



**ELEMENT**  
**SUSTAINABILITY**

**98 WILMSLOW ROAD,  
MANCHESTER**

# **ENVIRONMENT STANDARDS REPORT**

**FEBRUARY 2022**

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|  |  |  |
| Charles Atkins<br>Sustainability Consultant                                       | Caroline<br>Director                                                              | Laurie Wills<br>Director                                                             |

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**ELEMENT**  
SUSTAINABILITY

phone: 01829 733 444

email: [hello@elementsustainability.co.uk](mailto:hello@elementsustainability.co.uk)

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www: [www.elementsustainability.co.uk](http://www.elementsustainability.co.uk)

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Appendix A- BREEAM Pre-Assessment

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## 1. INTRODUCTION

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Element Sustainability has been commissioned by Views Limited to review the sustainability performance of the proposed scheme at 98 Wilmslow Road, Manchester.

The purpose of this statement is to summarise the relevant policy background and requirements of Manchester City Council (hereafter referred to as the council) and demonstrate the ways in which the developer, Views Ltd, has addressed these aims through their proposals, ensuring all practicable measures have been taken in order to deliver a sustainable development at this site.

Details of the design attributes, specifications and characteristics of the scheme are appraised in order to demonstrate how the proposals contribute to sustainable development in Manchester and seek to mitigate the environmental impacts of the scheme, providing a sustainability appraisal in support of the planning application.

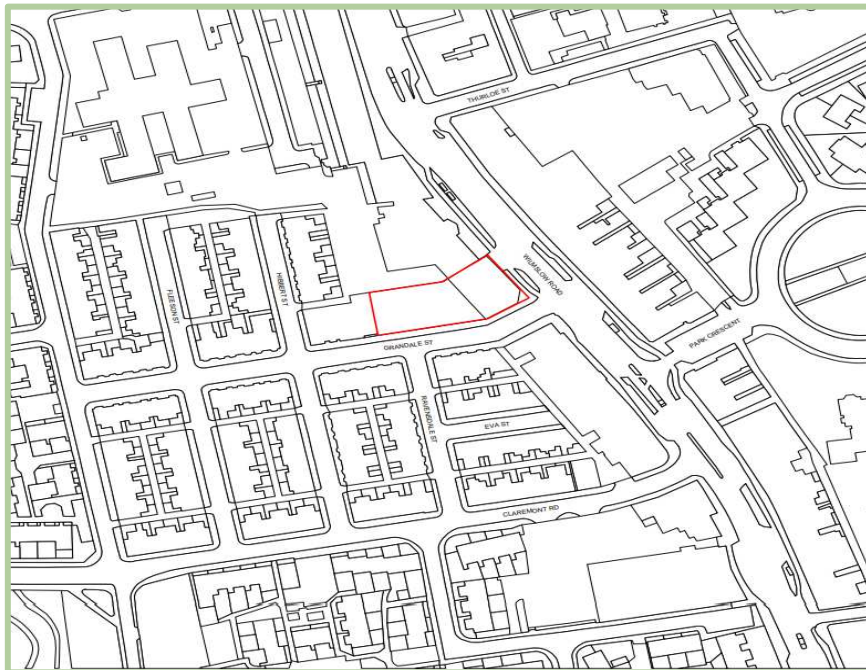


## 2. DEVELOPMENT PROPOSALS

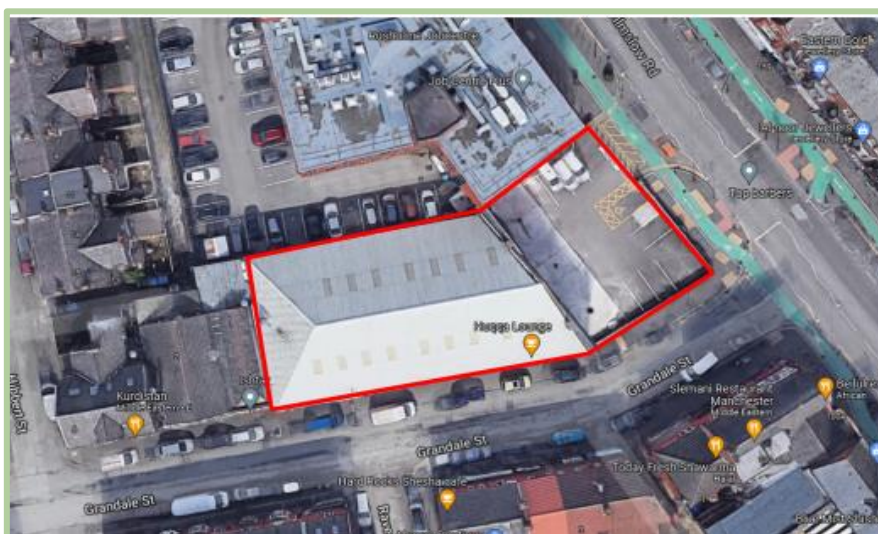
### 2.1 Development Site Description

The application site is located along the junction of Wilmslow Road and Grandale Street, within the Rusholme area of Manchester. The site is currently occupied by a restaurant building and customer car park which is accessed via Wilmslow Road to the east. Rusholme Jobcentre and associated car parking is located directly to the north of the application site and Grandale Street forms the site boundary to the south.

*Figure 2.1- Site Location Plan*



*Figure 2.2 – Pre-development Site*



## 2.2 Development Proposals

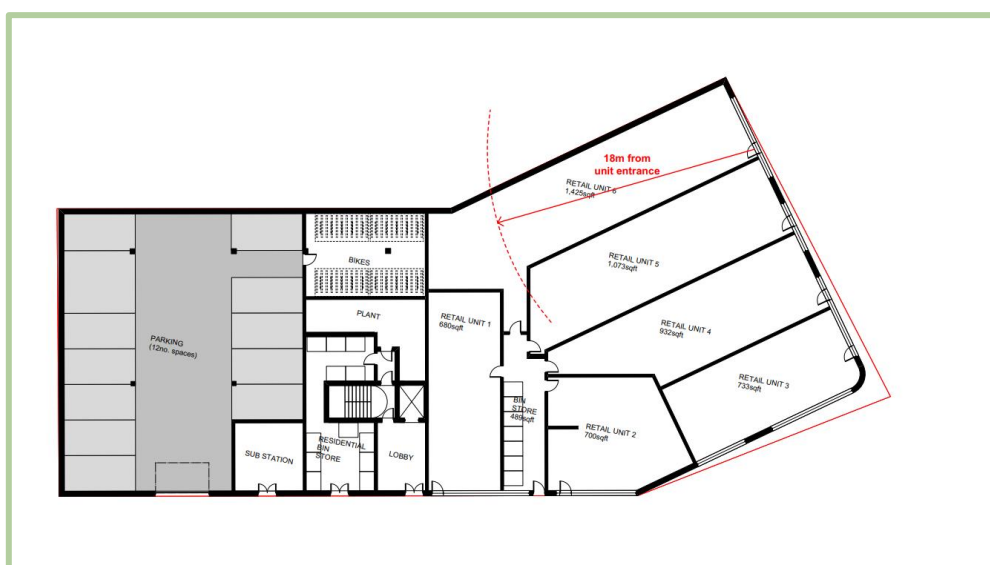
Planning approval is sought for the redevelopment of the site to provide a mixed-use scheme including 6no. retail units at ground floor level with 42 no. residential apartments on the floors above, with residential car and cycling parking. The site will be accessible from Wilmslow Road.

The following table shows the accommodation summary for the Site.

*Table 2.1 – Accommodation Schedule Summary*

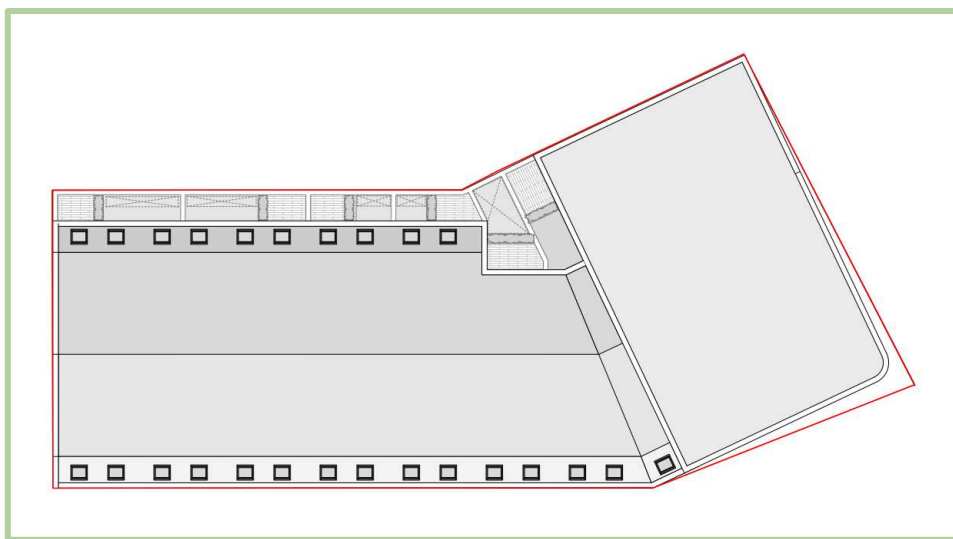
| Floor                 | 1 Bed Apartments | 2 Bed Apartments | 3 Bed Apartments |
|-----------------------|------------------|------------------|------------------|
| Ground                | 4                | 9                | 1                |
| 1 <sup>st</sup> Floor | 4                | 9                | 1                |
| 2 <sup>nd</sup> Floor | 4                | 9                | 1                |

*Figure 2.2 – Proposed Ground Floor Layout*



*Figure 2.4 – Proposed First Floor Layout*



*Figure 2.4 – Proposed Second Floor Layout**Figure 2.5 – Proposed Roof Layouts*

*Figure 2.6 Proposed Elevation Plan*

### 3. POLICY REVIEW

#### 3.1 National Planning Policy

The National Planning Policy Framework (NPPF) 2021 states that the planning system should play an active role in guiding development to sustainable solutions. At the heart of the 2021 updated NPPF lies the ‘presumption’ in favour of sustainable development; the golden thread running through plan-making and decision taking. There are three dimensions to sustainable development, as stated within the NPPF: economic, social, and environmental. These dimensions give rise to the need for the planning system to perform a number of roles:

**An economic role** – contributing to building a strong, responsive, and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;

**A social role** – supporting strong, vibrant, and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating beautiful and safe places, with accessible local services that reflect the community’s needs and support its health, social and cultural well-being; and

**An environmental role** – contributing to protecting and enhancing our natural, built, and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

These dimensions are considered to be mutually dependent with the NPPF, in its entirety, defining sustainable development. The NPPF states that ‘the purpose of the planning system is to contribute to the achievement of sustainable development’ (paragraph 7). It summarises the objective of sustainable development as meeting the needs of the present without compromising the ability of future generations to meet their needs. It goes on to state that at a similarly high level, members of the United Nations – including the United Kingdom – have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030. These address social progress, economic well-being, and environmental protection.

#### 3.2 Local Planning Policy

##### 3.2.1 Manchester Core Strategy

Manchester's Core Strategy (CS) was adopted on 11<sup>th</sup> July 2012 and is the key Development Plan Document in the Local Development Framework (LDF).

**CS Policy DM 1 - Development Management** requires all development to have regard to a number of development principles. Subject to scheme viability, developers may be required to demonstrate that new non-domestic development to achieve a BREEAM Rating of ‘Very Good’ or for domestic development to achieve the Code for Sustainable Homes standard<sup>1</sup>.

**CS Policy EN 4 - Reducing CO<sub>2</sub> Emissions** by Enabling Low and Zero Carbon Development requires all development to follow the principle of the Energy Hierarchy, being designed:

<sup>1</sup> On the 25<sup>th</sup> of March 2015 the Government issued a Written Ministerial Statement setting out the conclusion of the Housing Standards Review. The statement set out a new policy on the application of technical housing standards that applied immediately to all local planning authorities and qualifying bodies. This had a direct effect on the application of existing Code policies, and the setting of new Code policies. The Government elected to remove the Code for Sustainable Homes and incorporate new additional optional Building Regulations on water and access, and a new national space standard.



- To reduce the need for energy through design features that provide passive heating, natural lighting and cooling;
- To reduce the need for energy through energy efficient features such as improved insulation and glazing; and
- To meet residual energy requirements using low or zero carbon energy generating technologies.

**CS Policy EN 5 - Strategic Areas for low and zero carbon decentralised energy infrastructure** include:

- The Regional Centre, which also includes the Oxford Road Corridor and Eastlands;
- District Centres and associated major development sites;
- Airport Strategic Site;
- Strategic housing location; and,
- Strategic employment locations.

Within these areas new development, regeneration and retrofit projects, will be expected to take place in the context of more detailed proposals for decentralised low and zero carbon energy infrastructure in the form of energy proposals plans.

**CS Policy EN 6 - Target Framework for CO<sub>2</sub> Reductions from Low or Zero Carbon Energy Supplies** requires applications for residential development of 10 or more units and all other development over 1,000m<sup>2</sup> to meet, as a minimum, the targets shown in the tables below, unless unviable.

*Table 3.1 – Policy EN6 CO<sub>2</sub> Emissions Reduction Targets; Domestic*

| Target                                           | % Minimum Requirements                                                                        |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <b>Target One: Network development area</b>      | CHP/District heating anchor or connection or where not feasible a 15% increase on Part L 2010 |
| <b>Target Two: Electricity intense buildings</b> | +15% increase on Part L 2010                                                                  |
| <b>Target Three: Micro generation area</b>       | +15% increase on Part L 2010                                                                  |

The Proposed Development falls under the Target 2 criteria and must comply with Part L (2013). The emission reductions targeted within policy EN6 relate to Building Regulation Part L 2010. As a consequence of the reduction in emission rates required by current building regulations (Part L, 2013) relative to Part L 2010, the revised equivalent target CO<sub>2</sub> emission reductions for the residential scheme are presented below:

- Residential - 9% dwelling emission rate reduction over Part L 2013; and
- Non-domestic – 6% building emission rate reduction over Part L 2013.

**CS Policy EN 8 – Adaption to Climate Change** requires all new development to be adaptable to climate change in terms of the design, layout, siting and function of both buildings and associated external spaces. In achieving developments which are adaptable to climate change developers should have regard to the following, although this is not an exhaustive list:

- Minimisation of flood risk by appropriate siting, drainage, and treatment of surface areas to ensure rainwater permeability;



- Reduction in urban heat island effect using Green Infrastructure such as green roofs, green walls, increased tree cover and waterways;
- The need to control overheating of buildings through passive design; and
- The opportunity to provide linked and diverse green space to enhance natural habitats which will assist species adaptation.

**CS Policy T 1 – Sustainable Transport** aims to deliver a sustainable, high quality, integrated transport system to encourage modal shift away from car travel to public transport, cycling and walking, to support the needs of residents and businesses and to prepare for carbon free modes of transport, the Council will support proposals that:

- Improve choice by developing alternatives to the car;
- Promote regeneration and economic vitality by relieving traffic congestion and improving access to jobs and services, particularly for those most in need and for those without a car;
- Improve access to transport services and facilities to enable disabled people and people with mobility impairments to participate fully in public life;
- Improve pedestrian routes and the pedestrian environment;
- Improve and develop further Manchester's cycle network (for example the Manchester Cycleway and the Trans Pennine Trail); and
- Facilitate modes of transport that reduce carbon emissions e.g., by incorporating charging points for electric vehicles, subject to their appropriate design and location.

### 3.2.2 Guide to Development in Manchester, Supplementary Planning Document

Manchester's Core Strategy requires that all new residential developments should accord with the design guidance set out in the Supplementary Planning Documents (SPD). The Guide to Development in Manchester SPD was adopted on 11<sup>th</sup> April 2007 and supports and enhances the ongoing shaping of the City by providing a set of reasoned principles which will guide developers, designers and residents. These principles include a number of environmental standards, and includes the following categories which are identified in the SPD:

- |                                            |                            |
|--------------------------------------------|----------------------------|
| • Energy efficiency;                       | • Waste management;        |
| • Renewable energy;                        | • Construction management; |
| • Environmental design;                    | • Biodiversity; and,       |
| • Water management and weather resilience; | • Waterways.               |



### 3.2.3 Manchester Residential Quality Guidance

This document provides guidance for building new build dwellings in Manchester. The residential quality guidance demands design excellence in all new housing built in the city, sets minimum space standards, and ensures high environmental standards. The guidance includes the following nine components:

**Make it Manchester** – developers must understand the city’s unique character, heritage old and new, density and scale in various parts of the city and appreciate how new homes will fit in to what’s already there.

**Make it bring people together** – new homes must encourage a sense of community and neighbourliness, offering a mix of tenures to promote a mix of people.

**Make it animate streets and spaces** – understand the relationship between new homes and its environment and create public space.

**Make it easy to get around** – make sure developments have good transport links, along with good walking and cycling provision.

**Make it work with the landscape** – development should improve the connection with the local environment with improved biodiversity, as well as greening and water schemes.

**Make it practical** – dealing with waste, car parking, bike storage and visitors should be made as easy as possible.

**Make it future proof** – design must anticipate the impacts of climate change and extreme weather with efficient design and adaptability.

**Make it a home** – sufficient space, natural light, privacy and storage are essential for people to settle down and flourish.

**Make it happen** – ensuring proposals are delivered, to a high quality, with high design standards and high sustainability.

### 3.2.4 Manchester’s Great Outdoors

**A Green and Blue Infrastructure Strategy for Manchester** aims to invest in the city’s Green and Blue infrastructure over the next 10 years (by 2025). Four objectives have been established to enable the vision to be achieved:

1. Improve the quality and function of existing green and blue Infrastructure, to maximise the benefits it delivers.
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.
3. Improve connectivity and accessibility to green and blue infrastructure within the city and beyond.
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.



### 3.2.5 Climate Emergency

On 10<sup>th</sup> July 2019, a motion asking MCC to formally declare a **climate emergency** was unanimously agreed. The motion declares that climate change is a serious risk to Manchester's future and committed to embedding the issue as an integral part of council decision-making – making sure that all key decisions are taken with the city's target of becoming zero-carbon by 2038 in mind. The council has agreed the following:

- To deliver the 2038 zero carbon target and determine if an earlier target can be possible;
- Encourage involvement in all wards by April 2020 through meetings as part of the Our Manchester strategy;
- Review all policies, processes and procedures to ensure the council can become carbon neutral. Present an action plan by March 2020 detailing how the city can stay within its carbon budget;
- Make climate breakdown and the environment an integral part of activity throughout the council, including all decision making, ensuring key decisions take into account the impact on achieving the zero-carbon target;
- Investigate measures to ensure future procurement is carbon neutral. Increase the percentage of social value with an additional environmental element;
- Work with suppliers to green their supply chains and support local production;
- Investigate and introduce measures to help reach domestic zero carbon levels including addressing fuel poverty and retrofitting existing homes; and
- Investigate ways to ensure that future local plans place a mandatory requirement for all new development to be net zero carbon by the earliest possible date.

In March 2020 the Executive adopted the Manchester Climate Change Framework 2020-2025. The five-year framework sets out measures that MCC will take in order to reduce carbon emissions from its buildings, energy use and transport. Measures include retrofitting buildings to improve energy efficiency, increasing the use of Electric Vehicle Vehicles, and seeking 100% renewable energy. Whilst this has also not been formally adopted into planning policy, it is a key consideration for future development proposals.

### 3.3 Emerging Policies

The Draft 'Places for Everyone' (PfE) Plan is a new long-term plan of nine Greater Manchester districts (Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan) for jobs, new homes, and sustainable growth. It has been prepared by the GMCA on behalf of the nine districts.

