induced effects, a composite multiplier is applied to the employment figures set out in Section 3.1 and 3.2. A multiplier of 1.56 has been applied at the Greater Manchester level which takes account of national guidance and benchmarks and specifically the HCA Additionality Guide which provides specific figures for recreation projects.

[2] Great Britain Day Visitor Survey 2019 and Great Britain Tourism Survey 2019

[3] International Passenger Survey 2019

[4] The economic contribution of the tourism economy in the UK, Deloitte and Oxford Economics for Visit Britain, 2013

2.4 Total employment

Taking account of existing on-site employment; off-site visitor expenditure employment; indirect supply chain employment; and induced employment, it is estimated that **MCFC's existing operations already support 4,180 full time equivalent jobs within Greater Manchester** (or 7,400 full time, part time and casual jobs).

Table 2.3: Existing employment impact	
On-site employment FTE	1,100
Off-site visitor expenditure employment FTE	1,580
Indirect and induced employment FTE	1,500
Total full-time equivalent jobs (FTE)	**4,180**
Total jobs including full time, part time and casual	7,400

Data from the Office of National Statistics (based on census data) shows that 62% of workers in Manchester travel in from elsewhere in Greater Manchester and the North West. It is therefore assumed that around 1,588 of the 4,180 FTE jobs supported by the club's existing activity are taken by residents of Manchester.

2.5 Employment at the new Co-op Live Arena

The North Stand Development is another milestone in the creation of MCFC's longer term ambition to create a world-class entertainment district in East Manchester. The proposed hotel, new entertainment spaces, visitor attractions and food and beverage opportunities will combine with the new Co-Op Live Arena (scheduled to open in December 2023) to create a critical mass that will deliver long-term meaningful impact in jobs, skills development and business growth. Therefore, the employment and GVA impacts of the arena should be considered as part of the baseline together with the existing impacts of MCFC's operations.

Co-op Live Arena is scheduled to open in December 2023 which means that by the time that the North Stand Development is fully complete, the new arena will have been operating for several years and will have established itself.

According to the 2020 planning application, the arena is expected to create a net gain of 586 FTE jobs as a result of its on-site operations. In addition, it is expected to attract attendance of 1m per annum with off-site visitor expenditure estimated at £36m per annum which could support a further 580 FTE jobs. In total, the Co-Op Live Arena is expected to support 1,166 jobs per annum.

2.6 Total GVA impact

GVA is a measure of the economic value of goods and services produced in an area.[5] Data provided by Experian[6] suggests that the GVA per full time equivalent employee in the visitor economy in Greater Manchester is £39,969. MCFC's current employment and economic activity together with that expected from Co-Op Live Arena is estimated to support £213.7m of GVA in Greater Manchester every year.

Table 2.4: Existing GVA impact	
Total FTE employment – MCFC operations	4,180
Total FTE employment – Co-Op Live Arena operations	1,166
Total FTE employment	**5,346**
GVA per FTE employee in GM visitor economy	£39,969
Total GVA per annum	**£213,674,274**

[5] It is defined by the Office for National Statistics (ONS) as "… the difference between the value of goods and services produced and the cost of raw materials and other inputs which are used up in production."
[6] Experian Regional Planning Service – based on ONS data.

3 Project Economic Impact

3.1 Temporary construction impacts

3.1.1 Gross employment

The total project costs of £217.8m have been estimated by the project cost consultants (Turner and Townsend) and are based on plans and specifications provided by the design team. This estimated project expenditure has been used as the basis for calculating the number of temporary construction jobs by applying labour coefficients used in the 2015 HCA best practice note.[7]

The construction project could support **2,678 person years of construction related employment** (the equivalent of 2,678 people being employed on a full-time basis for 12 months). With a construction period of approximately three years (albeit phased to allow for the North Stand to completed by August 2025 and the hotel, public realm, food & beverage and workspace development to follow a year later) this could equate to c**.890 people employed full time for three years**. On the basis of the standard convention that each permanent job equates to ten person years of temporary employment, this would be equal to 268 *permanent* full-time equivalent (FTE) jobs.

Table 3.1: Construction employment (temporary)	
Construction phase capital expenditure	£217.8m
Gross temporary employment (person years)	**2,678**
Number of people employed full time for three years	**890**

3.1.2 Net additional GVA

To estimate the net additional impact during the construction phase, an allowance has been made for leakage, displacement and multiplier effects. The proposals could lead to some displacement of construction activity elsewhere in Manchester and Greater Manchester and a displacement rate of 20% and 30% has been applied respectively.

Not all of the construction workers will come from Greater Manchester. Data from the Office of National Statistics (based on census data) shows that 62% of workers in Manchester come from outside of the Manchester local authority and 16% of workers travel in from outside of Greater Manchester. It is therefore assumed that leakage is 62% at the Manchester level and 16% at the Greater Manchester level.