The Draft Plan will determine the kind of development that takes place across the city-region, maximising the use of brownfield land and urban spaces while protecting green belt land from the risk of unplanned development. It will also ensure all new developments are sustainably integrated into Greater Manchester's transport network or supported by new infrastructure.

The consultation for the PfE concluded in October 2021 and that it is now expected to progress to examination. It is therefore considered that the Plan is in an advanced stage of preparation.



### 3.4 Regulatory Framework

**Building Regulations, Part L - Conservation of Fuel and Power** sets the compliance standards for energy demand and carbon dioxide emissions from buildings. Guidance on how to meet the requirements of this regulation is provided within a number of approved documents. The relevant document is referenced below:

**Approved Document L1A** addresses the conservation of fuel and power in new dwellings. The Proposed Development is registered against Building Regulations, Part L1A (2013) which requires all newly constructed dwellings need to comply with 5 criteria set out in Approved Document L1A unless exempted through the transitional provisions:

- I. The predicted rate of carbon dioxide emissions from the dwelling (the Dwellings Emission Rate DER) is not greater than the Target Emissions Rate (TER). Additionally, the Dwelling Fabric Energy Efficiency (DFEE) is not greater than the Target Fabric Energy Efficiency (TFEE);
- II. The performance of the building fabric and fixed building services should be no worse than the design limits set out in Table 2 of the Approved Document;
- III. The dwelling has appropriate passive control measures to limit the effect of solar gains on indoor temperatures in summer;
- IV. The performance of the dwelling as built, is consistent with the DER, including site checking that the air permeability is within reasonable limits; and
- V. The necessary provisions for energy efficient operation of the dwelling are put in place including operating and maintenance instructions aimed at achieving economy in the use of fuel and power in a way that householders can understand.

**Approved Document L2A** addresses the conservation of fuel and power in new non-domestic buildings. The proposed development will be registered against Building Regulations, Part L (2013) which requires all newly constructed buildings to comply with the 5 criteria set out in Approved Document L2A:

- I. Achievement of an acceptable Building CO<sub>2</sub> Emission Rate. i.e., the BER is less than the TER (target emission rate for a notional building);
- II. Limits on design flexibility – including U-values, air permeability, air handling plant efficiency, duct leakage, insulation, lighting system efficiency;
- III. Limiting solar gains in summer;
- IV. Construction quality and commissioning - The BER must be recalculated as constructed; and
- V. Provision of information - Information must be provided to the building operator.

**Approved Document L1A (2021)** standards will come into effect in June 2022 and is subject to a twelve month transitional arrangement period. Emerging Part L 2021 standards are expected to reduce dwelling carbon emissions by 31% in relation to Building Regulations Part L1A, 2013.

### 3.5 Applicable Targets

Based upon a review of relevant planning policy requirements, legislative drivers, and client priorities, the following list provides a brief precis of the key criteria that should be targeted for this development:

- **CS Policy DM 1 - Development Management;**
- **CS Policy EN 4 – Reducing CO<sub>2</sub> Emissions;**
  - Following the principles of the Energy Hierarchy to reducing CO<sub>2</sub> Emissions;



- CS Policy EN 5 - Strategic Areas for low and zero carbon decentralised energy infrastructure;
- CS Policy EN 6 – Target Framework For CO<sub>2</sub> Reductions From Low or Zero Carbon Energy Supplies;
  - Residential - 9% dwelling emission rate reduction over Part L1A (2013)
  - Non-Domestic – 6% building emission rate reduction over Part L2A 2(013)
- CS Policy EN 8 – Adaption to Climate Change;
- CS Policy T 1 – Sustainable Transport;
- Great Jackson Street Framework (2018) – Key Principles;
- The Guide to Development in Manchester SPD;
- A Green and Blue Infrastructure Strategy for Manchester;

Approved Document L1A (2013) will guide the compliance standards for energy demand and carbon dioxide emissions from buildings to ensure compliance with CS Policy EN 6



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## 4. SUSTAINABILITY STATEMENT

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This section provides an appraisal of the development proposals and details the specific approach, design features and specifications which will contribute to reducing the environmental impact of this scheme. This section outlines those commitments that have been made to ensure this scheme contributes to sustainable development and meets the Council's policy aims.

### 4.1 Energy Improvements

In order to limit energy demand and carbon dioxide (CO<sub>2</sub>) emissions from the operation of the buildings, a number of design features will be integrated that will collectively contribute towards the emissions reduction target for the scheme.

Detailed measures are presented in Chapter 5 of this report, but in essence, the energy strategy focuses on a holistic and multi-faceted approach of improving the buildings' performance by applying a fabric-led approach and through improvements in the efficiency of the mechanical and electrical systems.

The reduction in energy demand to meet the carbon reduction targets will be achieved through the following design measures and low carbon technology options:

- High performance thermal insulation
- Low air permeability
- Maximising solar control to mitigate overheating risks
- Air Source Heat Pumps
- Heat Pump Hot Water Cylinders
- Heat recovery ventilation systems (MVHR)

These measures will secure the following carbon reduction targets:

- ✓ Residential Units – 9 % improvement over Part L1A Building Regulations (2013);
- ✓ Non-Domestic – 6 % improvement over Part L2A Building Regulations.

**These reductions are in line with the requirements of the Manchester Core Strategy Policy EN 6 - Target Framework for CO<sub>2</sub> Reductions from Low or Zero Carbon Energy Supplies.**

### 4.2 Water Conservation

The proposed development will be designed to reduce mains/potable water consumption and will include the following water efficient design and equipment:

- 'A' rated appliances will be used for dishwashers and washing machines (where provided) for their water saving capabilities;
- Specification of efficient water fixtures throughout the scheme (low flow taps and showers, dual flush WCs and low volume baths); and,
- In order to reduce water demand, the sanitary fixtures will be specified to achieve a calculated daily consumption of <110 litres/person/day.



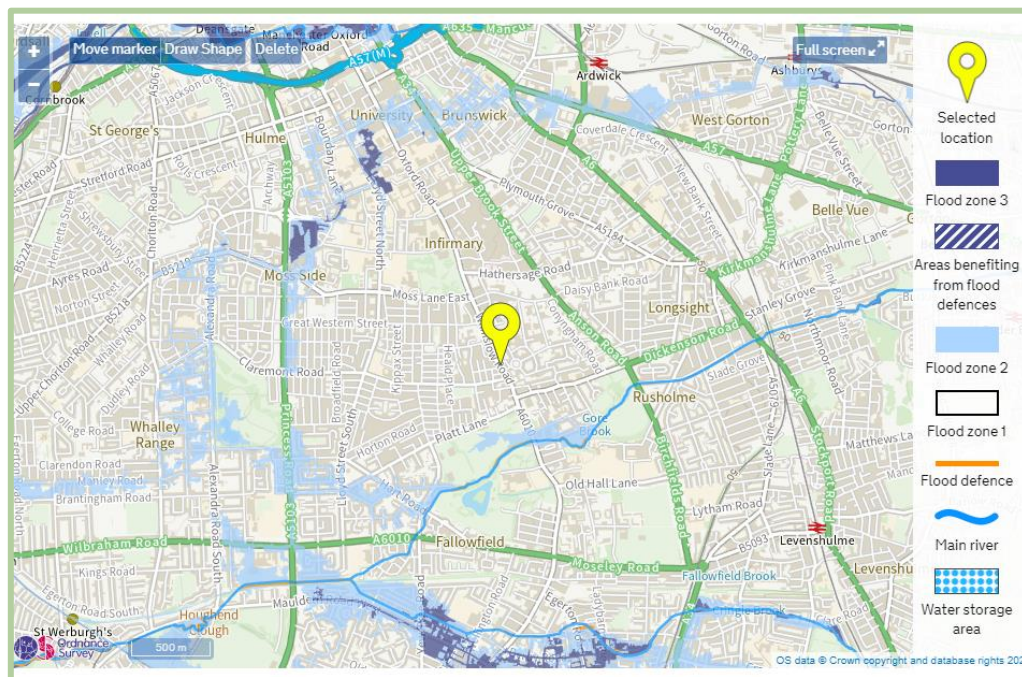
### 4.3 Flood Risk Management:

The Site is located within Flood Zone 1, and the probability of flooding is low (with a 1 in 1000 annual probability of river or sea flooding).

- As per the findings from the EA Risk of Flooding from Surface Water map, there is low risk from surface water flooding;
- There is no risk of flooding from reservoirs; and
- There is no risk of flooding from the groundwater.

The image below shows the extent of flooding on site (low to very low) on the EA Surface Water Flood Map.

Figure 4.1 EA Surface Water Flood Map



### 4.4 Waste Management

#### Construction Waste

Best practice techniques to prevent and minimise waste during the design and construction phases of the development will be adopted, as follows:

- Prior to commencement of the above ground construction phase, a site waste management plan (SWMP) will be produced by the developer to limit the on and off-site environmental impacts of construction. The SWMP will detail:
  - Recycled and secondary materials;
  - Waste reduction;
  - Waste segregation;



- Waste recovery; and,
  - Waste disposal.
- This scheme will promote the minimisation of waste arising in site development and seek to maximise the use of recycled materials in construction; and,
- A site waste management plan will identify opportunities to minimise waste generation and divert construction waste from landfill.

### Operational Waste

The operational waste strategy for the scheme focuses on the segregation of waste at source, in order to maximise the potential for residents and visitors to recycle. All residents will be informed on collection frequency, as well as guidance on recycling and health and safety practices related to the management and storage of waste.

The proposed strategy has been developed in compliance with the policies of Manchester City Council:

- Waste will be segregated at source (in the apartments) with the help of segregated bins. It is expected that there will be multiple streams of waste – general, recyclables and compost / green waste;
- Waste will be stored in 660 litre bins (for general waste and recyclables) and 240 litres for compost waste;
- Residents will be required to take their waste (via lifts) to the refuse store on the first floor;
- The number of bins and subsequently the size of the refuse store is based on waste generation figures for each apartment;
- Waste generated at the ground floor and basement will be transferred to the refuse room on the first floor by the staff of the management company;
- The management company will be responsible for transferring the waste from the refuse store to a hardstanding area on service area on the day of collection by refuse operators; and
- Following collection, the bins will be returned to the refuse store.

### 4.5 Materials

This development will contribute towards making more efficient use of non-renewable material resources and to reducing the lifecycle impact of materials used in construction. This is demonstrated by the selection of:

- Materials with low environmental impact throughout their lifecycle;
- Responsibly sourced materials from suppliers operating an Environmental Management System or procuring timber verified by either the Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification standard (PEFC);
- Local sourcing of construction materials where feasible and viable, which will minimise the impact of carbon dioxide emissions associated with the transportation of materials;
- Robust materials such as block paving and stone will be utilised for hard landscaping therefore, minimising the frequency of replacement and maximising materials optimisation and extending replacement intervals;



- Material selection within the apartment and office spaces will be carefully considered to avoid the use of toxic materials, such as Volatile Organic Compounds (VOCs) and contribute towards creating a healthy indoor environment; and
- Excavated material (such as soil and substructural elements) from construction and demolition works will be used, where practical, for landscaping purposes and within the public realm.

## 4.6 Ecology and Biodiversity

A Preliminary Ecological Appraisal and Potential Bat Root Survey has been undertaken for the site. The findings demonstrate that the site is not within any designated areas and has negligible potential for roosting bats. Therefore, will not require further surveys.

The proposals are for 100% site coverage and as such any biodiversity net gain will need to be achieved by the use of habitat walls, green roof areas or the use of rain garden & Sustainable Urban drainage systems. The final landscape design will need to utilise these schemes to meet the minimum biodiversity net gain requirement for planning.

## 4.7 Transport

The proposed site has a high level of connectivity and benefits from access to a number of sustainable transport options, resulting in an excellent GMAL (Greater Manchester Accessibility Levels) rating of 8. The site benefits from direct access to the improved Dutch-style cycle corridor, which is also part of the Greater Manchester cycling and walking infrastructure named the “Bee Network”. A signed route that marks the safest and most enjoyable way to navigate the area on foot or by bike.

There is limited on site car parking available, which should increase the likelihood of pedestrian footfall, cyclists and public transport users to and from the site. However, there is on-street parking available nearby and there are many publicly available car parks situated within 500m of the site. Alternatively, there will be 44 secure cycle parking spaces for residents. Exceeding MCC’s recommendation of 50% provision. In an attempt to encourage more people to travel by sustainable modes of transport.

The nearest bus stops are located within 50m of the site on both sides of Wilmslow Road. Travel times via public transport into the city centre is approximately 20 minutes. This is made possible via the frequently serviced Oxford Road bus corridor. There is no rail station within close proximity of the site, but the nearest station can be accessed via a 15 minute direct bus journey.

Overall, the surrounding area benefits from excellent levels of pedestrian and cycling infrastructure and there are plenty of public transport options within appropriate walking distance of the site.



## 5. ENERGY STRATEGY

### 5.1 Energy Strategy for 98 Wilmslow Road

In essence, the Energy Strategy for 98 Wilmslow Road focuses on a holistic and multi-faceted method of improving the building's performance by applying an enhanced fabric-led approach to limiting demand side energy loads, allied to improvements in the efficiency of the mechanical and electrical systems and the inclusion of renewable and low carbon energy technology. The design measures outlined in the Energy Strategy comply with the policy requirements as set by the Manchester City Council's Core Strategy.

#### 5.1.1 Build Fabric and Thermal Performance – Residential Apartments

The standard measurement of heat transfer through a given building material or construction type is the U-value ( $\text{W/m}^2\text{K}$ ); the lower the U-value, the more slowly heat transfers and is lost out of a building.

In buildings, heat loss generally occurs through the following areas and elements of the construction:

- Ground Floor;
- External Walls;
- Roofs;
- Doors and Windows;
- Thermal (cold) Bridging; and,
- Uncontrolled Ventilation.

Table 5.1 presents the fabric parameters proposed for limiting heat loss and improving the building performance for the residential apartments.

*Table 5.1 - Fabric Parameters for Residential Apartments*

| Construction Element | Proposed Fabric Specification                                                  |
|----------------------|--------------------------------------------------------------------------------|
| Ground Floor         | $U=0.10 \text{ W/m}^2\text{K}$                                                 |
| External Wall        | $U=0.15 \text{ W/m}^2\text{K}$                                                 |
| Roof                 | $U=0.10 \text{ W/m}^2\text{K}$                                                 |
| Windows              | $U=0.80 \text{ W/m}^2\text{K}$ , $g=0.57$<br><i>Triple Glazed, UPVC, Low-E</i> |
| Air Permeability     | $3.0\text{m}^3/\text{hm}^2$ (@50Pa.)                                           |



Table 5.2 presents the fabric parameters proposed for limiting heat loss and improving the building performance for the retail units.

*Table 5.2 - Fabric Parameters for Retail Units*

| Construction Element | Proposed Fabric Specification                                                  |
|----------------------|--------------------------------------------------------------------------------|
| Ground Floor         | $U=0.10 \text{ W/m}^2\text{K}$                                                 |
| External Wall        | $U=0.15 \text{ W/m}^2\text{K}$                                                 |
| Roof                 | $U=0.25 \text{ W/m}^2\text{K}$                                                 |
| Windows              | $U=1.40 \text{ W/m}^2\text{K}$ , $g=0.57$<br><i>Double Glazed, UPVC, Low-E</i> |
| Air Permeability     | $3.0\text{m}^3/\text{hm}^2$ (@50Pa.)                                           |

These specifications and design attributes will provide the following benefits:

- **High performance thermal insulation** throughout the building envelope (ensuring very low U-values for all heat loss elements) and thermally efficient windows and doors will minimise heat loss through the main building elements;
- **Thermally efficient, triple-glazed windows** will be specified with argon gas fill and low emissivity coatings to limit heat loss through the panes. The glazing g-value will be specified to optimise beneficial solar gains but limit the propensity for the apartments to overheat;
- **Low air permeability** of  $<3.0\text{m}^3/\text{hm}^2$  (@50Pa.) is targeted for this build in order to minimise uncontrolled ventilation. This will further reduce heat losses and provide high levels of occupant comfort (in combination with the proposed mechanical ventilation strategy). Focus on the quality of the build is vital to deliver such airtight buildings;
- **Attention to cold bridging junctions** including the provision of insulation to reduce heat and limit heat losses that occur at the junctions between building elements and around openings and will significantly improve the emission rate of the apartments; and
- **Efficient Form** – residential apartments are an inherently efficient form of construction, both in terms of the materials required to build the apartments and the ongoing heat energy demand. This is a result of relatively low areas of external heat loss elements associated with such layouts, which enhance the energy efficiency of the apartments and guarantees low energy demand throughout their occupation.

This specification will help to deliver an energy efficient development that achieves an emission rate reduction and fabric energy efficiency performance significantly beyond the requirements set by building regulation Part L (2013).

### 5.1.2 Building Services Specification – Residential Apartments

In addition to the improvements in the building fabric and thermal performance, a number of measures to improve the energy efficiency of the building systems have also been considered. The proposed mechanical and electrical specification that will be incorporated to ensure efficient servicing of the buildings is presented in Tables 5.2.



*Table 5.3 -Mechanical and Electrical Specification - Residential Apartments*

| Building Elements      | Proposed Fabric Specification                                                          |
|------------------------|----------------------------------------------------------------------------------------|
| Mechanical Ventilation | Mechanical Heat Recovery Ventilation (MVHR)<br>Nuaire MRXBOX-ECO3                      |
| Space Heating          | Electric Panel Heaters                                                                 |
|                        | Time and temperature zone controls                                                     |
| Water Heating          | . KERS Energy Recovery MVHR-W160<br>(Integral air source heat pump for hot water only) |
| Water Efficiency       | <110 litres / person / day                                                             |
| Lighting               | Low energy LED                                                                         |

This mechanical and electrical specification will deliver a Building Regulation Part L1A (2013) compliant scheme and will provide the following benefits:

- **Mechanical ventilation with heat recovery (MVHR)** systems will be specified in each apartment unit to maintain a healthy living environment and further reduce the heat losses and the energy demand of the apartments. The design air permeability of  $3.0\text{m}^3/\text{hm}^2$  (@50Pa.) for the apartments will virtually eliminate uncontrolled ventilation and ensure that the majority of the expelled stale air will pass across the heat exchanger, thereby boosting the energy reduction potential of these systems;
- **Electrical panel heating (for space heating)** generates a reduced overheating potential – electric space heating delivers virtually instantaneous heating at the location it is required. Unlike a ‘wet system’ associated with communal gas boilers which inherently have a long lag time for the heat to be generated and then dissipated when no longer needed. This lag time can lead to the units overheating as the hot water remains in the radiators for a considerable time after the heat demand is required;
- **Self-contained heat pump hot water cylinders:** KERS Energy Recovery MVHR-W160 have been specified for heating water for the residential apartments. These are high performing and extremely energy efficient systems for high heat output with minimal energy consumption;
- **LED lighting** will be specified throughout the scheme to maximise operational efficiencies and lifespan of the fittings. LEDs operate with an estimated energy efficiency of up to 90% when compared to traditional lighting and conventional light bulbs. This means that about c.90% of the electrical energy is converted to light, rather than wasted heat as in conventional bulbs; and
- **Sophisticated heating controls** including time and temperature zonal controls will ensure the efficient delivery of heat from electric panel heaters to further reduce the apartments’ energy demand.



### 5.1.3 Building Services Specification – Retail Units

The energy strategy proposed as a suitable fit out for the retail units differs from the residential component of the scheme by utilising ASHPs for space heating and Electric POUs for water heating.

Table 5.4 below shows the proposed building systems specified for the fit out of the retail units.

*Table 5.4 System Parameters for Retail Units*

| Building Elements | Proposed Fabric Specification                            |
|-------------------|----------------------------------------------------------|
| Ventilation       | Natural ventilation, intermittent extract where required |
| Space Heating     | Air Source Heat Pumps (ASHPs) - split system             |
| Water Heating     | Instantaneous – Electric Point of Use                    |
| Lighting          | Low energy LED                                           |

This mechanical and electrical specification will deliver a Building Regulation Part L2A (2013) compliant scheme and will provide the following benefits:

- **Air Source Heat Pumps (for space heating):** are a low carbon solution that are ideal for non residential spaces. They are highly efficient method of producing heat as ASHPs collect low-grade heat from the air to supply useful heat for space heating requirements by applying additional energy input (in the form of electricity).
- **Electric Point of Use (PoU)** will meet the retail units' hot water load. The water flows immediately to the desired temperature therefore conserves water with little energy or circulation losses. To further limit energy demand for hot water, dwellings will be provided with water-efficient fixtures and fittings, to limit overall water consumption to
- **LED lighting** will be specified throughout the scheme to maximise operational efficiencies and lifespan of the fittings. LEDs operate with an estimated energy efficiency of up to 90% when compared to traditional lighting and conventional light bulbs. This means that about c.90% of the electrical energy is converted to light, rather than wasted heat as in conventional bulbs; and

## 5.2 Energy Performance Calculations

### Residential Analysis

In order to demonstrate the environmental benefits associated with the energy strategy for this site, approved SAP 2012 software has been used to generate representative energy demand models for the residential component of the building. SAP software calculates the regulated energy demand and associated carbon dioxide emissions in accordance with the requirements of Building Regulation, Part L1A (2013) that this development will be constructed in compliance with.



Table 5.5 below presents a summary of these calculation results, which show the regulated energy demand and emission reductions achieved by the enhanced material specification, efficient servicing, and renewable energy solutions.

*Table 5.5 – Calculated Dwelling Emission Rate – Residential Apartments*

| Representative Apartment | DER<br>(kgCO <sub>2</sub> /m <sub>2</sub> /year) | TER<br>(kgCO <sub>2</sub> /m <sub>2</sub> /year) | % Variance |
|--------------------------|--------------------------------------------------|--------------------------------------------------|------------|
| Plot 1.14 Ground         | 34.19                                            | 27.19                                            | -25.74     |
| Plot 1.12 Ground         | 34.52                                            | 28.88                                            | -19.54     |
| Plot 1.11 Ground         | 32.63                                            | 25.78                                            | -26.57     |
| Plot 1.14 Mid            | 30.37                                            | 23.62                                            | -28.58     |
| Plot 1.12 Mid            | 29.81                                            | 25.23                                            | -18.17     |
| Plot 1.11 Mid            | 27.85                                            | 21.79                                            | -27.79     |
| Plot 1.14 Top            | 33.13                                            | 25.74                                            | -28.7      |
| Plot 1.12 Top            | 34.67                                            | 28.15                                            | -23.17     |
| Plot 1.11 Top            | 44.42                                            | 31.54                                            | -40.83     |

There is an expected average improvement of -42.74% over part L of Building Regulations (2013), for the residential units. The proposed development is in compliance with the Council's adopted Core Strategy Policy EN 6 - Target Framework for CO<sub>2</sub> Reductions from Low or Zero Carbon Energy Supplies.

#### Non-Domestic Analysis

In order to demonstrate the environmental benefits associated with the energy strategy for the retail units, representative Simplified Building Energy Models (SBEM) have been completed using the Design Builder software. It should be noted that these results are indicative of the overall demand for energy.

Table 5.6 below presents a summary of these calculations, which show the regulated energy demand and emission reductions achieved by the enhanced material specification and the specification of energy efficient systems for the retail units.

*Table 5.6 – Energy Calculations for Retail Units*

| Representative Unit | BER<br>(kgCO <sub>2</sub> /m <sub>2</sub> /year) | TER<br>(kgCO <sub>2</sub> /m <sub>2</sub> /year) | % Variance |
|---------------------|--------------------------------------------------|--------------------------------------------------|------------|
| 1                   | 91.4                                             | 100.5                                            | -9.05      |
| 2                   | 91.7                                             | 102.4                                            | -10.45     |
| 3                   | 93.7                                             | 104.8                                            | -10.59     |
| 4                   | 90.2                                             | 99.9                                             | -9.71      |
| 5                   | 90.2                                             | 99.8                                             | -9.62      |
| 6                   | 89.1                                             | 102.3                                            | -12.90     |

The calculations show that there is an expected improvement of between 9.05 and 12.90% over Part L2A of the Building Regulations (2013) for the retail units. Again, this is in compliance with the targets for non-domestic buildings as per the Policy EN 6 - Target Framework for CO<sub>2</sub> Reductions from Low or Zero Carbon Energy Supplies of the Manchester Core Strategy.

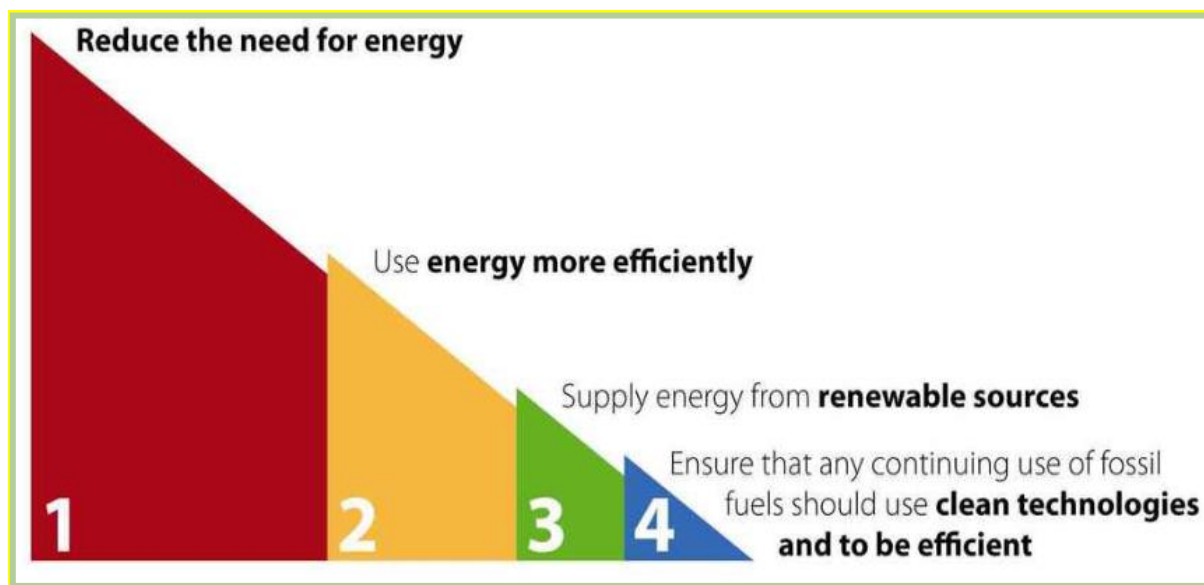


### 5.3 Energy Hierarchy

The 98 Wilmslow Road scheme will incorporate a significantly enhanced material specification along with high quality design and construction standards in order to improve the whole building energy efficiency through a 'fabric led' energy strategy. The proposed construction, design and specification will deliver a scheme that is inherently energy efficient during occupation.

The energy hierarchy provides a framework to guide energy policy and decision making to achieve practical and cost-effective carbon emission reductions. The hierarchy prioritises demand-side activities to reduce wastage and improve efficiency (see Figure 5.1).

Figure 5.1 – The Energy Hierarchy



#### First Principle:

The following efficiency measures are designed to reduce heat losses and minimise energy demand:

- The building will be constructed with high specification materials and design criteria which exceed current minimum Building Regulation standards and includes numerous efficiency measures designed to reduce heat losses and minimise energy demand.
- Heating systems will be provided with zonal, programmable thermostatic controls. Which will allow occupants to control zones within their units independently for maximum flexibility. This is intended to reduce the demand for additional energy usage.

#### Second Principle:

The approach taken for this Scheme will help to minimise energy demand and associated carbon dioxide emissions and is aligned with the second principle of the energy hierarchy which states that reduction in energy demand should be achieved initially by energy efficiency.

To this effect, the following measures have been proposed:



- The design air permeability target for the buildings is 3.0m<sup>3</sup>/hm<sup>2</sup> (@50Pa.). This low air permeability target will assist to limit the heat loss through the structure of the building;
- High efficiency air handling units with heat recovery capture 'waste' heat from the extracted stale air;
- The g value within the buildings will be optimised to control solar gain in the summer months and allow beneficial gains in the winter season to minimise the overheating risk and limit the heating energy demand within the units; and
- 100% LED provision and sophisticated control systems for the space within the buildings will also ensure the energy consumed is used efficiently. Photocell switching and automatic presence control of the lighting will be specified in order to further improve the efficiency of the lighting system.

### Third Principle:

Renewable and low carbon technology including air source heat pumps providing hot water within the apartments and delivering space heating requirements in the commercial units will be specified for the development in a bid to reduce the scheme's operational carbon footprint.

### Fourth Principle:

The use of electric panels will ensure that fossil fuels converted and distributed through the National Grid as electrical energy for heating purposes will be consumed cleanly and efficiently.

Furthermore, as the UK electricity grids' CO<sub>2</sub> footprint continues to improve, so too would the carbon dioxide emissions associated with the operational phase of the proposed scheme which benefits from a 'full electric' energy strategy.



## 6. BREEAM

### BREEAM

BREEAM (Building Research Establishment's Environmental Assessment Method) is the world's leading and most widely used environmental assessment method for buildings.

BREEAM UK New Construction scheme is a performance based assessment method and certification scheme for new non-domestic buildings. The primary aim of BREEAM UK New Construction is to mitigate the life cycle impact of new buildings on the environment in a robust and cost effective manner. This is achieved through integration and the use of the scheme by clients and their project team at key stages in the design and construction process.

The building's performance is assessed under a number of categories, including:

- Energy;
- Water;
- Transport;
- Materials;
- Land Use;
- Pollution;
- Health and wellbeing; and
- Management.

The BREEAM rating benchmarks for BREEAM UK new construction projects assessed using the 2018 version of BREEAM are presented in Table 6.1 below.

*Table 6.1 – BREEAM Rating Benchmarks*

| BREEAM Rating | % Score Required |
|---------------|------------------|
| Outstanding   | ≥ 85             |
| Excellent     | ≥ 70             |
| Very Good     | ≥ 55             |
| Good          | ≥ 45             |
| Pass          | ≥ 30             |

There are minimum standards associated with the BREEAM 'Very Good' standard in terms of the building's energy and emission performance. However, to ensure that performance against fundamental environmental issues is not over-looked in pursuit of a particular rating, BREEAM sets minimum standards of performance in key areas e.g. energy, water, materials etc.

A BREEAM 'Very Good' rating requires the following minimum performance standards, see Table 6.2.



Table 6.2 – Mandatory ‘Very Good’ Standards – Shell Only

| <i>BREEAM NC 2018 Issues</i>                    | <i>Minimum Standards for BREEAM for 'Very Good' rating</i>           |
|-------------------------------------------------|----------------------------------------------------------------------|
| <i>MAN 4: Commissioning and Handover</i>        | <i>One credit (commissioning-test schedule and responsibilities)</i> |
| <i>MAN 4: Commissioning and Handover</i>        | <i>Criterion 11 (Building User Guide)</i>                            |
| <i>ENE 2: Energy Monitoring</i>                 | <i>One credit (First sub metering credit)</i>                        |
| <i>WAT 1: Water Consumption</i>                 | <i>One credit</i>                                                    |
| <i>WAT 2: Water Monitoring</i>                  | <i>Criterion 1 only</i>                                              |
| <i>MAT 3: Responsible Sourcing of Materials</i> | <i>Criterion 1 only</i>                                              |

## 6.1 Potential BREEAM Rating

BREEAM UK 2018 Non-Domestic New Construction (Commercial: Retail) – Shell Only pre-assessment has been prepared by a qualified, licensed BREEAM Assessor. This determines the feasible credits and potential BREEAM rating for 98 Wilmslow Road retail units and demonstrates a commitment to the principles of good construction, design and sustainability.

### BREEAM Score and Rating – ‘Very Good’

Working alongside the qualified BREEAM assessor, the technical design team has reviewed the individual credit criteria and award of credits within the Pre-Assessment in order to optimise the building’s BREEAM performance. All credits allocated within this BREEAM Pre-Assessment will require further technical verification and additional feasibility assessment during the formal Design Stage and Post Construction BREEAM assessment.

The BREEAM Pre-Assessment (presented in the Appendix of this Statement) show that the building is expected to perform as follows:

- Indicative building BREEAM score = **59.33%** (*minimum required for BREEAM ‘Very Good’ = 55%*)
- Indicative BREEAM rating = Potential for **BREEAM ‘Very Good’ rating**.

Following an initial review of the proposals the BREEAM New Construction pre-assessment report demonstrates that the proposed development is able, in principle, to meet all mandatory credit requirements and achieve an overall BREEAM ‘Very Good’ rating for all retail units.

Details of the pre-assessments can be found in the appendix of this report.

*Note that a number of assumptions have been made within this initial appraisal which will require confirmation by means of further technical input during the formal assessment, once the design and specifications are finalised. The approach to achieving the target BREEAM rating may therefore, be subject to change further into the development cycle.*



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## 7. CONCLUSION

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This Statement has reviewed the sustainability performance of the proposed Wilmslow Road Development against national and local planning policies. The conclusion that can be drawn from the review is as per the following:

### Sustainability Performance –

- Water consumption of the development will be minimised. The internal water strategy will exceed the regulatory standard specified to achieve a calculated daily consumption of <110 litres/person/day through **the specification of efficient water fixtures**.
- The proposed scheme location promotes access **to sustainable transport options** and the design has prioritised pedestrians and cyclists over the private car. Provision of cycle storage and access to regular busses will contribute towards creating a highly connected and sustainable development.
- The development Site is located within Flood Risk Zone 1. Post development surface water run-off rates will be **managed and mitigated through the implementation of SUDs** where applicable.
- Waste arising during construction and occupation/operation will be minimised through the **implementation of a Waste Management Plan (CEMP)**. The WMP will be used to ensure that there is adequate management and storage of construction waste takes place in line with the Council's policies. Opportunities for the possible recycling of construction from excavation works will also be considered in line with best practice.
- **A refuse management strategy** has been developed to manage waste and recyclables from the operational phase of the development. Source segregation and the provision of refuse areas will encourage the residents to recycle and **divert waste away from landfills**.
- Materials are proposed to be **responsibly sourced and materials with low environmental impact** will be selected and local suppliers will be prioritised. Material selection will be carefully considered to avoid the use of toxic materials and materials with VOCs.
- The findings from the Preliminary Ecological Appraisal & Potential Bat Roost Survey show that there are **no legally protected and / or notable species and their habitats on site**.

### Energy Strategy –

The development will be designed and specified in accordance with **the principles of the energy hierarchy** and in line with the **targets and guidance set out in Manchester City Council's Core Strategy**.

### Residential Units:

- For the residential units, the focus is on reducing the demand for energy by **limiting heat gains and losses through the building fabric** through an enhanced material specification, well beyond the regulatory requirement
- The apartments will integrate highly efficient mechanical and electrical systems, including **electric panels for space heating, low energy lighting and a packaged mechanical ventilation heat recovery heat pump** for water heating loads;



- Based on these specifications, the residential apartmetns will secure a 42% carbon dioxide emissions reduction **over Part L1A (2013) of the Building Regulations**.

Retail Units:

- A combination of **enhanced building fabric** (significantly beyond the regulatory compliance standard), efficient mechanical and electrical systems, and controls, will achieve compliance with the emission reduction targets stipulated by Building Regulations Part L2A (2013).
- The non-domestic units fit-out also benefits from **air source heat pumps** specified to meet the space requirements. These systems are extremely energy efficient and will play a significant role in reducing the development's carbon footprint;
- **Local controls** will be utilised to ensure maximum thermal comfort and energy savings; and
- Energy modelling calculates a minimum **9% emissions reductions** over Part L2A (2013) of the Building Regulations.

In conclusion, the proposals reviewed within this statement for the mixed use scheme at 98 Wilmslow Road in Manchester will deliver a highly energy efficient and sustainable scheme, providing a quality development that accords with the guidance provided within the Manchester City Council' adopted planning policies.



## Appendix A – BREEAM Pre-Assessment



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**BREEAM 2018 New Construction Criteria (NC)**

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## Executive Summary

Element Sustainability have been appointed by Views Limited to complete an assessment of the proposed development under the Building Research Establishment Environmental Assessment Methodology (BREEAM). This pre-assessment review report gives an indication of the expected BREEAM score and rating for the development that may be achieved when the final assessment is submitted to the Building Research Establishment (BRE), based on the information provided at this pre-assessment stage.

The proposed scheme the redevelopment of the site to provide a mixed-use development including 6no. retail units at ground floor level with circa forty residential apartments on the floors above.

## BREEAM Methodology

The BREEAM UK New Construction 2018 scheme can be used to assess the environmental life cycle impacts of new non-domestic buildings at the design and construction stages. 'New Construction' is defined as development that results in a new standalone structure, or new extension to an existing structure, which will come into operation or use for the first time upon completion of the works.

A BREEAM pre-assessment report has been prepared by a qualified and licensed BREEAM Assessor to demonstrate the feasibility of achieving the desired BREEAM ratings for the new build scheme. The initial pre-assessment report details the possible strategies to be employed.

The BREEAM assessment methodology applicable to this development is as follows:

- BREEAM UK 2018 Non-Domestic New Construction (Commercial: Retail) – Shell Only.

## Design Stage Review

Design specifications are assessed for each individual building, before construction begins. A rating is determined, and (subject to quality assurance) a Design Stage or Interim Certificate is awarded for each building. Registered assessors can apply for assessment of a site, compile and submit a design report for assessment and monitor the assessment status online.

## Post Construction Stage Review

The Post Construction Stage (PCS) assessment confirms that buildings have either been built to the Design Stage specifications or to (documented) variations from the Design Stage. Variations must be reassessed so that new scores and BREEAM levels can be calculated for each affected building. Where a Design Stage assessment has been undertaken, it is used to inform the PCS assessment.

## BREEAM Rating



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## BREEAM 2018 New Construction Criteria (NC)

A review of the current development proposals has been carried out against the BREEAM UK 2018 New Construction assessment methodology. It is anticipated that the scheme's design has the potential to score **59.33%** (minimum score level for BREEAM 'Very Good' rating is 55%), see Table 1.2 below.

The rating obtained by using this BREEAM Pre-Assessment is for guidance only. The predicted ratings may differ from those obtained through a formal assessment, which will be carried out by an appropriately licensed BREEAM assessor. Advice should be sought from a licensed assessor at an early stage in a project to ensure the estimated rating will be obtained.

### Minimum Standards

The minimum standards for the BREEAM 'Very Good' rating are provided within Table 1.1 of this report and highlighted within Table 1.2. To achieve a particular level of performance the majority of BREEAM credits can be traded, i.e. non-compliance in one area can be off set through compliance in another to achieve the target BREEAM rating.

To ensure that performance against fundamental environmental issues is not overlooked in pursuit of a particular rating, BREEAM sets minimum standards of performance in key areas.