In addition, there will be additional rounds of employment through indirect and induced effects. To take account of these effects, a multiplier of 1.25 has been applied at the Manchester level

[7] HCA (now Homes England), Calculating Cost Per Job: Best Practice Note, 2015. Expenditure uplifted to account for inflation.

and 1.46 at the Greater Manchester level which is informed by national guidance and benchmarks including the HCA's Additionality Guide and reflects the structure of the local economy.

After adjusting for displacement and multiplier effects, it is estimated that the project would support the creation of 2,299 net additional person years of construction employment in Greater Manchester (1,018 in Manchester).

Data provided by Experian[8] suggests that the GVA per full time equivalent employee in the construction sector in Greater Manchester was £83,138 in 2022 which would provide a temporary GVA impact of £191.1m to Greater Manchester over the course of the three-year project (£84.6m in Manchester).

Table 3.2: Construction phase net additional GVA (temporary)

	Manchester	Greater Manchester
Gross temporary employment (person years)	2,678	2,678
Indirect and induced effect	669	1,232
Total direct, indirect and induced employment	3,347	3,910
Displacement and leakage effect	-2,330	-1,611
Net additional temporary employment (person years)	**1,018**	**2,299**
GVA per FTE in construction in Greater Manchester	£83,138	£83,138
Net additional GVA (temporary)	**£84,596,862**	**£191,117,669**

3.1.3 Other impacts from the construction project

Alongside directly supporting employment through the construction works, the project will also create supply chain opportunities for businesses within Greater Manchester including through, for example, the purchase of construction equipment and supplies. The new Everton stadium in Liverpool is expected to spend half of its construction budget with local suppliers whilst the adjacent Co-op Live arena is targeting 43% of its budget with local suppliers. When MCFC developed the City Football Academy, MCFC exceeded its target of retaining 43% of supply chain expenditure within Greater Manchester.

With this project, MCFC expects it will spend circa 50% of its construction budget locally in line with these other projects. With a total project cost of £217.8m, it is expected that a minimum of **£108.9m local supply chain expenditure** will be created during the construction period.

The construction activity from the implementation of the project also provides a real opportunity to increase skills in the area. Based on the anticipated construction spend and assumptions relating to labour costs, average wages and new entrants, it is estimated that between 7,000 and 7,500 person weeks of **training** could be provided.

In terms of **apprenticeships**, it is expected that approximately 78 apprentices could be engaged during the project. Though the activities of Manchester Life Development Limited, a joint venture

[8] Experian Regional Planning Service – based on ONS data.

with Manchester City Council, which has delivered new developments in Ancoats and New Islington, the wider group has significant experience of successfully delivering construction apprenticeships, as shown in Box 1.

Box 1: Manchester Life Apprenticeship Programme

In 2015, the Manchester Life Apprenticeship Scheme, a partnership between Manchester City Council, Manchester Life, The Manchester College and Manchester Life's supply chain, was created to support more local young people into careers in construction and development. There have been 26 Higher Apprenticeships over the past two years, with Year 4 recruitment currently underway.

Apprentices are employed by one of the Manchester Life partner companies for two years, with an annual salary, local travel costs covered, and placements across six partner companies, providing the apprentices with a broad base of skills to kick-start their careers.

Placements include Manchester Life development team, architect, engineer, project manager, building contractor, quantity surveyor and within the local authority planning department. Apprentices also study with The Manchester College for a Level 4 HNC in Construction and work towards a Level 4 NVQ in Construction and the Built Environment. At the end of two years, the apprentices can continue with a general qualification to a Level 5 Higher National Diploma or transfer to a specialist degree. Apprenticeships will count as the first year of a degree course.

The apprentices supported by Manchester Life have hugely benefited from this experience and have now obtained full-time employment in the industry. Manchester Life have continued to liaise with their apprentices during their onward careers, as shown by the strong successes below:

- **Benjamin Susca at Mace**: Ben won 'Apprentice of the Year' at the Made in Manchester Awards. Ben explained in 2019 that "*I started with Mace in August 2015 after enrolling on an apprenticeship programme called the Manchester Life Advanced Apprenticeship. During my time on the apprenticeship programme, I undertook various roles at different companies as well as attending college on a day release basis. At the end of the two years I gained a level four HNC and NVQ in construction and the built environment*".
- **Jessica Sharples at Eric Wright Construction**: Jessica is an assistant site manager at the company, after completing the Manchester Life Advance Apprenticeship as part of the 2018 cohort. Jessica explained in 2023 that "*Without the Manchester Life Apprenticeship I wouldn't have been able to find my career and path in the construction sector and understand what the construction industry entails. Eric Wright's sponsorship and differing placements have enabled me to gain a true representative understanding of the different stakeholders in the industry from client-side management to architectural aspects as well as main contracting*".
- **Jack Layfield at Caddick Construction**: Jack is a site engineer at Caddick Construction, after completing the Manchester Life Advance Apprenticeship as part of the 2016 cohort. Jack explained in 2023 that "t*he Manchester Life apprenticeship enabled me to gain a wealth of knowledge and experience in a variety of disciplines within construction. I was able to work on projects at different stages for both contractors and consultants, which not only helped me understand what best practice looks like, but also where my interests and skills could be best applied. Ultimately, the apprenticeship provided me with an excellent foundation for a successful career in construction*".

3.2 Operational impacts

3.2.1 On-site employment

City Football Group is already a significant employer in Manchester with approximately 2,776 people employed directly or indirectly in a variety of full-time, part-time, casual and matchday support roles. Based on information provided by MCFC, it is estimated that current operations support **1,100 full time equivalent jobs (FTE) on site** (including through third party providers). It is also estimated that the on-site operations of the Co-Op Live Arena will support **586 FTE jobs**.

As a result of the North Stand Development, new on-site employment will be created. Based on information supplied by MCFC, its consultant teams and AMION projections, it estimated that **602 full time equivalent jobs** will be created on-site (1,131 when part time and casual workers are taken into account) including:

- 223 full time equivalent jobs created in the 4,180 sqm of new commercial workspace (based on typical employment densities for co-working and managed workspaces[9]);
- 133 full-time equivalent jobs created in the new 401-bed hotel (based on typical employment densities in mid-scale hotels[9]);
- 92 full-time equivalent jobs created in the 2,300 sqm of new food and beverage units (based on typical employment densities for restaurants and cafes[9]);
- 85 full time equivalent jobs created within MCFC's back-office functions (operations, legal, HR, finance, marketing etc.) based on an assumed 10% increase of existing CFG employment;
- 38 full time equivalent jobs created within the Etihad Stadium on catering, stewarding, security and car parking based on a 15% increase in overall stadium capacity and requiring around 285 additional people on any given matchday/event night;
- 11 full time equivalent jobs created in the new Etihad Stadium events space (City Hall) based on trading projections provided by MCFC;
- 9 full time equivalent jobs created in the new interactive visitor attraction based on employment levels at other similar venues (The O2, Tottenham, Anfield, ArcelorMittal Orbit and Cutty Sark);
- 7 full time equivalent jobs created in the new 1,408 sqm shop which is additional to existing employment within the club's retail operations (based on typical employment densities in retail[9]); and
- 4 full time equivalent jobs created in the new 480 sqm museum which is additional to existing employment within the museum (based on typical employment densities within visitor attractions[9]).

Upon completion of this phase of work and once fully operational, it is estimated that the site will support a total of **2,288 full time equivalent jobs** (including existing employment and Co-Op Live).

[9] Employment Density Guide (3rd Edition), Homes and Communities Agency, 2015

However, the number of actual jobs created will be higher once part-time and casual workers are taken into account and is likely to be in the order of **5,000 jobs**.

3.2.2 Indirect employment from off-site visitor expenditure

In addition to the onsite employment that will be created as a result of the new development, the site will generate further economic impact by attracting additional visitors to the area who will go on to spend with other businesses which in turn will create and support employment.

With stadium capacity increasing by 7,910 seats, annual matchday and concert attendance could increase from 1.66m to 1.91m (250,000 additional).

Furthermore, it is estimated that an additional 20,000 people will attend conferences, functions and events in the new events venue, City Hall.

In total therefore, a typical season would see approximately 1.93m visitors to the Etihad Stadium (an increase of 270,000).

Data from Visit Britain[10] suggests that day visitors to Manchester spend £43.07 per head whilst overnight leisure visitors spend an average of £228.25 per trip. Meanwhile, ONS[11] data suggests that overseas visitors to Manchester spend an average of £430.56 per trip.

In estimating off-site visitor expenditure, it has been assumed that:

- the number of season ticket holders will not increase but that the additional capacity will be taken by home supporting 'match-by-match' fans;
- the geographic profile of these additional visitors will reflect the existing profile of home-supporting match-by-match ticket buyers (30% Greater Manchester, 50% rest of UK, 20% from overseas);
- all visitors from Greater Manchester are day visitors;
- 80% of visitors from the rest of UK are day visitors and 20% stay in Manchester; and
- all visitors from overseas stay in Manchester.