*Table 1.1 - Minimum Standards*

| BREEAM NC 2018 Issues                    | Minimum Standards for BREEAM for 'Very Good' rating           |
|------------------------------------------|---------------------------------------------------------------|
| MAN 4: Commissioning and Handover        | One credit (commissioning-test schedule and responsibilities) |
| MAN 4: Commissioning and Handover        | Criterion 11 (Building User Guide)                            |
| ENE 2: Energy Monitoring                 | One credit (First sub metering credit)                        |
| WAT 1: Water Consumption                 | One credit                                                    |
| WAT 2: Water Monitoring                  | Criterion 1 only                                              |
| MAT 3: Responsible Sourcing of Materials | Criterion 1 only                                              |

### RIBA Sensitive Credits

There are a number of BREEAM credits that need to be addressed at particular RIBA Stage. These credits have been highlighted in blue within Table 1.2 below. A full outline of all the RIBA Stage sensitive credits is provided within Appendix A of this report.



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## BREEAM 2018 New Construction Criteria (NC)

Table 1.2 – Pre-Assessment Review

| Issue                            |                                             | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------|---------------------------------------------|-------------------|------------------|----------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Management                       |                                             |                   |                  |                      |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Man 1 – Project Brief and Design |                                             |                   |                  |                      |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Man 1a                           | Stakeholder Consultation (Project Delivery) | 1                 | 1                | 0.80%                | Design Team    | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> Prior to completion of the <b>Concept Design</b>, the project delivery stakeholders meet to identify and define for each key phase of project delivery:</p> <ul style="list-style-type: none"> <li>1.a Roles</li> <li>1.b Responsibilities</li> <li>1.c Contributions.</li> </ul> <p>Consider each one of the following items when defining roles, responsibilities and contributions for each key phase of the project:</p> <ul style="list-style-type: none"> <li>2.a End user requirements</li> <li>2.b Aims of the design and design strategy</li> <li>2.c Particular installation and construction requirements or limitations</li> <li>2.d Occupiers' budget and technical expertise in maintaining any proposed systems</li> <li>2.e Maintainability and adaptability of the proposals</li> <li>2.f Operational energy</li> <li>2.g Requirements for the production of project and end user documentation</li> <li>2.h Requirements for commissioning, training and aftercare support.</li> </ul> <p><b>2)</b> The project team demonstrates how the project delivery stakeholders' contributions, and the consultation process outcomes influence the following:</p> <ul style="list-style-type: none"> <li>3.a Initial Project Brief</li> <li>3.b Project Execution Plan</li> <li>3.c Communication Strategy</li> <li>3.d Concept Design.</li> </ul> |



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## BREEAM 2018 New Construction Criteria (NC)

| Issue  |                                        | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------|----------------------------------------|-------------------|------------------|----------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                                        |                   |                  |                      |                | <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Copy of the Consultation Plan setting out the scope of the consultation.</li> <li>- Copies of meeting minutes / construction programme / responsibilities schedule, relevant sections/clauses of the building contract.</li> <li>- Evidence demonstrating how the project delivery stakeholder contributions and the outcomes of the consultation process have influenced or changed the Initial Project Brief, Project Execution Plan, Communication Strategy, and Concept Design.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Man 1b | Stakeholder Consultation (Third Party) | 1                 | 1                | 0.80%                | Design Team    | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> Prior to completion of the <b>Concept Design</b>, the design team consult with all interested parties (for example actual or intended building users, representative consultation group from the existing community, existing partnerships and networks that have knowledge of existing buildings of the same type, potential users of shared facilities) on matters that cover the minimum consultation content.</p> <p><u>Minimum Consultation Content:</u></p> <ol style="list-style-type: none"> <li>1. Functionality, build quality and impact (including aesthetics).</li> <li>2. Provision of appropriate internal and external facilities (for future building occupants and visitors or users).</li> <li>3. Management and operational implications.</li> <li>4. Maintenance resources implications.</li> <li>5. Impacts on the local community, e.g. local traffic or transportation impact.</li> <li>6. Opportunities for shared use of facilities and infrastructure with the community or appropriate stakeholders.</li> <li>7. Compliance with statutory (national or local) consultation requirements.</li> <li>8. Energy use and sustainability measures.</li> <li>9. Implementing principles and processes that deliver an inclusive and accessible design.</li> </ol> |



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**Date:** 10<sup>th</sup> February 2022  
**Revision:** 1.0

## BREEAM 2018 New Construction Criteria (NC)

| Issue  |                            | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------|----------------------------|-------------------|------------------|----------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                            |                   |                  |                      |                | <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Consultation plan setting out the process and scope of the consultation.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Man 1c | BREEAM AP (Concept Design) | 1                 | 0                | 0.80%                | BREEAM AP      | <p><b>Credit Not Sought</b><br/> <b>BREEAM Criteria:</b><br/>           Involve a BREEAM AP in the project at an appropriate time and level to:</p> <ol style="list-style-type: none"> <li>Work with the project team, including the client, to consider the links between BREEAM issues and assist them in maximising the project's overall performance against BREEAM, from their appointment and throughout <b>Concept Design</b>.</li> <li>Monitor progress against the performance targets agreed throughout all stages after their appointment, where decisions critically impact BREEAM performance.</li> <li>Proactively identify risks and opportunities related to the achievement of the targets agreed.</li> <li>Provide feedback to the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets.</li> <li>Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team.</li> </ol> |



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| Issue                                             |                              | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility  | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------|------------------------------|-------------------|------------------|----------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Man 1d                                            | BREEAM AP (Developed Design) | 1                 | 0                | 0.80%                | BREEAM AP       | <p><b>Credit Not Sought</b><br/> <b>BREEAM Criteria:</b><br/> Involve the BREEAM AP in the project at an appropriate time and level to:</p> <ul style="list-style-type: none"> <li>a. Work with the project team, including the client, to consider the links between BREEAM issues and to assist them in maximising the project's overall performance against BREEAM throughout <b>Developed Design</b>.</li> <li>b. Monitor progress against the performance targets agreed throughout all stages where decisions critically impact the specification and tendering process and the BREEAM performance.</li> <li>c. Proactively identify risks and opportunities related to the achievement of the targets agreed.</li> <li>d. Provide feedback to the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets.</li> <li>e. Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team.</li> </ul> |
| Man 2 - Life Cycle Cost and Service Life Planning |                              |                   |                  |                      |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Man 2a                                            | Elemental LCC                | 2                 | 0                | 0.80%                | Cost Consultant | <p><b>Credit Not Sought</b><br/> <b>BREEAM Criteria:</b><br/> <b>1)</b> A competent person (see Definitions on the facing page) carries out an outline, entire asset LCC plan at Process Stage 2 (equivalent to <b>Concept Design</b> - RIBA Stage 2) together with any design options appraisals in line with Standardised method of life cycle costing for construction procurement' PD 156865: 2008. <b>The elemental LCC plan:</b></p> <ul style="list-style-type: none"> <li>a. Provides an indication of future replacement costs over a period of analysis as required by the client (e.g. 20, 30, 50 or 60 years);</li> <li>b. Includes service life, maintenance and operation cost estimates.</li> </ul> <p>The study period should ideally be agreed by the client, in line with the design life expectancy of the building.</p>                                                                                                                                                                   |



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| Issue  |               | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility  | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------|---------------|-------------------|------------------|----------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |               |                   |                  |                      |                 | <p>However, where the life expectancy of the building is not yet formally agreed (due to being at very early design stages), the default design life of 60 years should be used for modelling purposes (in line with the UK default).</p> <p>2) Demonstrate, using appropriate examples provided by the design team, how the elemental LCC plan has been used to influence building and systems design and specification to minimise life cycle costs and maximise critical value.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Man 2b | Component LCC | 1                 | 0                | 0.80%                | Cost Consultant | <p><b>Credit Not Sought</b><br/> <b>BREEAM Criteria:</b></p> <p>1) A competent person develops a component level LCC options appraisal by the end of Process Stage 4 (equivalent to <b>Technical Design</b> – RIBA Stage 4) in line with PD 156865: 2008.</p> <p><b>The component level LCC includes (where present):</b></p> <ul style="list-style-type: none"> <li>a. Envelope, e.g. cladding, windows, or roofing</li> <li>b. Services, e.g. heat source, cooling source, or controls</li> <li>c. Finishes, e.g. walls, floors or ceilings</li> <li>d External spaces, e.g. alternative hard landscaping, boundary protection.</li> </ul> <p>The Component level LCC option appraisal should review all of the above component types (where present).</p> <p>However, you do not need to consider every single example cited under each component; only a selection of those most likely to draw valued comparisons. This is to ensure that a wide range of options are considered and help focus the analysis on components which would benefit the most from appraisal.</p> <p>2) Demonstrate, using appropriate examples provided by the design team, how the component level LCC options appraisal has been used to influence building and systems design and specification to minimise life cycle costs and</p> |



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| Issue                                      |                          | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility            | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------|--------------------------|-------------------|------------------|----------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                            |                          |                   |                  |                      |                           | maximise critical value.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Man 2c                                     | Capital Cost Reporting   | 1                 | 1                | 0.80%                | Client or Project Manager | <p><b>BREEAM Criteria:</b><br/>The capital cost to be reported for the refurbishment project £/m<sup>2</sup>.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Letter of Commitment confirming predicted Capital Costs.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Letter of Confirmation confirming final Capital Costs.</li> </ul>                                             |
| Man 3 - Responsible Construction Practices |                          |                   |                  |                      |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Man 3                                      | Timber Procurement (M)   | Pre-Req           | Pre-Req          | -                    | Main Contractor           | <p><b>BREEAM Criteria:</b><br/>Main contractor to ensure that all timber is legally harvested and trade timber.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Letter of Commitment confirming all timber will be legally harvested and traded timber.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Copies of all relevant certificates or chain of custody evidence.</li> </ul> |
| Man 3a                                     | Environmental Management | 1                 | 1                | 0.80%                | Main Contractor           | <p><b>BREEAM Criteria:</b><br/>1) All parties who at any stage manage the construction site (e.g. the principal contractor, the demolition contractor) operate an EMS covering their main operations.</p> <p>The EMS must be third party certified, to <b>ISO 14001:2015(10)</b>, EMAS (EU Eco-Management and Audit Scheme) or equivalent standard, or be in compliance with BS8555:2016.</p>                                                                              |



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| Issue  |                         | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility          | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------|-------------------------|-------------------|------------------|----------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                         |                   |                  |                      |                         | <p><b>2)</b> All parties who at any point manage the construction site (e.g. the principal contractor, the demolition contractor) implement best practice pollution prevention policies and procedures on site in accordance with Working at construction and demolition sites: <b>PPG6, Pollution Prevention Guidelines</b>.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Letter of Commitment.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- A copy of the principal contractors EMS/EMAS certificate or for BS 8555, evidence of their status, e.g. a copy of their phase 4 audit.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Man 3b | Sustainability Champion | 1                 | 1                | 0.80%                | Sustainability Champion | <p><b>BREEAM Criteria:</b><br/> Involve a BREEAM AP in the project at an appropriate time and level to:</p> <ul style="list-style-type: none"> <li>a. Work with the project team, including the client, to consider the links between BREEAM issues and assist them in achieving and if possible, going beyond the design intent, to maximise the project's performance against the agreed performance targets throughout the <b>Construction, Handover and Close Out</b> stages.</li> <li>b. Monitor construction progress against the performance targets agreed throughout all stages where decisions critically impact BREEAM performance.</li> <li>c. Proactively identify risks and opportunities related to the procurement and construction process and the achievement of the targets agreed.</li> <li>d. Provide feedback to the constructors and the project team as appropriate to support them in taking corrective actions and achieving their agreed performance targets.</li> <li>e. Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team and the provision to the assessor.</li> </ul> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Letter of instruction to BREEAM AP.</li> <li>- Formal letter of Commitment.</li> </ul> |



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| Issue                      |                                     | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility  | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-------------------------------------|-------------------|------------------|----------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            |                                     |                   |                  |                      |                 | <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Meeting minutes / communication records / formal notes of conversations and other statements reporting on discussions related to performance targets and maximising performance.</li> <li>- BREEAM AP Report.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                    |
| Man 3c<br>MINIMUM STANDARD | Responsible Construction Management | 2                 | 2                | 0.80%                | Main Contractor | <b>BREEAM Criteria:</b><br>The Main Contractor to register with CCS and achieve a score of beyond compliance and achieve the remaining items listed on Table 4.1 of the NC 2018 Technical Manual.<br><br><b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Letter of Commitment</li> <li>- Letter of Registration to CCS Scheme</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Final CCS Report</li> </ul>                                                                                                                                                                                                 |
|                            | Pre-requisite                       | -                 | -                |                      | Design Team     | <b>BREEAM Criteria:</b><br>Assign responsibility to an individual for monitoring, recording and reporting energy use, water consumption and transportation data (where measured) resulting from all on-site construction processes (and dedicated off-site manufacturing) throughout the build programme.<br><br>To ensure the robust collection of information, this individual must have the appropriate authority and responsibility to request and access the data required. Where appointed, the BREEAM AP could perform this role.<br><br><b>Design Stage Evidence:</b><br>Letter of Commitment<br><br><b>Post Construction Stage Evidence:</b><br>As per Design Stage. |



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| Issue  |                                                            | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility  | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------|------------------------------------------------------------|-------------------|------------------|----------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Man 3d | Monitoring of Construction site impacts (Energy and Water) | 1                 | 1                | 0.80%                | Main Contractor | <p><b>BREEAM Criteria:</b><br/> <u>Energy Consumption</u><br/> Main Contractor sets targets for the site energy consumption in kWh (and where relevant, litres of fuel used) as a result of the use of construction plant, equipment (mobile and fixed) and site accommodation.</p> <p>Monitor and record data for the energy consumption described.</p> <p>Report the total carbon dioxide emissions (total kg CO<sub>2</sub>/project value) from the construction process via BREEAM Projects.</p> <p><u>Water Consumption</u><br/> Set targets for the potable water consumption (m<sup>3</sup>) arising from the use of construction plant, equipment (mobile and fixed) and site accommodation.</p> <p>Monitor and record data for the potable water consumption.</p> <p>Use the collated data to report the total net water consumption (m<sup>3</sup>), i.e. consumption minus any recycled water use from the construction process via BREEAM Projects.</p> <p><b>Design Stage Evidence:</b><br/> - Letter of Commitment</p> <p><b>Post Construction Stage Evidence:</b><br/> - Final monitoring and recording data</p> |
| Man 3e | Monitoring of Construction Site Impacts (Transport)        | 1                 | 1                | 0.80%                | Main Contractor | <p><b>BREEAM Criteria:</b><br/> Main Contractor sets targets for transportation movements and impacts resulting from delivery of the majority of construction materials to site and construction waste from site. As a minimum cover:</p> <p>a. transportation of materials from the point of supply to the building site, including any transport, intermediate storage and point of supply.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



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| Issue                                     |                                               | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility  | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------|-----------------------------------------------|-------------------|------------------|----------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                           |                                               |                   |                  |                      |                 | <p>Monitor as a minimum:</p> <ul style="list-style-type: none"> <li>a.i. Materials used in major building elements (i.e. those defined in BREEAM issue Mat 01 Environmental impacts from construction products - Building life cycle assessment (LCA)).</li> <li>a.i. Ground works and landscaping materials.</li> <li>b. transportation of construction waste from the construction gate to waste disposal processing or recovery centre gate. This monitoring must cover the construction waste groups outlined in the project's resource management plan.</li> </ul> <p>Monitor and record data for the transportation movements as described above.</p> <p>Using the collated data, report separately for materials and waste, the total transport-related carbon dioxide emissions (kgCO<sub>2</sub>-eq), plus total distance travelled (km) via BREEAM Projects (for the purposes of potential future BREEAM performance benchmarking).</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Letter of Commitment</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Final monitoring and recording data</li> </ul> |
| <b>Man 4 - Commissioning and Handover</b> |                                               |                   |                  |                      |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Man 4c</b>                             | <b>Testing and inspecting building fabric</b> | 1                 | 1                | 0.80%                | Main Contractor | <p><b>BREEAM Criteria:</b></p> <ol style="list-style-type: none"> <li>1) Achieve the 'Commissioning – Testing Schedule and responsibilities' credit.</li> <li>2) Complete 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 (this is through <b>airtightness testing</b> and a <b>thermographic survey</b>). A suitably qualified professional undertakes the survey and testing in accordance with the appropriate standard.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



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| Issue                  |             | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility      | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------|-------------|-------------------|------------------|----------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        |             |                   |                  |                      |                     | <p><b>3)</b> Rectify any defects identified during post-construction testing and inspection prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building or element as defined at the design stage.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Letter of Commitment confirming the appointment of a suitably qualified professional to complete post-construction testing and inspection (thermography surveys and airtightness testing) in accordance with the appropriate standard.</li> <li>- Formal letter confirming that any defects identified during post-construction testing and inspection will be rectified, prior to building handover, to the required performance characteristics for the building or element as defined at the design stage.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Copy of the thermographic survey results and air tightness testing results and, where applicable, a formal letter to confirm the measures taken to rectify any defects.</li> </ul> |
| Health and Wellbeing   |             |                   |                  |                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Hea 1 - Visual Comfort |             |                   |                  |                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Hea 1b                 | Daylighting | 2                 | 1                | 0.87%                | Daylight Consultant | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> Daylighting criteria have been met:</p> <ul style="list-style-type: none"> <li>- 80% of relevant building areas achieve a 2% Average Daylight Factor</li> </ul> <p><b>Definition:</b> Daylighting - relevant building areas<br/> For the purpose of BREEAM, this is defined as areas within the building where good daylighting is considered to be of benefit to the building users (typically those areas occupied continuously for 30 minutes or more). This includes the following (where occupied continuously for 30 minutes or more) specifically stated because they are often omitted:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



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|--------|----------|-------------------|------------------|----------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |          |                   |                  |                      |                | <p>1. Sports hall exercise spaces<br/> 4. Kitchen and catering areas<br/> 5. General communal areas<br/> 6. Small offices (including those within multi-residential buildings)<br/> 7. Meeting rooms (including those within multi-residential buildings)<br/> 8. Leisure areas<br/> 9. Any area that may involve close up work.</p> <p>However, this <u>excludes</u> the following (where present):</p> <p>Media, arts production, SEN sensory spaces, and other areas requiring strictly controlled acoustic or lighting conditions.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Daylighting Calculations</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Formal letter confirming that the building has been constructed according to measures identified in the Daylighting assessment.</li> </ul> |
| Hea 1c | View Out | 1                 | 1                | 0.87%                | Architect      | <p><b>BREEAM Criteria:</b></p> <p>1) 95% of the floor area in 95% of spaces for each relevant building area are within 8m of an external wall which has a window which is at least 20% of the surrounding wall area.</p> <p>Where the room depth is greater than 8m, the percentage of window opening must be at least the same as the values in Table 1.0 BS8206: Part 2.</p> <p><b>Definition/Applicable Rooms:</b></p> <p>BREEAM defines relevant building areas requiring a view out to include areas of the building where:</p> <ul style="list-style-type: none"> <li>1. There are or will be workstations or benches or desks for building users.</li> <li>2. Close work will be undertaken, or visual aids will be used.</li> </ul>                                                                                                                                                      |



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|------------------------------|--------------------------------|-------------------|------------------|----------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              |                                |                   |                  |                      |                | <b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- View Out Calculations</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Formal letter confirming that the building has been constructed according to measures identified in the View Out calculations.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Hea 1d                       | Internal and External Lighting | 1                 | 1                | 0.87%                | M&E            | <b>BREEAM Criteria:</b><br><b>3) External Lighting –</b><br>All external lighting located within the refurbishment or fit-out zone is designed in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas3 and BS EN 12464-2:2014 Light and lighting - Lighting of work places - Part 2: Outdoor work places.<br><br><b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Relevant sections/clauses of the building specification/contract and/or formal letter confirming that all external lighting is in accordance with BS 5489-1: 2013 Code for the practice for the design of road lighting - Lighting of roads and public amenity areas and BS EN 12464-2: 2014 Light and lighting - Lighting of workplaces - Part 2: Outdoor workplaces.</li> <li>- Design drawings demonstrating the internal lighting zones and occupant controls.</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Formal letter confirming that there have been no changes to the external lighting design.</li> <li>- 'As built' drawings showing the lighting layout</li> <li>- BREEAM assessor's site inspection.</li> </ul> |
| Hea 5 - Acoustic Performance |                                |                   |                  |                      |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Hea 5a                       | Performance Standard           | 1                 | 1                | 0.87%                | Acoustician    | <b>BREEAM Criteria:</b><br><b>1) During the design stages</b> the building meets the appropriate acoustic performance standards and testing requirements for the acoustic principles                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |



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|------------------------------------|-----------------------|-------------------|------------------|----------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                    |                       |                   |                  |                      |                | <p>of:</p> <p>Indoor ambient noise level.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Formal letter of appointment or other confirmation demonstrating when the acoustician was appointed.</li> <li>- Evidence to confirm that the acoustician is 'suitably qualified' in line with the BREEAM criteria.</li> <li>- Acousticians report demonstrating compliance with appropriate acoustic performance standards and testing requirements for indoor ambient noise levels.</li> <li>- Relevant sections/clauses of the building specification/contract and/or a formal letter confirming that a programme of pre-completion testing will be carried out by a compliant test body in accordance with the relevant acoustic testing and measurement procedures.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Acousticians' pre-completion testing report confirming that the requirements for indoor ambient noise levels.</li> <li>- Evidence to confirm that the acoustician is 'suitably qualified' in line with the BREEAM criteria.</li> <li>- Formal letter, where relevant, to confirm that all required remedial works have been carried out in accordance with the acousticians' recommendations.</li> </ul> |
| <b>Hea 6 - Safety and Security</b> |                       |                   |                  |                      |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Hea 6a                             | Consultation with ALO | 1                 | 1                | 0.87%                | Architect/ALO  | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> A Suitably Qualified Security Specialist (SQSS) conducts an evidence-based Security Needs Assessment (SNA) during or prior to <b>Concept Design</b> (RIBA Stage 2 or equivalent). The purpose of the SNA will be to identify attributes of the proposal, site and surroundings which may influence the approach to security for the development.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



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| Issue                                         |                    | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility                | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------|--------------------|-------------------|------------------|----------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                               |                    |                   |                  |                      |                               | <p><b>2)</b> The SQSS develops a set of security controls and recommendations for incorporation into the proposals. Those controls and recommendations shall directly relate to the threats and assets identified in the preceding SNA.</p> <p><b>3)</b> The controls and recommendations shall be incorporated into proposals and implemented in the as-built development. Any deviation from those controls and recommendations shall be justified and agreed with the SQSS.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Security Needs Assessment in line with BREEAM requirements.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Formal letter confirming that the recommendations contained within the SNA have been incorporated within the building design (with examples).</li> </ul> |
| <b>Hea 07 – Safe and Healthy Surroundings</b> |                    |                   |                  |                      |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hea 7a</b>                                 | <b>Safe Access</b> | 1                 | 0                | 0.87%                | Architect/Landscape Architect | <p><b>Credit Not Currently Sought</b><br/> <b>BREEAM Criteria:</b></p> <p><b>1)</b> Where external site areas form part of the assessed development the following apply:</p> <p><b>2)</b> Dedicated and safe cycle paths are provided from the site entrance to any cycle storage and connect to offsite cycle paths where applicable.</p> <p><b>3)</b> Dedicated and safe footpaths are provided on and around the site providing suitable links for the following:</p> <ol style="list-style-type: none"> <li>The site entrance to the building entrance.</li> <li>Car parks (where present) to the building entrance.</li> <li>The building to outdoor space.</li> <li>Connecting to off-site paths where applicable.</li> </ol> <p><b>4)</b> Pedestrian drop-off areas are designed off, or adjoining to, the access road and should provide direct access to other footpaths.</p>    |



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| Issue  |               | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility                | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------|---------------|-------------------|------------------|----------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |               |                   |                  |                      |                               | <p>5) Where vehicle delivery access and drop-off areas form part of the assessed development, the following apply:</p> <p>Delivery areas are not accessed through general parking areas and do not cross or share the following:</p> <ul style="list-style-type: none"> <li>a. Pedestrian and cyclist paths.</li> <li>b. Outside amenity areas accessible to building users and general public.</li> </ul> <p>6) There is a dedicated parking or waiting area for goods vehicles with appropriate separation from the manoeuvring area and staff and visitor car parking.</p> <p>7) Parking and turning areas are designed for simple manoeuvring according to the type of delivery vehicle likely to access the site, thus avoiding the need for repeated shunting.</p> |
| Hea 7b | Outside Space | 1                 | 0                | 0.87%                | Architect/Landscape Architect | <p><b>Credit Not Currently Sought</b><br/> <b>BREEAM Criteria:</b></p> <p>1) There is an outside space providing building users with an external amenity area.</p> <p>The outside space must:</p> <ul style="list-style-type: none"> <li>- be an outdoor landscaped area, for example a garden, balcony or terrace; the majority of the space should be open to the sky.</li> <li>- have appropriate seating areas and be non-smoking.</li> <li>- be located to ensure it is accessible to all building users and avoids areas that will have disturbances from sources of noise (e.g. building services, car parks, busy roads, delivery areas etc.).</li> </ul>                                                                                                        |



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| Issue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Available Credits                            | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------|----------------------|----------------|-----------------------------|
| Energy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                              |                  |                      |                |                             |
| Ene 1 - Reduction of CO2 Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                              |                  |                      |                |                             |
| Ene 1a<br>MINIMUM STANDARD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Reduction of CO <sub>2</sub> Emissions       | 9                | 7                    | 0.73%          | Energy Assessor             |
| <p><b>BREEAM Criteria:</b></p> <p>1) Calculate an Energy Performance Ratio for New Construction (EPR NC). Compare the EPR NC achieved with the benchmarks in Table 6.1 and award the corresponding number of BREEAM credits.</p> <p>The methodology for the EPR NC calculation considers three metrics of modelled building performance when determining the number of credits achieved for this issue. The three metrics are:</p> <ol style="list-style-type: none"> <li>1. The building's heating and cooling energy demand</li> <li>2. The building's primary energy consumption</li> <li>3. The total resulting CO<sub>2</sub>-eq emissions.</li> </ol> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- A copy of the building regulations output document from the approved software.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- As per interim design stage., but with the output documents from the approved software reflecting performance at the as-built stage of analysis. This must account for any changes to the specification during construction and the measured air leakage rate, ductwork leakage and fan performances (as required by building regulations).</li> </ul> |                                              |                  |                      |                |                             |
| Ene 1b                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Prediction of operational energy consumption | 4                | 0                    | 0.73%          | Energy Assessor/Design Team |
| <p><b>Credit Not Currently Sought</b></p> <p><b>BREEAM Criteria:</b></p> <p>1) Involve relevant members of the design team in an energy design workshop focusing on operational energy performance.</p> <p>2) Undertake additional energy modelling during the design and post-construction stage to generate predicted operational energy consumption</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |                  |                      |                |                             |



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| Issue                     |                   | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------|-------------------|-------------------|------------------|----------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           |                   |                   |                  |                      |                | <p>figures.</p> <p><b>3)</b> Report predicted energy consumption targets by end use, design assumptions and input data (with justifications).</p> <p><b>4)</b> Carry out a risk assessment to highlight any significant design, technical, and process risks that should be monitored and managed throughout the construction and commissioning process.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Ene 3 - External Lighting |                   |                   |                  |                      |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Ene 3                     | External Lighting | 1                 | 1                | 0.73%                | M&E            | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> No external lighting (which includes lighting on the building, at entrances, or signs),</p> <p><b>OR;</b></p> <p><b>2)</b> The average initial luminous efficacy of the external light fittings within the construction zone is not less than 70 luminaire lumens per circuit Watt.</p> <p>External light fittings are automatically controlled for prevention of operation during daylight hours and presence detection in areas of intermittent pedestrian traffic.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Relevant sections/clauses of the building specification/contract and design drawings demonstrating the proposed external lighting strategy, confirming that all external lighting is automatically controlled to prevent operation during daylight hours, with presence detection in areas of intermittent pedestrian traffic.</li> <li>- Manufacturer's datasheets confirming the lamp lumens and circuit Watt for each fitting, confirming an average luminous efficacy of not less than 70 lumens per circuit Watt.</li> </ul> |



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| Issue                     |                         | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility        | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------|-------------------------|-------------------|------------------|----------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           |                         |                   |                  |                      |                       | <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- 'As built' drawings showing the number and type of installed external light fittings, photocell and time clock, in line with the design stage specification.</li> <li>- Where changes have occurred since the design stage specification, please provide manufacturer's datasheets for the installed fittings confirming the lamp lumens and circuit Watt of each fitting.</li> <li>- BREEAM assessor's site inspection.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Ene 4 - Low Carbon Design |                         |                   |                  |                      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Ene 4a                    | Passive Design Analysis | 1                 | 1                | 0.73%                | M&E / Energy Assessor | <b>BREEAM Criteria:</b> <ol style="list-style-type: none"> <li>1) Achieve the first credit Hea 04 Thermal comfort: One credit - Thermal modelling to demonstrate that the building design delivers appropriate thermal comfort levels in occupied spaces.</li> <li>2) The project team analyses the proposed building design and development during <b>Concept Design</b> to identify opportunities for the implementation of passive design measures</li> <li>3) Implement passive design measures to reduce the total heating, cooling, mechanical ventilation, lighting loads and energy consumption in line with the passive design analysis findings.</li> <li>4) Quantify the reduced total energy demand and carbon dioxide (CO<sub>2</sub>-eq) emissions resulting from the passive design measures.</li> </ol> <b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Passive Design Analysis Report.</li> <li>- Results from a dynamic simulation model demonstrating the reduced energy demand and CO<sub>2</sub>-eq emissions from the specified passive design measures.</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- As per interim design stage.</li> </ul> |



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| Issue  |                  | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility        | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------|------------------|-------------------|------------------|----------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ene 4b | Free Cooling     | 1                 | 0                | 0.73%                | M&E / Energy Assessor | <p><b>Credit Not Currently Sought</b><br/> <b>BREEAM Criteria:</b></p> <ol style="list-style-type: none"> <li>1) Achieve the passive design analysis credit.</li> <li>2) Include a free cooling analysis in the passive design analysis.</li> <li>3) Identify opportunities for the implementation of free cooling solutions.</li> <li>4) The building is naturally ventilated or uses any combination of the free cooling strategies listed below: <ul style="list-style-type: none"> <li>- Night-time cooling (which could include the use of a high exposed thermal mass)</li> <li>- Ground coupled air cooling</li> <li>- Displacement ventilation (not linked to any active cooling system)</li> <li>- Ground water cooling</li> <li>- Surface water cooling</li> <li>- Evaporative cooling, direct or indirect</li> <li>- Desiccant dehumidification and evaporative cooling, using waste heat</li> <li>- Absorption cooling, using waste heat.</li> </ul> </li> </ol> |
| Ene 4b | LZC Technologies | 1                 | 1                | 0.73%                | M&E / Energy Assessor | <p><b>BREEAM Criteria:</b></p> <ol style="list-style-type: none"> <li>1) An energy specialist completes a feasibility study (see Low and zero carbon feasibility study on the next page) by the end of <b>Concept Design</b>.</li> <li>2) Establish the most appropriate recognised local (on-site or near-site) low and zero carbon (LZC) energy sources for the building or development based on the feasibility study.</li> <li>3) Specify local LZC technologies for the building or development in line with the feasibility study recommendations.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                          |



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| Issue                                        |                                      | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility  | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------|--------------------------------------|-------------------|------------------|----------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              |                                      |                   |                  |                      |                 | <p><b>4)</b> Quantify the reduced regulated carbon dioxide (CO<sub>2</sub>-eq) emissions resulting from the feasibility study.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- LZV Feasibility Report</li> <li>- Results from a dynamic simulation model demonstrating reductions in CO<sub>2</sub>-eq emissions from the specified low and zero carbon technology.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- As per interim design stage.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Transport                                    |                                      |                   |                  |                      |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Tra 1 - Transport assessment and travel plan |                                      |                   |                  |                      |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Tra 1                                        | Transport assessment and travel plan | 2                 | 2                | 1.20%                | BREEAM Assessor | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> No later than <b>Concept Design</b> stage, undertake a site-specific transport assessment (or develop a travel statement) and draft travel plan, which can demonstrably be used to influence the site layout and built form.</p> <p><b>2)</b> The site-specific travel assessment (or statement) shall cover as a minimum:</p> <ul style="list-style-type: none"> <li>a: If relevant, travel patterns and attitudes of existing building or site users towards cycling, walking and public transport, to identify relevant constraints and opportunities.</li> <li>b: Predicted travel patterns and transport impact of future building or site users.</li> <li>c: Current local environment for pedestrians and cyclists, accounting for any age-related requirements of occupants and visitors.</li> <li>d: Reporting of the number and type of existing accessible amenities, within 500m of the site.</li> <li>e: Disabled access accounting for varying levels and types of disability, including visual impairment.</li> <li>f: Calculation of the existing public transport Accessibility Index (AI),</li> </ul> |



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| Issue                                         |                                       | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility  | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------|---------------------------------------|-------------------|------------------|----------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                               |                                       |                   |                  |                      |                 | <p>g: Current facilities for cyclists.</p> <p><b>3)</b> Following a transport assessment, a site-specific travel plan that provides a long-term management strategy which encourages more sustainable travel will be produced.</p> <p>The travel plan includes measures to increase or improve more sustainable modes of transport and movement of people and goods during the building's operation.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Copy of the travel plan based on a site-specific travel survey/assessment, which covers the minimum BREEAM content and proposals to increase or improve sustainable modes of transport and movement of people and goods during the building's operation and use.</li> <li>- Design drawings demonstrating examples of measures specified in support of the travel plan.</li> <li>- Formal letter to confirm that the recommendations of the travel plan will be implemented post construction and supported by the building's management in operation.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Formal letter confirming that the travel plan will be implemented and supported by the building's management in operation.</li> <li>- BREEAM assessor's site inspection.</li> </ul> |
| <b>Tra 2 – Sustainable Transport Measures</b> |                                       |                   |                  |                      |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Tra 2</b>                                  | <b>Sustainable Transport Measures</b> | 10                | 3                | 1.20%                | BREEAM Assessor | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> Award credits according to the existing Accessible Index (AI) of the project, and the total number of points achieved for the options implemented.</p> <p><b>1. The existing AI calculated in Tra 01 achieves ≥ 8.</b></p> <p><b>2. Demonstrate an increase over existing accessibility / dedicated service.</b></p> <p><b>3. Provide a public transport information system in a publicly accessible</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



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| Issue                        |                     | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------|---------------------|-------------------|------------------|----------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              |                     |                   |                  |                      |                | <p>area, to allow building users access to up-to-date information on the available public transport and transport infrastructure. This may include signposting to public transport, cycling, walking infrastructure or local amenities.</p> <p>6. Provide electric recharging stations of a minimum of 3kW for at least 10% of the total car parking capacity for the development.</p> <p>7. Set up a car sharing group or facility.</p> <p>8. Consult with local Authority, agree and implement one proposition.</p> <p><b>9. Install compliant cycle storage spaces to meet the minimum levels.</b></p> <p>10. Provide at least two compliant cyclists' facilities for the building users: Showers, Changing facilities, Lockers or Drying spaces.</p> <p><b>11. At least three existing accessible amenities are present.</b></p> <p>12. Ensure a minimum of one new accessible amenity (eg access to outdoor open space), is provided.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Provide evidence demonstrating the sustainable transport measures being implemented on site.</li> <li>- Design Stage drawings</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Post Construction Stage drawings</li> <li>- BREEAM assessor's site inspection.</li> </ul> |
| Water                        |                     |                   |                  |                      |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Wat 2 - Water Monitoring     |                     |                   |                  |                      |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Wat 2<br>MINIMUM<br>STANDARD | Water<br>Monitoring | 1                 | 1                | 1%                   | M&E            | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> Specify a water meter on the mains water supply to each building. This includes instances where water is supplied via a borehole or other private source.</p> <p><b>2)</b> For water-consuming plant or building areas consuming 10% or more of the building's total water demand:</p> <p>a. Fit easily accessible sub-meters OR</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



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| Issue |  | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------|--|-------------------|------------------|----------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |  |                   |                  |                      |                | <p>b. Install water monitoring equipment integral to the plant or area.</p> <p><b>3) For each meter (main and sub):</b></p> <p>a. Install a pulsed or other open protocol communication output AND</p> <p>b. Connect it to an appropriate utility monitoring and management system, e.g. a building management system (BMS), for the monitoring of water consumption. If there is no BMS system in operation at Post Construction stage, award credits provided that the system used enables connection when the BMS becomes operational.</p> <p>In buildings with swimming pools, or large water tanks and aquariums, fit separate sub-meters on the water supply of the above and any associated changing facilities (toilets, showers etc.) irrespective of their water consumption levels.</p> <p>In buildings containing laboratories, fit a separate water meter on the water supply to any process or cooling loop for 'plumbed-in' laboratory process equipment, irrespective of their water consumption levels.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Relevant sections/clauses of the building specification/contract and design drawings confirming the specification of a water meter on the mains water supply to the building, and where any water consuming plant or building areas consume 10% or more of the building's total water demand.</li> <li>- Relevant sections/clauses of the building specification/contract and/or a formal letter confirming that the water meter and sub-meters will be pulsed output and connected to a BMS.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- 'As built' drawings confirming the installation of a water meter on the mains water supply to the building.</li> <li>- Formal letter confirming that the water meter and sub-meters will be connected to the BMS.</li> </ul> |



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| Issue                                       |                       | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------|-----------------------|-------------------|------------------|----------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                             |                       |                   |                  |                      |                | - BREEAM assessor's site inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Wat 3 - Water Leak Detection and Prevention |                       |                   |                  |                      |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Wat 3a                                      | Leak detection system | 1                 | 1                | 1%                   | M&E            | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> A leak detection system which is capable of detecting a major water leak on the mains water supply within the building and between the building and the utilities water meter is installed.</p> <p>The leak detection system must be:</p> <ul style="list-style-type: none"> <li>a. A permanent automated water leak detection system that alerts the building occupants to the leak OR an inbuilt automated diagnostic procedure for detecting leaks is installed.</li> <li>b. Activated when the flow of water passing through the water meter/data logger is at a flow rate above a pre-set maximum for a pre-set period of time.</li> <li>c. Able to identify different flow and therefore leakage rates, e.g. continuous, high and/or low level, over set time periods.</li> <li>d. Programmable to suit the owner/occupiers' water consumption criteria.</li> <li>e. Where applicable, designed to avoid false alarms caused by normal operation of large water-consuming plant such as chillers.</li> </ul> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Relevant sections/clauses of the building specification/contract and design drawings confirming the specification of a water leak detection system which is capable of detecting a major leak on the mains water supply within the building and between the building and the site boundary.</li> <li>- Manufacturer's product details demonstrating the scope of the leak detection system, in line with the BREEAM criteria.</li> </ul> |