It is estimated that the 270,000 additional visitors to the Etihad Stadium will generate £35.8m of off-site visitor expenditure each year. This £35.8m of additional off-site visitor expenditure has been converted to FTE jobs by employing a metric derived from a Deloitte study[12] on behalf of Visit Britain in 2013 which asserts that £54,000 of visitor expenditure is required to support 1 FTE job. After inflating this figure to 2022 prices, it is estimated that visitors to the Etihad Stadium will support an additional **550 full time equivalent jobs** in the Greater Manchester visitor economy (hotels, taxis, transports, parking, bars, retail and restaurants).

Taking account of existing activity and including Co-Op Live, off-site visitor expenditure associated with visitors will support 2,710 full time equivalent jobs (c.4,065 jobs when part time employment is taken into consideration).

[10] Great Britain Day Visitor Survey 2019 and Great Britain Tourism Survey 2019

[11] International Passenger Survey 2019

[12] The economic contribution of the tourism economy in the UK, Deloitte and Oxford Economics for Visit Britain, 2013

3.2.3 Indirect and induced employment

In buying-in goods and services from the wider supply chain, MCFC and its partners on-site will contribute to further rounds of indirect employment. In addition, employees use their wages and salaries to purchase additional goods and services which creates further rounds of employment. This is known as the induced effect.

To take account of the indirect and induced effects, a composite multiplier is applied to the employment figures set out above. A multiplier of 1.56 has been applied at the Greater Manchester level which takes account of national guidance and benchmarks and specifically the HCA Additionality Guide which provides specific figures for recreation projects.

3.2.4 Total employment

Upon completion of the project, MCFC will be supporting an estimated 5,975 full time equivalent jobs through on-site employment, employment created through off-site visitor expenditure, indirect supply chain employment and induced employment through household expenditure. Co-Op Live Arena will be supporting 1,166 FTE jobs.

This is an increase of 1,795 full time equivalent jobs. The actual number of people employed will be much higher once part-time and casual working is accounted for (likely to be in the order of 2,925 additional jobs).

Table 3.3: Employment impact

	Baseline	Future	Additional
On-site employment FTE	1,100	1,700	600
Off-site visitor expenditure employment FTE	1,580	2,130	550
Indirect and induced employment FTE	1,500	2,145	645
Co-Op Live	1,166	1,166	0
Total full-time equivalent jobs	**5,346**	**7,141**	**1,795**
Total jobs including full time, part time and casual	9,375	12,300	2,925

Data from the Office of National Statistics (based on census data) shows that 62% of workers in Manchester come from outside of the Manchester local authority and 16% of workers travel in from outside of Greater Manchester. It is therefore assumed that leakage is 62% at the Manchester level and 16% at the Greater Manchester level.

Given the very special and unique nature of the facilities being created it is considered that there will be no displacement of economic activity from elsewhere.

3.2.5 Total GVA impact

An assessment has been undertaken of the net additional GVA generated as a result of the operational jobs expected to be created through the project. This has been based on the FTE job

estimates and average GVA per FTE job figures in Greater Manchester (sourced from Experian local market forecasts).

Overall, it is estimated that the North Stand development, once fully operational, will add £71.7 million of net additional GVA per annum into the Greater Manchester economy. Since GVA is a workplace measure, leakage has been added back when considering net additional GVA.

Table 3.4: GVA impact

	Baseline	Future	Additional
Total employment (FTE)	5,346	7,141	1,795
Total jobs (including part time/casual)	9,375	12,300	2,925
GVA per FTE employee in GM visitor economy	£39,969	£39,969	£39,969
Total GVA per annum	**£213,674,274**	**£285,418,629**	**£71,744,355**

4 Wider Social Impacts

4.1 Social Impact of Previous Investment at the Etihad Campus

Aside from investment into the Etihad Stadium, MCFC and City Football Group have also created significant landmark facilities, building on the largely public sector investment into sporting facilities for the 2002 Commonwealth Games, and effectively extending the Campus to form the Beswick Hub.

The City Football Academy is home to Manchester City's men's and women's teams, Elite Development Squad and youth development. City Football Academy includes 16.5 football pitches (including a community use pitch), a 7,000 capacity stadium and staff offices. City Football Academy is the Headquarters of City Football Group's global operation. Built on an 32 hectare (80 acre) site at the heart of East Manchester, adjacent to the Etihad Stadium, MCFC spent twelve months remediating the polluted site before building work could begin.

As part of the joint venture between MCFC and the Council, 2.2 hectares (5.5 acres) of this land was donated for public use and is now home to the East Manchester Leisure Centre, Connell Co-op College and the Manchester Institute of Health & Performance (MIHP).

Each of these facilities is a significant development in their own right. The establishment of all four in quick succession represented a once-in-a-generation opportunity to accelerate the economic regeneration of East Manchester and deliver a range of lasting social, economic and environmental benefits to the local community.