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| Issue                                                                                                       |                                                          | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility                | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------|------------------|----------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                             |                                                          |                   |                  |                      |                               | <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- 'As built' drawings showing the installation of a BREEAM compliant water leak detection system.</li> <li>- BREEAM assessor's site inspection.</li> </ul>                                                                                                                                                                                                                                           |
| <b>Materials</b>                                                                                            |                                                          |                   |                  |                      |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Mat 02 - Environmental impacts from construction products – Environmental Product Declarations (EPD)</b> |                                                          |                   |                  |                      |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Mat 2                                                                                                       | Environmental impacts from construction products – (EPD) | 1                 | 1                | 1.57%                | Architect/Structural Engineer | <b>BREEAM Criteria:</b><br>Specify construction products with EPD that achieve a total EPD points score of at least 20, according to the Methodology in the BREEAM Technical Manual.<br><br><b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- The Mat 01/02 Results Submission tool.</li> <li>- Copies of EPD certificates.</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>        |
| <b>Mat 3 - Responsible Sourcing of Materials</b>                                                            |                                                          |                   |                  |                      |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Mat 3a<br>MINIMUM STANDARD                                                                                  | Timber Procurement                                       | Pre-Req.          | Pre-req.         | -                    | Main Contractor               | <b>BREEAM Criteria:</b><br>All timber used on site will be sourced in accordance with the UK Government's Timber Procurement Policy.<br><br><b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Letter of Commitment confirming all timber will be legally harvested and traded timber.</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Copies of all relevant certificates or chain of custody evidence.</li> </ul> |



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| Issue  |                              | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility  | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------|------------------------------|-------------------|------------------|----------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mat 3b | Sustainable Procurement Plan | 1                 | 1                | 1.57%                | Main Contractor | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> A sustainable procurement plan must be used by the design team to guide specification towards sustainable construction products. The plan must:</p> <ul style="list-style-type: none"> <li>a. Be in place before <b>Concept Design</b>.</li> <li>b. Include sustainability aims, objectives and strategic targets to guide procurement activities. Note: targets do not need to be achieved for the credit to be awarded but justification must be provided for targets that are not achieved.</li> <li>c. Include a requirement for assessing the potential to procure construction products locally. There must be a policy to procure construction products locally where possible.</li> <li>d. Include details of procedures in place to check and verify the effective implementation of the sustainable procurement plan.</li> </ul> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Copy of the sustainable procurement plan, which has been produced during Concept Design (RIBA Stage 2), and includes sustainability aims, objectives and strategic targets to guide specification towards sustainable construction products.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul> |
| Mat 3c | Major Building Elements      | 3                 | 1                | 1.57%                | Main Contractor | <p><b>BREEAM Criteria:</b></p> <p>Key building materials are responsibly sourced to reduce environmental and socio-economic impacts, as demonstrated through the specification of products with compliant Responsible Sourcing Certification (BES 6001, ISO 14001, FSC, PEFC).</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Relevant sections/clauses of the building specification/contract and design drawings confirming: <ul style="list-style-type: none"> <li>a. The applicable building elements</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |



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| Issue                            |                          | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------|--------------------------|-------------------|------------------|----------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                  |                          |                   |                  |                      |                | <p>b. Details of the material specification for each applicable element.</p> <ul style="list-style-type: none"> <li>- Relevant sections/clauses of the building specification/contract and/or a formal letter of commitment confirming the requirement to procure all relevant materials from responsible sources.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- 'As built' drawings confirming the installation of materials for the applicable location and use categories as per the design stage.</li> <li>- Responsible sourcing certificates (i.e. ISO 14001, BES 6001 etc.) for each material comprising the applicable building elements.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Mat 5 - Designing for Robustness |                          |                   |                  |                      |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Mat 5                            | Designing for Robustness | 1                 | 1                | 1.57%                | Architect      | <p><b>BREEAM Criteria:</b><br/> <b>Protecting vulnerable parts of the building from damage</b><br/> <b>1)</b> The building incorporates suitable durability and protection measures or designed features/solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements. This must include, but is not necessarily limited to:</p> <ul style="list-style-type: none"> <li>a. Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc.).</li> <li>b. Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas.</li> </ul> <p><b>Protecting exposed parts of the building from material degradation</b><br/> <b>2)</b> Environmental factors have been identified that are relevant to the site location.</p> <p><b>3)</b> Existing applicable building elements that are exposed to any relevant environmental factors have been identified.</p> <p><b>4)</b> Existing applicable building elements have been surveyed have been</p> |



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| Issue |  | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|       |  |                   |                  |                      |                | <p>assessed to identify impacts of material degradation effects including an assessment to grade the severity of any degradation effects.</p> <p><b>5)</b> Design and specification measures have to be developed to repair and protect existing elements according to the severity of any degradation affects, to limit degradation. Where it is not feasible to implement measures to limit material degradation for existing elements, justification should be provided.</p> <p><b>6)</b> Newly specified materials or newly constructed elements (e.g. a new external wall) within the scope of refurbishment or fit-out works incorporate appropriate design and specification measures to limit material degradation due to environmental factors.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Design drawings illustrating the vulnerable areas/parts of the building and the durability measures specified to reduce damage to the building's fabric or materials in case of accidental or malicious damage.</li> <li>- Evidence confirming the applicable building elements appropriate to the building and the environmental factors likely to cause material degradation effects in the identified applicable materials.</li> <li>- Relevant sections/clauses of the building specification/contract and/or design drawings confirming the elements/products achieving an appropriate quality or durability standard or design guide, as outlined in Table 9.14 of the BREEAM NC 2018 scheme guidance, or a copy of a detailed assessment of the element's resilience when exposed to the applicable material degradation and environmental factors.</li> <li>- Relevant sections/clauses of the building specification/contract and/or design drawings demonstrating that convenient access to the roof and façade for cost-effective cleaning, replacement and repair has been included in the design, and that the roof and façade has been designed to prevent water damage, ingress and detrimental ponding.</li> </ul> |



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| Issue                       |                     | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------|---------------------|-------------------|------------------|----------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             |                     |                   |                  |                      |                | <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- 'As built' drawings confirming the installation of protection measures in order to protect vulnerable areas in line with the design stage specification.</li> <li>- BREEAM assessor's site inspection.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Mat 6 – Material Efficiency |                     |                   |                  |                      |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Mat 6                       | Material Efficiency | 1                 | 1                | 1.57%                | Design Team    | <b>BREEAM Criteria:</b> <ol style="list-style-type: none"> <li>1) At the <b>Preparation and Brief</b> and <b>Concept Design</b> stages, set targets and report on opportunities and methods to optimise the use of materials. These must be done for each of the following stages.               <ul style="list-style-type: none"> <li>- Preparation and Brief</li> <li>- Concept Design</li> <li>- Developed Design</li> <li>- Technical Design</li> <li>- Construction.</li> </ul> </li> <li>2) Develop and record the implementation of material efficiency, during:               <ul style="list-style-type: none"> <li>- Developed Design</li> <li>- Technical Design</li> <li>- Construction.</li> </ul> </li> <li>3) Report the targets and actual material efficiencies achieved.</li> </ol> <b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Details of targets, opportunities and methods reported during each RIBA Stage (1-5) to optimise the use of materials, following the material efficiency strategy outlined in Table 9.15 of the BREEAM NC 2018 scheme guidance.</li> </ul> |



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| Issue                                 |                                                              | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility  | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                                                              |   |                                      |   |                                    |   |                                    |                                |                                    |
|---------------------------------------|--------------------------------------------------------------|-------------------|------------------|----------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------------------------|---|--------------------------------------|---|------------------------------------|---|------------------------------------|--------------------------------|------------------------------------|
|                                       |                                                              |                   |                  |                      |                 | <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"><li>- Details of material efficiency measures implemented during the Developed Design (RIBA Stage 3), Technical Design (RIBA Stage 4) and Construction (RIBA Stage 5).</li><li>- Provide details of the targets and actual material efficiencies achieved.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                                                              |   |                                      |   |                                    |   |                                    |                                |                                    |
| Waste                                 |                                                              |                   |                  |                      |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                                                              |   |                                      |   |                                    |   |                                    |                                |                                    |
| Wst 1 - Construction Waste Management |                                                              |                   |                  |                      |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                                                              |   |                                      |   |                                    |   |                                    |                                |                                    |
| Wst 1b                                | Construction Resource Efficiency                             | 3                 | 2                | 0.80%                | Main Contractor | <b>BREEAM Criteria:</b><br><b>1)</b> Prepare a compliant Resource Management Plan (RMP) covering: <ul style="list-style-type: none"><li>a. Non-hazardous waste materials(from on-site construction and dedicated off-site manufacture or fabrication, including demolition and excavation waste.</li><li>b. Accurate data records on waste arisings and waste management routes.</li></ul><br><b>2)</b> Meet or improve upon the benchmarks below for non-hazardous construction waste, excluding demolition and excavation waste.<br><br><table><thead><tr><th><u>No. of BREEAM credits</u></th><th><u>Amount of waste generated per 100m<sup>2</sup> (GIFA)</u></th></tr></thead><tbody><tr><td>1</td><td>≤13.3 m<sup>3</sup> or ≤11.1 tonnes</td></tr><tr><td>2</td><td>≤7.5 m<sup>3</sup> or ≤6.5 tonnes</td></tr><tr><td>3</td><td>≤3.4 m<sup>3</sup> or ≤3.2 tonnes</td></tr><tr><td>1 exemplary performance credit</td><td>≤1.6 m<sup>3</sup> or ≤1.9 tonnes</td></tr></tbody></table><br><b>Design Stage Evidence:</b> <ul style="list-style-type: none"><li>- A copy of the Resource Management Plan.</li><li>- Relevant sections/clauses of the building specification/contract and/or a formal letter confirming the requirement for the principal contractor to develop a Resource Management Plan (RMP) covering non-hazardous waste materials (from on-site construction and dedicated off-site manufacture or fabrication), including demolition and excavation waste, and accurate data records on waste arisings and waste management</li></ul> | <u>No. of BREEAM credits</u> | <u>Amount of waste generated per 100m<sup>2</sup> (GIFA)</u> | 1 | ≤13.3 m <sup>3</sup> or ≤11.1 tonnes | 2 | ≤7.5 m <sup>3</sup> or ≤6.5 tonnes | 3 | ≤3.4 m <sup>3</sup> or ≤3.2 tonnes | 1 exemplary performance credit | ≤1.6 m <sup>3</sup> or ≤1.9 tonnes |
| <u>No. of BREEAM credits</u>          | <u>Amount of waste generated per 100m<sup>2</sup> (GIFA)</u> |                   |                  |                      |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                                                              |   |                                      |   |                                    |   |                                    |                                |                                    |
| 1                                     | ≤13.3 m <sup>3</sup> or ≤11.1 tonnes                         |                   |                  |                      |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                                                              |   |                                      |   |                                    |   |                                    |                                |                                    |
| 2                                     | ≤7.5 m <sup>3</sup> or ≤6.5 tonnes                           |                   |                  |                      |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                                                              |   |                                      |   |                                    |   |                                    |                                |                                    |
| 3                                     | ≤3.4 m <sup>3</sup> or ≤3.2 tonnes                           |                   |                  |                      |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                                                              |   |                                      |   |                                    |   |                                    |                                |                                    |
| 1 exemplary performance credit        | ≤1.6 m <sup>3</sup> or ≤1.9 tonnes                           |                   |                  |                      |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                                                              |   |                                      |   |                                    |   |                                    |                                |                                    |



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| Issue  |                                  | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility  | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------|----------------------------------|-------------------|------------------|----------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                                  |                   |                  |                      |                 | <p>routes, meeting the construction resource efficiency benchmarks in Table 10.1 of the BREEAM NC 2018 scheme guidance.</p> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Copy of the final compliant Resource Management Plan confirming the waste types (per waste group) generated on site relating to on site construction and dedicated off site manufacture/fabrication (excluding demolition and excavation waste).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Wst 1d | Diversion of waste from Landfill | 1                 | 1                | 0.80%                | Main Contractor | <p><b>BREEAM Criteria:</b></p> <p>1) Meet, where applicable, the diversion from landfill benchmarks in Table 10.2 for non-hazardous construction waste and demolition and excavation waste generated.</p> <p>Sort waste materials into separate key waste groups, either on-site or through a licensed contractor for recovery.</p> <p><b>One Credit</b><br/> Non-Demolition – 70% by Volume or 80% by tonnage<br/> Demolition – 80% by Volume or 90% by tonnage<br/> Excavation – N/A</p> <p><b>Exemplary</b><br/> Non-Demolition – 85% by Volume or 90% by tonnage<br/> Demolition – 85% by Volume or 95% by tonnage<br/> Excavation – 95% by Volume or 95% by tonnage</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Relevant sections/clauses of the building specification/contract and/or a formal letter confirming the requirement for the principal contractor to meet the diversion from landfill benchmarks in Table 10.2 of the BREEAM NC 2018 scheme guidance for non-hazardous construction waste, demolition and excavation waste generated, and to sort waste materials into separate key waste groups as per Table 10.3 of the BREEAM NC 2018</li> </ul> |



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| Issue                                                     |                          | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility                      | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------|--------------------------|-------------------|------------------|----------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                           |                          |                   |                  |                      |                                     | <p>scheme guidance, either on-site or through a licensed contractor for recovery.</p> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Copy of the final compliant Resource Management Plan confirming the waste types (per waste group) generated on site relating to on site construction and dedicated off site manufacture/fabrication, and the amount of waste that has been diverted from landfill. Note that at least 80% (by weight) or 70% (by volume) of non-hazardous construction waste (on site and off-site manufacture/fabrication in a dedicated facility) must be diverted from landfill.</li> </ul> |
| Wst 2 -Use of recycled and sustainably sourced aggregates |                          |                   |                  |                      |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Wst 2                                                     | Recycled Aggregates      | 1                 | 0                | 0.80%                | Main Contractor/Structural Engineer | <p><b>Credit Not Currently Sought</b></p> <p><b>BREEAM Criteria:</b></p> <ul style="list-style-type: none"> <li>- Identify all aggregate uses and types on the project</li> <li>- Determine the quantity in tonnes for each identified use and aggregate type.</li> <li>- Identify the region in which the aggregate source is located.</li> <li>- Calculate the distance in kilometres travelled by all aggregates by transport type</li> </ul> <p>Enter the information into the BREEAM Wst 02 calculator to calculate the Project Sustainable Aggregate points.</p>                                                                                        |
| Wst 3 - Recyclable Waste Storage                          |                          |                   |                  |                      |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Wst 3<br>MINIMUM STANDARD                                 | Recyclable Waste Storage | 1                 | 1                | 0.80%                | Architect/ building Owner           | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> Dedicated space(s) is provided for the segregation and storage of operational recyclable waste volumes generated by the assessed building/unit, its occupant(s) and activities.</p> <p>This space must be:</p>                                                                                                                                                                                                                                                                                                                                                                                                    |



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| Issue |  | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------|--|-------------------|------------------|----------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |  |                   |                  |                      |                | <p>a. Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams</p> <p>b. Accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractors</p> <p>c. Of a capacity appropriate to the building type, size, number of units (if relevant) and predicted volumes of waste that will arise from daily/weekly operational activities and occupancy rates.</p> <p>For consistent and large amounts of operational waste generated, provide:</p> <p>a. Static waste compactors or balers; situated in a service area or dedicated waste management space.</p> <p>b. Vessels for composting suitable organic waste OR adequate spaces for storing segregated food waste and compostable organic material for collection and delivery to an alternative composting facility.</p> <p>c. A water outlet provided adjacent to or within the facility for cleaning and hygiene purposes where organic waste is to be stored or composted on site.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Project team meeting minutes or a formal letter confirming the likely waste streams and indicative volumes.</li> <li>- Relevant sections/clauses of the building specification/contract and design drawings confirming the provision and scope of dedicated facilities (i.e. storage of recyclable waste streams, access arrangements, and capacity).</li> <li>- Relevant sections/clauses of the building specification/contract and design drawings confirming the provision of a compactor/baler, where there is a consistent generation in volume of packaging waste, and a vessel(s) for composting or adequate space for storing segregated food waste and compostable organic material, along with a bib tap near to or within the waste/composting storage facility (where applicable).</li> </ul> |



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| Issue                                  |                                | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility                  | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------|--------------------------------|-------------------|------------------|----------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                        |                                |                   |                  |                      |                                 | <p><b>Post Construction Stage Evidence:</b></p> <p>'As built' drawings showing the installed areas provided for the storage and segregation of recyclable waste and general waste, in line with the design stage specification.</p> <p>BREEAM assessor's site inspection.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Wst 5 – Adaptability to Climate Change |                                |                   |                  |                      |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Wst 5                                  | Adaptability to Climate Change | 1                 | 1                | 0.80%                | Architect / Structural Engineer | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> Conduct a climate change adaptation strategy appraisal for structural and fabric resilience by the end of <b>Concept Design</b> (RIBA Stage 2 or equivalent), in accordance with the following approach:</p> <p><b>2)</b> Carry out 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 should cover the following stages:</p> <ul style="list-style-type: none"> <li>• Hazard identification</li> <li>• Hazard assessment</li> <li>• Risk estimation</li> <li>• iv. Risk evaluation</li> <li>• Risk management.</li> </ul> <p><b>3)</b> Develop recommendations or solutions based on the climate change adaptation strategy appraisal, before or during <b>Concept Design</b>, that aim to mitigate the identified impact.</p> <p><b>4)</b> Provide an update during <b>Technical Design</b> demonstrating how the recommendations or solutions proposed at Concept Design have been implemented where practical and cost effective. Omissions have been justified in writing by the assessor</p> |



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| Issue                                                  |                         | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility                  | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------|-------------------------|-------------------|------------------|----------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                        |                         |                   |                  |                      |                                 | <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Copy of the climate change adaptation strategy appraisal, developed during Concept Design (RIBA Stage 2), which identifies the impact of expected extreme weather conditions arising from climate change on the building over its projected life cycle, and covers the installation of building services and renewable systems, as well as structural and fabric resilience aspects in line with the BREEAM methodology.</li> <li>- Provide an updated appraisal during Technical Design (RIBA Stage 4) demonstrating how the recommendations or solutions proposed at Concept Design have been implemented where practical and cost effective, with any omissions justified in writing.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>                                                                                           |
| <b>Wst 6 – Design for disassembly and adaptability</b> |                         |                   |                  |                      |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Wst 6                                                  | Functional Adaptability | 2                 | 2                | 0.80%                | Architect / Structural Engineer | <p><b>BREEAM Criteria:</b></p> <p><u><b>Design for Disassembly and Functional Adaptability – Recommendations</b></u></p> <p><b>1)</b> Conduct a study to explore the ease of disassembly and the functional adaptation potential of different design scenarios by the end of <b>Concept Design</b>.</p> <p><b>2)</b> Develop recommendations or solutions based on the study during or prior to <b>Concept Design</b>, that aim to enable and facilitate disassembly and functional adaptation.</p> <p><u><b>Disassembly and Functional Adaptability – Implementation</b></u></p> <p><b>3)</b> Provide an update, during Technical Design, on:</p> <ul style="list-style-type: none"> <li>a. How the recommendations or solutions proposed by Concept Design have been implemented where practical and cost effective. Omissions have been justified in writing to the assessor.</li> <li>b. Changes to the recommendations and solutions during the development of the Technical Design.</li> </ul> |