New Economy were commissioned in 2016 to evaluate the impact of this investment. That analysis estimated that the total public value benefits of these new facilities would be £206 million over the next decade, including £89 million from permanent jobs creation, £51 million from improved educational outcomes, £38 million from health benefits, and £28 million from increased visitor spending. There were also public value benefits during the construction phase.

4.2 City in the Community

Founded in 1986, City in the Community is MCFC's charity, supporting people across Greater Manchester by empowering healthier lives through football. Youth-led programmes place physical and mental wellbeing at their core, whilst also creating healthy future and healthy communities.

Between 2018 and 2022, City in the Community has delivered 11,273 hours of programmes (7,002 from the City Football Academy and 4,271 from the Etihad Stadium) to 78,488 participants, together with outreach activities in Greater Manchester schools across the following projects:

(i) Healthy People

City Play is a bespoke programme that provides physical activity sessions for children aged between 2 and 5 years in nurseries and schools across Greater Manchester. Each themed session delivers a variety of fundamental movement and skills in a fun, engaging and inclusive environment. These sessions reflect the 7 learning areas of the EYFS framework, helping children to meet the nationally recognised 3 hours of physical activity per day. The programme aims to

use the power of football and the MCFC brand to encourage children in Manchester to live a health and active lifestyle from a young age.

City in the Community delivers the **Premier League Primary Stars** programme in schools across Greater Manchester. Pupils and teachers take part in national curriculum PE lessons, extra-curricular activities, PSHE lessons, English and Maths workshops, targeted interventions and collapsed curriculum days. City in the Community coaches work in five schools per week and deliver a full day each week of the academic year to each school. The aim is to use the inspiration of MCFC and the Premier League to engage pupils and teachers to lead healthier, more active lifestyles. The programme also intends to improve teacher's confidence and competence when delivering PE and School Sport, and to increase children's enjoyment and engagement in this area.

City in the Community **Soccer Schools** uses the brand of MCFC to engage participants in open access football, increasing physical activity throughout the school holidays with regular sessions in communities across the city. Participants are provided with free full day structured coaching sessions as well as free food provision at all sites to tackle holiday hunger in the most deprived areas of the city. Sessions are also adapted to include educational and supportive workshops to highlight important topics such as mental health and anti-bullying.

One City Disability provides opportunity for participants to take part in free football and sporting provision relevant to their specific disability. Sessions are held in Primary and High Schools as well as in community venues outside of school hours ensuring that participants across Greater Manchester have access to disability specific provision and education. Disabled participants do not always feel comfortable or able to access universal provision, so it is important to provide disability specific sports to provide participants with a development and participation pathway, regardless of their disability or impairment.

City in the Community provides two free **Walking Football** session per week, aimed at engaging older participants in regular physical activity. By coming to the sessions, participants can meet others and build social relationships. Some individuals come to the sessions for the social interaction specifically as this is the only place that they have someone to talk to. City in the Community take this social interaction further by giving participants that chance to travel and play other Premier League teams that also have walking football sessions.

City Thrive embeds a mental health curriculum across all City in the Community programme for people aged up to 25. In partnership with the NHS, City Thrive utilises a blended approach, using football sessions, group workshops and one-to-one mentoring to educate students around mental health subjects whilst also equipping them with the tools to regulate their own mental wellbeing in a post COVID-19 landscape. The programme also embeds an NHS mental health clinician within the City in the Community team four days a week, meaning that participants can access immediate support if needed.

Reminiscity was launched to create a dementia safe environment for participants to enjoy social and physical activity, thought the conduit of football and MCFC, to promote active and engaged lifestyles in the face of the challenges dementia can bring. The Reminiscity programme consists of a six-week programme of activity, taking place in and around the Etihad Stadium and Campus. Activity includes social elements, where participants can relive classic MCFC matches and group discussions on MCFC history, as well as physical activity such as stadium walks and arts and crafts.

(ii) Healthy Futures

The **City Girls** project engages female participants with free football training, leadership and mentoring opportunities. Through after-school clubs and community satellites, girls across Greater Manchester have the regular opportunity to play for free with City in the Community. Using the power of football and brand of MCFC, the City Girls project aims to provide safe spaces for girls to engage in football, improve their physical and mental wellbeing and develop their leadership skills.

Partnered with the Premier League, **City Inspires** aims to use the appeal of MCFC to work with secondary school learners who are at risk of not reaching their potential, and to support them through the education system and early adulthood. City in the Community coaches deliver a high-quality education curriculum that inspires pupils to succeed and excel academically, physically and socially. The programme provides an opportunity for pupils to learn essential life skills, with a focus of improving their engagement in education, prosocial behaviours and mental well-being. Within the City Inspires programme, City in the Community offers a wide range of PSHE sessions, which schools can choose from to tailor the programme to the needs of their students. It place a strong focus on behaviour, welfare and personal development as it is felt that these topics are vital for the cohorts that the programme is aimed at.