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| Issue                 |                   | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility               | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------|-------------------|-------------------|------------------|----------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       |                   |                   |                  |                      |                              | <p><b>4)</b> Produce a building adaptability and disassembly guide to communicate the characteristics allowing functional adaptability and disassembly to prospective tenants.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Disassembly and functional adaptability study, implementation plan report, building adaptability and disassembly guide.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>                                                                                                                                                                                                                                                                |
| Land Use and Ecology  |                   |                   |                  |                      |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Le 1 – Site Selection |                   |                   |                  |                      |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Le 1a                 | Site Selection    | 1                 | 1                | 1.46%                | Architect                    | <p><b>BREEAM Criteria:</b><br/>Proposed development on a pre-developed site - At least 75% of the proposed development's footprint is on an area of land which has previously been occupied.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Design drawings, report and site photographs confirming: <ul style="list-style-type: none"> <li>a. Type and duration of previous land use</li> <li>b. Area (m2) of previous land use</li> <li>c. Location and footprint (m2) of proposed development and temporary works.</li> </ul> </li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- 'As built' drawings confirming that there have been no changes to the site layout building orientation.</li> </ul> |
| Le1b                  | Contaminated Land | 1                 | 0                | 1.46%                | Contaminated Land Specialist | <p><b>Credit Not Currently Sought</b><br/><b>BREEAM Criteria:</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



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| Issue                                     |                       | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility          | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------------|-----------------------|-------------------|------------------|----------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                           |                       |                   |                  |                      |                         | <p>A contaminated land professional's site investigation, risk assessment and appraisal has deemed land within the site to be affected by contamination. The site investigation, risk assessment and appraisal have identified:</p> <ul style="list-style-type: none"> <li>- The degree of contamination</li> <li>- The contaminant sources or types</li> <li>- The options for remediating sources of contamination which present an unacceptable risk.</li> </ul> <p>The client or principal contractor confirms that remediation of the site will be carried out in accordance with the remediation strategy and its implementation plan as recommended by the contaminated land professional.</p> |
| LE 2 – Ecological Risks and Opportunities |                       |                   |                  |                      |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Le 2                                      | Pre-Requisite         | Pre-Req           | Pre-Req          | -                    | Ecologist / Design Team | <p><b>BREEAM Criteria:</b><br/>The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Ecologist Report</li> <li>- Completed BREEAM GN13 Document</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>                                                                                                                                                                                                                            |
| Le 2a                                     | Survey and Evaluation | 1                 | 1                | 1.46%                | Ecologist / Design Team | <p><b>BREEAM Criteria:</b><br/>1) A Suitably Qualified Ecologist (SQE) carries out a survey and evaluation for the site early enough to influence site preparation works, layout and, where necessary, strategic planning decisions (typically <b>Preparation and Brief</b> or <b>Concept Design</b> stage).</p> <p>The SQE's survey and evaluation determines the site's ecological baseline, including:</p>                                                                                                                                                                                                                                                                                         |



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| Issue |                                 | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility          | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------|---------------------------------|-------------------|------------------|----------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |                                 |                   |                  |                      |                         | <p>a. Current and potential ecological value and condition of the site and related areas within the Zone of Influence.</p> <p>b. Direct and indirect risks to current ecological value from the project.</p> <p>c. Capacity and feasibility for enhancement of the site's ecological value and, where relevant, areas within the Zone of Influence.</p> <p>Recommendations and data collected from the survey and evaluation are shared with appropriate project team members to influence decisions made for activities during site preparation, design and construction works, which can support ecological features.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Ecologist Report</li> <li>- Completed BREEAM GN13 Document</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul> |
| Le 2b | Determining Ecological Outcomes | 1                 | 1                | 1.46%                | Ecologist / Design Team | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> Achieve the 'Survey and Evaluation' credit.</p> <p><b>2)</b> The project team liaise and collaborate with representative stakeholders early enough to influence key planning decisions (typically <b>Concept Design</b> stage), to:</p> <p>a. Identify the optimal ecological outcomes for the site.</p> <p>b. Identify, appraise and select measures to meet the optimal ecological outcomes for the site, in line with the mitigation hierarchy of action:</p> <ol style="list-style-type: none"> <li>1. Avoidance</li> <li>2. Protection</li> <li>3. Reduction or limitation of negative impacts</li> <li>4. On site compensation and</li> <li>5. Enhancement, considering the capacity and feasibility within the site,</li> </ol>                                                                                                                       |



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| Issue                              |                               | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility                       | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------|-------------------------------|-------------------|------------------|----------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                    |                               |                   |                  |                      |                                      | <p>or where viable, offsite.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Ecologist Report</li> <li>- Completed BREEAM GN13 Document</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| LE 3 – Managing Impacts on Ecology |                               |                   |                  |                      |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Le 3                               | Pre-Requisite                 | Pre-Req           | Pre-Req          | -                    | Ecologist / Design Team / Contractor | <p><b>BREEAM Criteria:</b><br/>Le 02's 'Survey and evaluation and Determining ecological outcomes' criteria have been achieved.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Ecologist Report</li> <li>- Completed BREEAM GN13 Document</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>                                                                                                                                                                                                                                                                                                                                                      |
| Le 3a                              | Planning and Measures on Site | 1                 | 1                | 1.46%                | Ecologist / Design Team / Contractor | <p><b>BREEAM Criteria:</b></p> <ol style="list-style-type: none"> <li>1) Further planning to avoid and manage negative ecological impacts on-site is carried out early enough to influence the concept design and design brief as well as site preparation planning (typically <b>Concept Design</b> stage).</li> <li>2) On-site measures for managing negative ecological impacts during site preparation and construction are implemented in-practice (e.g. mitigation measures to protect existing ecological features).</li> <li>3) 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 LE02 Ecological risks and opportunities.</li> </ol> |



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| Issue                                    |                           | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility                            | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------|---------------------------|-------------------|------------------|----------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                          |                           |                   |                  |                      |                                           | <b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Ecologist Report</li> <li>- Completed BREEAM GN13 Document</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Le 3b                                    | Managing Negative Impacts | 2                 | 1                | 1.46%                | Ecologist / Design Team / Contractor      | <b>BREEAM Criteria:</b> <ol style="list-style-type: none"> <li>1) Negative impacts from site preparation and construction works have been managed according to the mitigation hierarchy, in line with the SQE's recommendations and, either:               <ol style="list-style-type: none"> <li>a. No overall loss of ecological value has occurred (two credits).</li> <li>b. The loss of ecological value has been minimised (Minimising Loss) (one credit).</li> </ol> </li> </ol> <b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Ecologist Report</li> <li>- Completed BREEAM GN13 Document</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul> |
| LE 4 – Ecological Change and Enhancement |                           |                   |                  |                      |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Le 4                                     | Pre-Requisite             | Pre-Req           | Pre-Req          | -                    | Ecologist / Design Team / Main Contractor | <b>BREEAM Criteria:</b> <ol style="list-style-type: none"> <li>1) Achieve the 'Managing Negative Impacts' credit.</li> <li>2) The client or contractor confirms compliance is monitored against all relevant UK, EU or international legislation relating to the ecology of the site.</li> </ol> <b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Ecologist Report</li> <li>- Completed BREEAM GN13 Document</li> </ul>                                                                                                                                                                                                                                                                                                          |



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| Issue |                                   | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility                            | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------|-----------------------------------|-------------------|------------------|----------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |                                   |                   |                  |                      |                                           | <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Le 4a | Ecological Enhancement            | 1                 | 1                | 1.46%                | Ecologist / Design Team / Main Contractor | <b>BREEAM Criteria:</b> <ol style="list-style-type: none"> <li>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. Measures are implemented in the following order: <ul style="list-style-type: none"> <li>a. On site, and where this is not feasible,</li> <li>b. Off site within the Zone of Influence.</li> </ul> </li> <li>Data collated are analysed and where potentially valuable, provided to the local environmental records centres nearest to, or relevant for, the site.</li> </ol> <b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Ecologist Report</li> <li>- Completed BREEAM GN13 Document</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul> |
| Le 4c | Change and Enhancement of Ecology | 3                 | 2                | 1.46%                | Ecologist / Design Team / Main Contractor | <b>BREEAM Criteria:</b> <ol style="list-style-type: none"> <li>Up to three credits are awarded based on the change in ecological value occurring as a result of the project. <p>This must be calculated in accordance with the process set out in GN36 – BREEAM, CEEQUAL and HQM Ecology Calculation Methodology – Route 2.</p> <p>Credits are awarded in line with the Reward Scale table in GN36 where there are no residual impacts on protected sites or irreplaceable habitats.</p> </li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



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| Issue                                               |                                                   | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility             | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------|---------------------------------------------------|-------------------|------------------|----------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     |                                                   |                   |                  |                      |                            | <b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Ecologist Report</li> <li>- Completed BREEAM GN13 Document</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>                                                                                                                                                                                                                                                                                                                                                          |
| LE 5 - Long Term Ecology Management and Maintenance |                                                   |                   |                  |                      |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Le 5                                                | Pre-Requisite                                     | Pre-Req           | Pre-Req          | -                    | Ecologist/ Main Contractor | <b>BREEAM Criteria:</b> <ol style="list-style-type: none"> <li>1) 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.</li> <li>2) Achieve the 'Managing Negative Impacts' credit.</li> </ol> <b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Ecologist Report</li> <li>- Completed BREEAM GN13 Document</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>                                          |
| Le 5a                                               | Management and Maintenance Throughout the Project | 1                 | 1                | 1.46%                | Ecologist/ Main Contractor | <b>BREEAM Criteria:</b> <ol style="list-style-type: none"> <li>1) 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.</li> <li>2) To ensure the optimal ecological outcomes agreed in Le 02 are met in-practice, these measures must monitor and review the effectiveness of the mitigation and enhancement measures in place for Le 03 &amp; Le 04 to ensure they are implemented.</li> </ol> |



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| Issue |                                       | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility             | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------|---------------------------------------|-------------------|------------------|----------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |                                       |                   |                  |                      |                            | <p><b>3)</b> A 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. This should include detailed management and maintenance plans as required by landscape and asset managers as well as relevant parts of the handover information for occupiers written in a format that encourages understanding and supportive behaviours.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Ecologist Report</li> <li>- Completed BREEAM GN13 Document</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> <li>- As-built evidence showing measures have been carried out in practice.</li> </ul>                                                                                                                                                                                                                |
| Le 5b | Landscape and Ecology Management Plan | 1                 | 1                | 1.46%                | Ecologist/ Main Contractor | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> A Landscape and Ecology Management Plan, or equivalent, has been developed in accordance with BS 42020:2013 Section 11.1(213) covering at least the first five years after project completion as a minimum and including:</p> <ul style="list-style-type: none"> <li>a. Actions and responsibilities of relevant individuals prior to handover</li> <li>b. The ecological value and condition of the site at handover and how this is expected to develop and change over time</li> <li>c. Identification of opportunities for ongoing alignment with activities beyond the development project, which support the aims of BREEAM's Strategic Ecology Framework.</li> <li>d. Identification and guidance to trigger appropriate remedial actions to address previously unforeseen impacts</li> <li>e. Clearly defined and allocated roles and responsibilities for delivering the plan.</li> </ul> <p><b>2)</b> The landscape and management plan or similar will be updated to support maintenance of the ecological value of the site.</p> |



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| Issue                       |               | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility        | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------|---------------|-------------------|------------------|----------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             |               |                   |                  |                      |                       | <b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Ecologist Report</li> <li>- Completed BREEAM GN13 Document</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> <li>- Copy of the Landscape and Ecology Management Plan.</li> </ul>                                                                                                                                                                                                                                                                    |
| Pollution                   |               |                   |                  |                      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Pol 3 Surface Water Run-Off |               |                   |                  |                      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Pol 3                       | Pre-Requisite | Pre-Req           | Pre-Req          | -                    | Flood Risk Specialist | <b>BREEAM Criteria:</b><br>An appropriate consultant is appointed to carry out and demonstrate the development's compliance with all criteria.<br><br><b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Completed BREEAM GN13 Document</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>                                                                                                                                                                                                        |
| Pol 3a                      | Flood Risk    | 2                 | 2                | 1%                   | Flood Risk Specialist | <b>BREEAM Criteria:</b><br><u>Low Flood Risk – 2 Credits</u><br>A site-specific flood risk assessment (FRA) confirms the development is in a flood zone that is defined as having a low annual probability of flooding. The FRA takes all current and future sources of flooding into consideration.<br><br><u>Medium or High Flood Risk – 1 Credit</u><br>A site-specific FRA confirms the development is in a flood zone that is defined as having a medium or high annual probability of flooding and is not in a functional floodplain. The FRA must take all current and future sources of |



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| Issue |                       | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility      | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------|-----------------------|-------------------|------------------|----------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |                       |                   |                  |                      |                     | <p>flooding into consideration. For smaller sites refer to Level of detail required in the FRA for smaller sites on page 340, which overrides criterion 2 above.</p> <p>To increase the resilience and resistance of the development to flooding, one of the following must be achieved:</p> <ul style="list-style-type: none"><li>a. The ground level of the building and access to both the building and the site, are designed (or zoned) so they are at least 600 mm above the design flood level of the site's flood zone.</li><li>b. The final design of the building and the wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach outlined in section 5 of BS8533:2017 (222).</li></ul> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"><li>- Flood Risk Assessment</li></ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"><li>- Formal letter confirming that there have been no changes to the flood risk associated with the development site.</li></ul> |
| Pol 3 | Surface Water Run-Off | Pre-Req           | Pre-Req          | -                    | Drainage Consultant | <p><b>BREEAM Criteria:</b></p> <p>Surface water run-off design solutions must be bespoke, i.e. they must take account of the specific site requirements and natural or man-made environment of and surrounding the site. The priority levels detailed in the Methodology must be followed, with justification given by the appropriate consultant where water is allowed to leave the site.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"><li>- Completed BREEAM GN13 Document</li><li>-</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



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| Issue  |                              | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility      | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------|------------------------------|-------------------|------------------|----------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                              |                   |                  |                      |                     | <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- As per Design Stage.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Pol 3b | Surface Water Run-off (Rate) | 1                 | 1                | 1%                   | Drainage Consultant | <b>BREEAM Criteria:</b> <p><b>1)</b> For brownfield sites, drainage measures are specified so that the peak rate of run-off from the site to the watercourses (natural or municipal) shows a 30% improvement for the developed site compared with the predeveloped site.</p> <p>This should comply at the 1-year and 100-year return period events.</p> <p><b>2)</b> For Greenfield sites, drainage measures are specified so that the peak rate of run-off from the site to the watercourses (natural or municipal) is no greater for the developed site than it was for the pre-development site.</p> <p>This should comply at the 1-year and 100-year return period events.</p> <p><b>3)</b> Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified Sustainable Drainage Systems (SuDS) are in place.</p> <p><b>4)</b> Calculations include an allowance for climate change. This should be made in accordance with current best practice planning guidance.</p> <b>Design Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Calculation results for the pre and post-development peak rate of run-off.</li> <li>- Completed BREEAM GN13 Document</li> </ul> <b>Post Construction Stage Evidence:</b> <ul style="list-style-type: none"> <li>- Formal letter confirming that the drainage solutions assessed at the design stage have been implemented.</li> <li>- 'As built' drawings showing the impermeable areas pre and post development.</li> </ul> |



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## BREEAM 2018 New Construction Criteria (NC)

| Issue  |                                | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility      | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------|--------------------------------|-------------------|------------------|----------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pol 3c | Surface Water Run-off (Volume) | 1                 | 1                | 1%                   | Drainage Consultant | <p><b>BREEAM Criteria:</b></p> <p><b>1)</b> Flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance); <b>AND</b></p> <p><b>EITHER</b></p> <p>Drainage design measures are specified so that the post-development run-off volume, over the development lifetime, is no greater than it would have been prior to the assessed site's development. This must be for the 100-year 6-hour event, including an allowance for climate change.</p> <p>Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other SuDS techniques.</p> <p><b>OR</b></p> <p>Justification from the appropriate consultant indicating why the above criteria cannot be achieved, i.e. where infiltration or other SuDS techniques are not technically viable options.</p> <p>Drainage design measures are specified so that the post-development peak rate of run-off is reduced to the limiting discharge. The limiting discharge is defined as the highest flowrate from the following options:</p> <ul style="list-style-type: none"> <li>a. The pre-development one-year peak flowrate</li> <li>b. The mean annual flowrate (Qbar)</li> <li>c. 2L/s/ha.</li> </ul> <p><b>2)</b> For the one-year peak flowrate, the one-year return period event criterion applies.</p> <p><b>3)</b> Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place</p> |



Project: 98 Wilmslow Road, Manchester  
 Project No: 2021.229  
 Date: 10<sup>th</sup> February 2022  
 Revision: 1.0

## BREEAM 2018 New Construction Criteria (NC)

| Issue  |                                  | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility      | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------|----------------------------------|-------------------|------------------|----------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                                  |                   |                  |                      |                     | <p>For either option, above calculations must include an allowance for climate change; this should be made in accordance with current best practice planning guidance.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Information showing the proposed drainage solution, system failure flood flow routes, potential flood ponding levels and ground floor levels.</li> <li>- Calculation results for the pre- and post-development volume of run-off.</li> <li>- Calculation results for the limiting discharge.</li> <li>- Completed BREEAM GN13 Document.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Formal letter confirming that the drainage solutions assessed at the design stage have been implemented.</li> <li>- 'As built' drawings showing the impermeable areas pre and post development.</li> </ul> |
| Pol 3d | Minimising Watercourse Pollution | 1                 | 0                | 1%                   | Drainage Consultant | <p><b>Credit Not Currently Sought</b><br/> <b>BREEAM Criteria:</b></p> <p><b>1)</b> There is no discharge from the developed site for rainfall up to 5 mm (confirmed by the appropriate consultant).</p> <p><b>2)</b> Areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques.</p> <p><b>3)</b> Areas with a high risk of contamination or spillage of substances, such as petrol and oil, have separators (or an equivalent system) are installed in surface water drainage systems.</p> <p><b>4)</b> Chemical or liquid gas storage areas have a means of containment fitted to the site drainage system (i.e. shut-off valves). This is to prevent the escape of chemicals to natural watercourses in the event of a spillage or bunding failure.</p>                                                   |



Project: 98 Wilmslow Road, Manchester  
Project No: 2021.229  
Date: 10<sup>th</sup> February 2022  
Revision: 1.0

## BREEAM 2018 New Construction Criteria (NC)

| Issue                                                  |                                         | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------|-----------------------------------------|-------------------|------------------|----------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                        |                                         |                   |                  |                      |                | <p>5) All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as the SuDS manual and other relevant industry best practice. They must be bespoke solutions taking account of the specific site requirements and natural or man-made environment of and surrounding the site.</p> <p>6) A comprehensive and up to date drainage plan of the site will be made available for the building or site occupiers.</p> <p>7) Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place.</p> <p>8) All external storage and delivery areas are designed and detailed in accordance with the current best practice planning guidance.</p>                                                                                                                                                                                       |
| <b>Pol 4 – Reduction of Night-time Light Pollution</b> |                                         |                   |                  |                      |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Pol 4                                                  | Reduction of Night-time Light Pollution | 1                 | 1                | 1%                   | M&E            | <p><b>BREEAM Criteria:</b></p> <p>1) External lighting pollution has been eliminated through effective design that removes the need for external lighting. This does not adversely affect the safety and security of the site and its users.</p> <p>OR;</p> <p>2) The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, 2011.</p> <p>3) All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00.</p> <p>4) If safety or security lighting is provided and will be used between 23:00 and 07:00, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP guidance notes.</p> <p>5) Where specified, illuminated advertisements are designed in compliance</p> |



**Project:** 98 Wilmslow Road, Manchester  
**Project No:** 2021.229  
**Date:** 10<sup>th</sup> February 2022  
**Revision:** 1.0