Delivered in colleges across Greater Manchester, City in the Community's **BTEC** programme aims to be totally inclusive, offering places to both male and female participants without trials. Coaches deliver a holistic education of football, supporting those who want to develop their skills and abilities on the pitch as well as receiving classroom-based education as well. The programme provides an opportunity for students who are passionate about football and their education, to combine the two as part of this course. The curriculum provides students with an insight into what life would be like coaching in an academy session, through the way in which City in the Community staff deliver sessions.

City in the Community's **Foundation and BSc Degree** programme brings together community football coaching knowledge with Manchester Metropolitan University's academic expertise, to offer the best of both worlds and an integrated path to rewarding career goals. With work-based learning in elite, professional sporting surroundings, this BSc course provides students with the skills, knowledge and experience needed to find success as a coach or sports programme leader.

City Careers is an eight-week employability programme, working in areas of deprivation creating health and education benefits, with an aim of getting young people into education and employment. Over the duration of the course, participants work with City in the Community officers, staff and external partners, on a series of employment workshops, with a focus on developing soft employability skills such as CV and cover letter writing, interview practice and how to approach job applications. There is also the opportunity to gain qualifications, such as ASDAN Level 1 Award in Employability Skills, First Aid Qualification, as well as Food Hygiene and Sale2Site Online CSCS qualifications.

In partnership with Hays, **92:30** is a long-term **Volunteer Programme** providing skills, experiences, qualifications, and pathways into employment both within City in the Community and across its network of partner organisations. Named after the iconic moment in May 2021, when MCFC became league champions for the first time in 44 years, it aims to inspire participants to never give up. 20 young people aged 16-25 from across various City in the Community programmes will

complete up to 93 hours of volunteering. Opportunities are designed to develop their skills and experience, to help them prepare for the world of work.

(iii) Healthy Communities

Kicks is an outreach programme which provides free evening, weekend and school holiday provision. Through mentoring and open-access football sessions, including specific Female Empowerment and disability provision, Kicks is delivered six days a week, 48 weeks a year, ensuring City in the Community has a consistent presence across Greater Manchester. The Kicks project addresses the lack of opportunity for those living in areas of social deprivation whilst providing positive activities at times and in communities where there is a gap in youth provision.

Kicks Targeted provision works alongside the Kicks regular sessions to deliver a bespoke mentoring programme for young people aged between 8-19 years, who are at risk of being affected by Serious Youth Violence, either as a victim or perpetrator. Young people are referred into the programme either by GMP or Youth Offending services, before they're given a personal development plan catered to their specific needs and circumstances. The overall aim is to transition the young people into positive activity, either with City in the Community or through an external partner.

The **Military Vets** project helps armed forces personnel stay active during and after transition to civilian life. It is a space for ex-military personnel to engage with each other, and enjoy the social aspects which team sports give, whilst maintaining regular physical exercise.

City Play Together is an initiative to help get families and their children aged between two and five taking part in physical activity together. This programme helps children and their parents to lead a healthy and active lifestyle.

4.3 Manchester Institute of Health & Performance (MIHP)

4.3.1 Overview

The MIHP is a world-class healthcare facility, combining modern diagnostic technology, sport medicine and education. MIHP was founded by Manchester City Council, Sport England and City Football Group, and is operated by Nuffield Health. The partnership brings together leaders from both elite and community sport, healthcare and local government to deliver cutting-edge facilities to the local community.

4.3.2 Community Outreach Examples

Nuffield Health launched a **Joint Pain Programme** and COVID Virtual programmes and have reached 130 beneficiaries and £1,151,000 Social Return on Investment (SROI). The Joint Pain Programme, trialled at the MIHP, has proven clinically effective and a switch to a non-cohort model allows more participants during the year. Nuffield Health intend to roll this programme out nationally later this year. 10 students from Connell Co-op College have shadowed the Joint Pain Programme and 202 students have been to an expert talk / applied learning session.

The clinical effectiveness analysis of the self-managed **COVID Rehab Programme** will be completed later this year, with positive initial beneficiary feedback.

Partnering with DWP and GMP, Nuffield Health have delivered over 100 health checks to police officers and staff.

Ten local people have been on courses in Nuffield Health's **Community Academy**.

Talk & Share, a mental health community café and the first Community Grant Project, has been launched. The café aims to reduce isolation, poverty and improve mental health by providing a welcoming space and free food. The café has been funded for another 20 weeks and is proving to be a great way for Nuffield Health to get to know more local people and become a trusted face.

Nuffield Health provided the warm-up for the MCFC Blue Run at the end of March 2023. The fitness team delivered a 10-15 minute warm-up to over a thousand runners on the day together with free blood pressure checks.

4.3.3 Research and Applied Activities

The **Major Trauma Enhanced Rehab** project is a partnership between Nuffield Health, Manchester University Foundation Trust and Northern Care Alliance NHS Trust. The foundations of the project are built around the legacy work undertaken at MIHP following the Manchester Arena Bombing in 2017.

Patients affected by Major Trauma have suffered life-altering injuries that severely impact their function, mental health and well-being. Funding has been secured for 50 patients to receive six months of intensive rehabilitation at MIHP, visiting twice per week for up to two hours at a time. Treatment is delivered by an interdisciplinary team of Surgeons & Consultants, Physiotherapists and Occupational Therapists, with Nuffield Health supporting with the provision of specialist equipment, facilities and expertise.

The 37th patient has recently been accepted into the programme. Mid-way outcomes are available for over half of the patients and the first three patients who have completed their full six months have been discharged and have transitioned into their complimentary membership to continue with their recovery with the support of teams in Nuffield Health's fitness and wellbeing centres.

This project is supported by the PROPERLY Study, which aims to assess the feasibility of this method of service provision with plans to influence the pathways for Major Trauma rehabilitation across Greater Manchester and beyond. The trial has received ethics sign off and is supported by Manchester University.

4.4 Impact of the Etihad Campus on Young Athletes

The world-leading co-location of facilities at the Etihad Campus, together with the educational and physical activity pathways offered by the key stakeholders, has made a huge impact on young Manchester athletes, including:

- **Jona Efoloko** is a member of Sale Harriers and a former Loreto High School student. His junior achievements include World U20 Champion and European U18 Champion in 200m. In 2022 he won gold medals for 100m relay ay the European Championships in Munich and the Commonwealth Games in Birmingham before achieving a bronze in the same event at the World Championships in Eugene Oregon. Previously a keen footballer, Jona's talent was

spotted at school, and he was then invited to train with Sale Harriers at the Regional Arena at the Etihad Campus.

- **Abigail Irozuru** is a member of Sale Harriers who specialises in Long Jump. Manchester born and raised, she began participating in athletics as a 14-year-old, leading to an invitation to start training at the Regional Arena on the Etihad Campus. Her most recent achievements include competing at the Tokyo Olympics in 2021, where she placed 9th.
- **Aimee Pratt** was 13 when she was introduced to athletics through the Diane Modahl Sports Foundation at her school, Wright Robinson College. She then joined Sale Harriers, training regularly at the Regional Arena, Etihad Campus under coach Vicente Modahl. The 3000m steeplechaser competed in her first Olympics in 2021 and reached the finals of the Commonwealth Games (4th) and World Championships (7th) in 2022.

5 Summary

5.1 Overview

The redevelopment of the Etihad Stadium will include:

- an improved North Stand with an additional 7,910 seats (including 750 in the new Sky Bar);
- a new 401-bed hotel integrated into the North Stand;
- a new corporate hire and entertainment venue with a capacity of up to 1,250 (City Hall);
- an improved 'City Square' for pre and post-match entertainment and other non-matchday events with 2,300 square metres of new food and beverage outlets (open to the public);
- a new 4,180 square metre commercial workspace with spaces let to start-ups, scale-ups and SMEs;
- a new museum and club shop replacing existing facilities;
- a new interactive (high-wire) visitor attraction; and
- improvements to public realm.

Manchester is ranked as the 8th most income-deprived local authority in England with 22% of its population considered to be 'income-deprived'. The project will create a significant number of new jobs in Manchester and Greater Manchester and many of these jobs will be taken up by local residents, helping to generate increased economic activity, retain skilled people within the area and bring more people into employment. The project is perfectly aligned with a number of local, regional and national policy areas which aim to improve neighbourhoods, create employment, attract visitors, increase productivity and develop skills.

Crucially, the North Stand development including the new hotel, new events venue, new food and beverage outlets and new visitor attractions will enable MCFC, its partners and tenants to offer more high quality, year-round non-matchday employment which is more likely to be full-time and permanent as opposed to the seasonal/matchday/temporary employment that is currently prevalent. As part of this, MCFC is developing, in partnership with a local education provider, plans to create a **'Service Sector Skills Academy'** which will promote careers in the hospitality sector and will deliver training, qualifications and professional development within a centre of excellence for hospitality and leisure.

5.2 Construction impacts

The construction project will inject £191.1m of GVA into the Greater Manchester economy over the course of three years (£84.6m into Manchester) and could provide 2,678 gross jobs. This is the equivalent of 890 people being employed full time for three years.

MCFC will encourage its construction partners to use a significant amount of local labour, engage with well-established local supply chains and create meaningful apprenticeships and training opportunities for local people.

The construction activity from the implementation of the project also provides a real opportunity to increase skills in the area and could provide between 7,000 and 7,500 person weeks of training. In terms of apprenticeships, the construction project could result in up to 100 apprenticeship opportunities over the course of the construction phase.

5.3 Operational impacts

Upon completion of the project, activity at new world class entertainment district will support a total of 12,300 jobs in the Greater Manchester economy (7,141 full time equivalents). This represents an increase of 2,925 jobs (1,795 full time equivalents) in Greater Manchester with 1,112 jobs taken by residents of Manchester (682 full time equivalents).

The number of visitors to the destination will increase from a baseline of 2.66m (including Co-Op Live) to 2.93m and the additional visitors will spend an extra £35.8m within Greater Manchester's visitor economy each year.

Overall, it is estimated that the project will inject an additional £71.7m of GVA into the Greater Manchester economy each year.

The impact of the North Stand Development goes beyond simple job creation. In particular, the creation of the new 4,180sqm workspace will encourage business growth and new business formation which, in turn, will underpin local growth in East Manchester. The workspace will house a cluster of growing SMEs who work with MCFC, as well as businesses who want to be close to the new Co-Op Live Arena and to MCFC. MCFC's global platform and its influence on football and sports innovation will attract businesses, start-ups and SMEs to the new workspace. As this matures, it is expected that the demand for grow-on space elsewhere in East Manchester and Manchester more generally will increase.

In the visitor economy, the development of a 401-bed hotel is crucial, not only to meet the demand generated on matchdays and from the future Co-Op Live Arena but to underpin the area as a year-round destination which, in turn, will attract new private investment and further job creation. The North Stand Development with hotel, visitor attractions and entertainment spaces is another milestone in the creation of MCFC's longer term ambition (which is shared by the local authority) to create a world-class entertainment district in East Manchester.

5.4 Wider social impacts

MCFC and City Football Group have created significant landmark facilities and delivered extensive community, sport and health programmes outside of the Etihad Stadium. The City Football Academy has been built on a polluted, former industrial site adjacent to the Stadium. As part of the joint venture between MCFC and the Council, 2.2 hectares (5.5 acres) of this land was donated for public use and is now home to the East Manchester Leisure Centre, Connell Co-op College and the MIHP.

City in the Community is MCFC's charity, which supports people across Greater Manchester by empowering healthier lives through football. Between 2018 and 2022, it has delivered 11,273 hours of programmes (7,002 from the City Football Academy and 4,271 from the Etihad Stadium)

to 78,488 participants, together with outreach activities in Greater Manchester schools across its Healthy People, Healthy Futures, and Healthy Communities programmes.

The MIHP is a world-class healthcare facility, combining modern diagnostic technology, sport medicine and education. It was founded by Manchester City Council, Sport England and City Football Group, and is operated by Nuffield Health. The partnership brings together leaders from both elite and community sport, healthcare and local government to deliver cutting-edge facilities to the local community. It has delivered a wide range of community outreach activities, including the Joint Pain Programme and Talk & Share, a mental health community café. In addition, it undertakes research and applied activities, such as the Major Trauma Enhanced Rehab project.

The world-leading co-location of facilities at the Etihad Campus, together with the educational and physical activity pathways offered by the key stakeholders, has made a huge impact on young Manchester athletes including, Jona Efoloko, Abigail Irozuru, and Aimee Pratt.

5.5 Summary

Table 5.1: Summary of benefits

	Baseline	Future	Additional
Construction phase (temporary)			
Gross construction jobs (temporary)	0	2,678	2,678
Full time construction jobs for three years	0	890	890
Net additional GVA in GM (temporary/one-off) *Of which in Manchester*	£0 *£0*	£191.2m *£84.6m*	£191.2m *£84.6m*
Apprenticeships	0	78	78
Training (person weeks)	0	7,250	7,250
Operational phase			
Total jobs supported in Greater Manchester *Full time equivalent*	9,375 *5,346*	12,300 *7,141*	2,925 *1,795*
Total jobs taken by residents of Manchester *Full time equivalent*	3,564 *2,031*	4,676 *2,713*	1,112 *682*
GVA per annum in Greater Manchester	£213.7m	£285.4m	£71.7m
Matchday attendance	1,413,000	1,625,000	212,000
Non matchday attendance	250,000	308,000	58,000
Co-Op Live Arena attendance	1,000,000	1,000,000	0
Visitor expenditure with other businesses in GM	£145.6m	£181.4m	£35.8m