## BREEAM 2018 New Construction Criteria (NC)

| Issue |  | Available Credits | Targeted Credits | Credit Weighting (%) | Responsibility | BREEAM Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------|--|-------------------|------------------|----------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |  |                   |                  |                      |                | <p>with ILP PLG05 The Brightness of Illuminated Advertisements.</p> <p><b>Design Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Relevant sections/clauses of the building specification/contract and/or a formal letter confirming that all external lighting has been designed out of the development, or has been designed in compliance with Table 2 of the ILP Guidance notes for the reduction of obtrusive light, 2011 and all external lighting is automatically switched off between 23.00 and 07.00, except where safety and security lighting is provided and will be used between 23.00 and 07.00, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP Guidance notes (or provides these lower levels at all times).</li> <li>- Formal written confirmation that there are no illuminated advertisements specified as part of the development.</li> </ul> <p><b>Post Construction Stage Evidence:</b></p> <ul style="list-style-type: none"> <li>- Formal letter confirming that the external lighting has been designed out of the development, or has been designed and installed in accordance with Table 2 of the ILP Guidance notes for the reduction of obtrusive light, 2011 and that all external lighting will automatically be switched off during 07.00hr and 23.00hr, excepting safety and security lighting that will switch to the lower levels of lighting recommended during these hours.</li> <li>- Formal letter confirming that there are no illuminated advertisements installed.</li> <li>- 'As built' drawing showing the installed external light fittings, photocell and time clock, in line with the design stage specification.</li> <li>- BREEAM assessor's site inspection.</li> </ul> |



Appendix B – BRUKL Reports



Project name

Shell and Core

Retail Units

As designed

Date: Thu Feb 10 13:23:15 2022

## Administrative information

## Building Details

Address: 98 Wilmslow Road, Rusholme, Manchester, M1

## Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v6.1.8

BRUKL compliance check version: v5.6.b.0

## Certifier details

Name: Colin Sowerbutts

Telephone number: 07415 922970

Address: , ,

Criterion 1: The calculated CO<sub>2</sub> emission rate for the building must not exceed the target

|                                                                                                    |                     |
|----------------------------------------------------------------------------------------------------|---------------------|
| CO <sub>2</sub> emission rate from the notional building, kgCO <sub>2</sub> /m <sup>2</sup> .annum | 100.5               |
| Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum               | 100.5               |
| Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum             | 91.4                |
| Are emissions from the building less than or equal to the target?                                  | BER ≤ TER           |
| Are as built details the same as used in the BER calculations?                                     | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

## Building fabric

| Element                                                                                                                                                                                                                                                                                                                                                                                                                                      | U <sub>a</sub> -Limit | U <sub>a</sub> -Calc | U <sub>i</sub> -Calc | Surface where the maximum value occurs* |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|----------------------|-----------------------------------------|
| Wall**                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.35                  | 0.15                 | 0.15                 | "Block 1 - Retail 1_W_9"                |
| Floor                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.25                  | 0.1                  | 0.1                  | "Block 1 - Retail 1_S_3"                |
| Roof                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.25                  | -                    | -                    | "No heat loss roofs"                    |
| Windows***, roof windows, and rooflights                                                                                                                                                                                                                                                                                                                                                                                                     | 2.2                   | 1.4                  | 1.4                  | "Block 1 - Retail 1_G_10"               |
| Personnel doors                                                                                                                                                                                                                                                                                                                                                                                                                              | 2.2                   | -                    | -                    | "No external personnel doors"           |
| Vehicle access & similar large doors                                                                                                                                                                                                                                                                                                                                                                                                         | 1.5                   | -                    | -                    | "No external vehicle access doors"      |
| High usage entrance doors                                                                                                                                                                                                                                                                                                                                                                                                                    | 3.5                   | -                    | -                    | "No external high usage entrance doors" |
| U <sub>a</sub> -Limit = Limiting area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>a</sub> -Calc = Calculated area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>i</sub> -Calc = Calculated maximum individual element U-values [W/(m <sup>2</sup> K)]                                                                                                                                                            |                       |                      |                      |                                         |
| * There might be more than one surface where the maximum U-value occurs.<br>** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.<br>*** Display windows and similar glazing are excluded from the U-value check.<br>N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool. |                       |                      |                      |                                         |

| Air Permeability                             | Worst acceptable standard | This building |
|----------------------------------------------|---------------------------|---------------|
| m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa | 10                        | 3             |

## Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

|                                                                                              |      |
|----------------------------------------------------------------------------------------------|------|
| Whole building lighting automatic monitoring & targeting with alarms for out-of-range values | NO   |
| Whole building electric power factor achieved by power factor correction                     | <0.9 |

### 1- Wilmslow

|                                                                                                                                                                   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>                                                                                                                                                | 5                  | 5                  | -                  | -             | -             |
| <b>Standard value</b>                                                                                                                                             | 2.5*               | N/A                | N/A                | N/A           | N/A           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>                                                              |                    |                    |                    |               | NO            |
| * Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards. |                    |                    |                    |               |               |

### 1- POU

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

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

### Shell and core configuration

| Zone               | Assumed shell? |
|--------------------|----------------|
| Block 1 - Retail 1 | YES            |

| General lighting and display lighting |                       | Luminous efficacy [lm/W] |      |              | General lighting [W] |
|---------------------------------------|-----------------------|--------------------------|------|--------------|----------------------|
| Zone name                             |                       | Luminaire                | Lamp | Display lamp |                      |
|                                       | <b>Standard value</b> | 60                       | 60   | 22           |                      |
| Block 1 - Retail 1                    |                       | -                        | 150  | 90           | 105                  |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone               | Solar gain limit exceeded? (%) | Internal blinds used? |
|--------------------|--------------------------------|-----------------------|
| Block 1 - Retail 1 | NO (-4.3%)                     | NO                    |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of 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?                     | NO  |
| Are any such measures included in the proposed design?                                 | YES |

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

|                                                       | Actual | Notional |
|-------------------------------------------------------|--------|----------|
| Area [m <sup>2</sup> ]                                | 66.5   | 66.5     |
| External area [m <sup>2</sup> ]                       | 80.1   | 80.1     |
| Weather                                               | MAN    | MAN      |
| Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa] | 3      | 5        |
| Average conductance [W/K]                             | 18.82  | 20.45    |
| Average U-value [W/m <sup>2</sup> K]                  | 0.23   | 0.26     |
| Alpha value* [%]                                      | 23.61  | 17.37    |

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

## Building Use

| % Area | Building Type                                                      |
|--------|--------------------------------------------------------------------|
|        | A1/A2 Retail/Financial and Professional services                   |
| 100    | <b>A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways</b>      |
|        | B1 Offices and Workshop businesses                                 |
|        | B2 to B7 General Industrial and Special Industrial Groups          |
|        | B8 Storage or Distribution                                         |
|        | C1 Hotels                                                          |
|        | C2 Residential Institutions: Hospitals and Care Homes              |
|        | C2 Residential Institutions: Residential schools                   |
|        | C2 Residential Institutions: Universities and colleges             |
|        | C2A Secure Residential Institutions                                |
|        | Residential spaces                                                 |
|        | D1 Non-residential Institutions: Community/Day Centre              |
|        | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
|        | D1 Non-residential Institutions: Education                         |
|        | D1 Non-residential Institutions: Primary Health Care Building      |
|        | D1 Non-residential Institutions: Crown and County Courts           |
|        | D2 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/m<sup>2</sup>]

|                 | Actual        | Notional      |
|-----------------|---------------|---------------|
| Heating         | 13.58         | 22.99         |
| Cooling         | 22.92         | 29.96         |
| Auxiliary       | 0             | 0             |
| Lighting        | 18.91         | 57.75         |
| Hot water       | 120.62        | 139.53        |
| Equipment*      | 115.14        | 115.14        |
| <b>TOTAL **</b> | <b>176.04</b> | <b>250.22</b> |

\* 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/m<sup>2</sup>]

|                       | Actual | Notional |
|-----------------------|--------|----------|
| Photovoltaic systems  | 0      | 0        |
| Wind turbines         | 0      | 0        |
| CHP generators        | 0      | 0        |
| Solar thermal systems | 0      | 0        |

## Energy & CO<sub>2</sub> Emissions Summary

|                                               | Actual | Notional |
|-----------------------------------------------|--------|----------|
| Heating + cooling demand [MJ/m <sup>2</sup> ] | 520.79 | 589.4    |
| Primary energy* [kWh/m <sup>2</sup> ]         | 540.45 | 484.82   |
| Total emissions [kg/m <sup>2</sup> ]          | 91.4   | 100.5    |

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

| HVAC Systems Performance                                                                                      |                   |                   |                    |                    |                   |               |               |                  |                  |      |
|---------------------------------------------------------------------------------------------------------------|-------------------|-------------------|--------------------|--------------------|-------------------|---------------|---------------|------------------|------------------|------|
| System Type                                                                                                   | Heat dem<br>MJ/m2 | Cool dem<br>MJ/m2 | Heat con<br>kWh/m2 | Cool con<br>kWh/m2 | Aux con<br>kWh/m2 | Heat<br>SSEEF | Cool<br>SSEER | Heat gen<br>SEFF | Cool gen<br>SEER |      |
| [ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity |                   |                   |                    |                    |                   |               |               |                  |                  |      |
|                                                                                                               | Actual            | 227.8             | 293                | 13.6               | 22.9              | 0             | 4.66          | 3.55             | 5                | 5    |
|                                                                                                               | Notional          | 201.1             | 388.3              | 23                 | 30                | 0             | 2.43          | 3.6              | ----             | ---- |

### 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

# Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

## Building fabric

| Element                                                                  | U <sub>i-Typ</sub> | U <sub>i-Min</sub>                                                 | Surface where the minimum value occurs* |
|--------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------|-----------------------------------------|
| Wall                                                                     | 0.23               | 0.15                                                               | "Block 1 - Retail 1_W_9"                |
| Floor                                                                    | 0.2                | 0.1                                                                | "Block 1 - Retail 1_S_3"                |
| Roof                                                                     | 0.15               | -                                                                  | "No heat loss roofs"                    |
| Windows, roof windows, and rooflights                                    | 1.5                | 1.4                                                                | "Block 1 - Retail 1_G_10"               |
| Personnel doors                                                          | 1.5                | -                                                                  | "No external personnel doors"           |
| Vehicle access & similar large doors                                     | 1.5                | -                                                                  | "No external vehicle access doors"      |
| High usage entrance doors                                                | 1.5                | -                                                                  | "No external high usage entrance doors" |
| U <sub>i-Typ</sub> = Typical individual element U-values [W/(m²K)]       |                    | U <sub>i-Min</sub> = Minimum individual element U-values [W/(m²K)] |                                         |
| * There might be more than one surface where the minimum U-value occurs. |                    |                                                                    |                                         |

| Air Permeability   | Typical value | This building |
|--------------------|---------------|---------------|
| m³/(h.m²) at 50 Pa | 5             | 3             |

Project name

Shell and Core

Retail Units

As designed

Date: Thu Feb 10 13:25:41 2022

## Administrative information

## Building Details

Address: 98 Wilmslow Road, Rusholme, Manchester, M1

## Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v6.1.8

BRUKL compliance check version: v5.6.b.0

## Certifier details

Name: Colin Sowerbutts

Telephone number: 07415 922970

Address: , ,

Criterion 1: The calculated CO<sub>2</sub> emission rate for the building must not exceed the target

|                                                                                                    |                     |
|----------------------------------------------------------------------------------------------------|---------------------|
| CO <sub>2</sub> emission rate from the notional building, kgCO <sub>2</sub> /m <sup>2</sup> .annum | 102.4               |
| Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum               | 102.4               |
| Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum             | 91.7                |
| Are emissions from the building less than or equal to the target?                                  | BER ≤ TER           |
| Are as built details the same as used in the BER calculations?                                     | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

## Building fabric

| Element                                                                                                                                                                                                                                                                                                                                                                                                                                      | U <sub>a</sub> -Limit | U <sub>a</sub> -Calc | U <sub>i</sub> -Calc | Surface where the maximum value occurs* |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|----------------------|-----------------------------------------|
| Wall**                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.35                  | 0.15                 | 0.15                 | "Block 1 - Retail 2_W_8"                |
| Floor                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.25                  | 0.1                  | 0.1                  | "Block 1 - Retail 2_S_3"                |
| Roof                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.25                  | -                    | -                    | "No heat loss roofs"                    |
| Windows***, roof windows, and rooflights                                                                                                                                                                                                                                                                                                                                                                                                     | 2.2                   | 1.4                  | 1.4                  | "Block 1 - Retail 2_G_9"                |
| Personnel doors                                                                                                                                                                                                                                                                                                                                                                                                                              | 2.2                   | -                    | -                    | "No external personnel doors"           |
| Vehicle access & similar large doors                                                                                                                                                                                                                                                                                                                                                                                                         | 1.5                   | -                    | -                    | "No external vehicle access doors"      |
| High usage entrance doors                                                                                                                                                                                                                                                                                                                                                                                                                    | 3.5                   | -                    | -                    | "No external high usage entrance doors" |
| U <sub>a</sub> -Limit = Limiting area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>a</sub> -Calc = Calculated area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>i</sub> -Calc = Calculated maximum individual element U-values [W/(m <sup>2</sup> K)]                                                                                                                                                            |                       |                      |                      |                                         |
| * There might be more than one surface where the maximum U-value occurs.<br>** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.<br>*** Display windows and similar glazing are excluded from the U-value check.<br>N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool. |                       |                      |                      |                                         |

| Air Permeability                             | Worst acceptable standard | This building |
|----------------------------------------------|---------------------------|---------------|
| m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa | 10                        | 3             |

## Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

|                                                                                              |      |
|----------------------------------------------------------------------------------------------|------|
| Whole building lighting automatic monitoring & targeting with alarms for out-of-range values | NO   |
| Whole building electric power factor achieved by power factor correction                     | <0.9 |

### 1- Wilmslow

|                                                                                                                                                                   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------|---------------|
| This system                                                                                                                                                       | 5                  | 5                  | -                  | -             | -             |
| Standard value                                                                                                                                                    | 2.5*               | N/A                | N/A                | N/A           | N/A           |
| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system                                                                         |                    |                    |                    |               | NO            |
| * Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards. |                    |                    |                    |               |               |

### 1- POU

|                | 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"

### Shell and core configuration

| Zone               | Assumed shell? |
|--------------------|----------------|
| Block 1 - Retail 2 | YES            |

| General lighting and display lighting |                | Luminous efficacy [lm/W] |      |              | General lighting [W] |
|---------------------------------------|----------------|--------------------------|------|--------------|----------------------|
| Zone name                             |                | Luminaire                | Lamp | Display lamp |                      |
|                                       | Standard value | 60                       | 60   | 22           |                      |
| Block 1 - Retail 2                    |                | -                        | 150  | 90           | 97                   |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone               | Solar gain limit exceeded? (%) | Internal blinds used? |
|--------------------|--------------------------------|-----------------------|
| Block 1 - Retail 2 | NO (-41.3%)                    | NO                    |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of 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?                     | NO  |
| Are any such measures included in the proposed design?                                 | YES |

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

|                                                       | Actual | Notional |
|-------------------------------------------------------|--------|----------|
| Area [m <sup>2</sup> ]                                | 62.9   | 62.9     |
| External area [m <sup>2</sup> ]                       | 91.5   | 91.5     |
| Weather                                               | MAN    | MAN      |
| Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa] | 3      | 5        |
| Average conductance [W/K]                             | 23.58  | 36.6     |
| Average U-value [W/m <sup>2</sup> K]                  | 0.26   | 0.4      |
| Alpha value* [%]                                      | 25.78  | 17.31    |

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

## Building Use

| % Area | Building Type                                                      |
|--------|--------------------------------------------------------------------|
|        | A1/A2 Retail/Financial and Professional services                   |
| 100    | <b>A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways</b>      |
|        | B1 Offices and Workshop businesses                                 |
|        | B2 to B7 General Industrial and Special Industrial Groups          |
|        | B8 Storage or Distribution                                         |
|        | C1 Hotels                                                          |
|        | C2 Residential Institutions: Hospitals and Care Homes              |
|        | C2 Residential Institutions: Residential schools                   |
|        | C2 Residential Institutions: Universities and colleges             |
|        | C2A Secure Residential Institutions                                |
|        | Residential spaces                                                 |
|        | D1 Non-residential Institutions: Community/Day Centre              |
|        | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
|        | D1 Non-residential Institutions: Education                         |
|        | D1 Non-residential Institutions: Primary Health Care Building      |
|        | D1 Non-residential Institutions: Crown and County Courts           |
|        | D2 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/m<sup>2</sup>]

|                 | Actual        | Notional      |
|-----------------|---------------|---------------|
| Heating         | 14.62         | 30.44         |
| Cooling         | 22.64         | 29.25         |
| Auxiliary       | 0             | 0             |
| Lighting        | 18.76         | 54.66         |
| Hot water       | 120.62        | 139.53        |
| Equipment*      | 115.14        | 115.14        |
| <b>TOTAL **</b> | <b>176.65</b> | <b>253.87</b> |

\* 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/m<sup>2</sup>]

|                       | Actual | Notional |
|-----------------------|--------|----------|
| Photovoltaic systems  | 0      | 0        |
| Wind turbines         | 0      | 0        |
| CHP generators        | 0      | 0        |
| Solar thermal systems | 0      | 0        |

## Energy & CO<sub>2</sub> Emissions Summary

|                                               | Actual | Notional |
|-----------------------------------------------|--------|----------|
| Heating + cooling demand [MJ/m <sup>2</sup> ] | 534.6  | 645.29   |
| Primary energy* [kWh/m <sup>2</sup> ]         | 542.3  | 495.74   |
| Total emissions [kg/m <sup>2</sup> ]          | 91.7   | 102.4    |

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

## HVAC Systems Performance

| System Type                                                                                                   | Heat dem<br>MJ/m2 | Cool dem<br>MJ/m2 | Heat con<br>kWh/m2 | Cool con<br>kWh/m2 | Aux con<br>kWh/m2 | Heat<br>SSEEF | Cool<br>SSEER | Heat gen<br>SEFF | Cool gen<br>SEER |
|---------------------------------------------------------------------------------------------------------------|-------------------|-------------------|--------------------|--------------------|-------------------|---------------|---------------|------------------|------------------|
| [ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual                                                                                                        | 245.3             | 289.3             | 14.6               | 22.6               | 0                 | 4.66          | 3.55          | 5                | 5                |
| Notional                                                                                                      | 266.3             | 379               | 30.4               | 29.2               | 0                 | 2.43          | 3.6           | ----             | ----             |

### 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                                                                                   |

# Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

## Building fabric

| Element                                                                  | U <sub>i-Typ</sub> | U <sub>i-Min</sub>                                                 | Surface where the minimum value occurs* |
|--------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------|-----------------------------------------|
| Wall                                                                     | 0.23               | 0.15                                                               | "Block 1 - Retail 2_W_8"                |
| Floor                                                                    | 0.2                | 0.1                                                                | "Block 1 - Retail 2_S_3"                |
| Roof                                                                     | 0.15               | -                                                                  | "No heat loss roofs"                    |
| Windows, roof windows, and rooflights                                    | 1.5                | 1.4                                                                | "Block 1 - Retail 2_G_9"                |
| Personnel doors                                                          | 1.5                | -                                                                  | "No external personnel doors"           |
| Vehicle access & similar large doors                                     | 1.5                | -                                                                  | "No external vehicle access doors"      |
| High usage entrance doors                                                | 1.5                | -                                                                  | "No external high usage entrance doors" |
| U <sub>i-Typ</sub> = Typical individual element U-values [W/(m²K)]       |                    | U <sub>i-Min</sub> = Minimum individual element U-values [W/(m²K)] |                                         |
| * There might be more than one surface where the minimum U-value occurs. |                    |                                                                    |                                         |

| Air Permeability   | Typical value | This building |
|--------------------|---------------|---------------|
| m³/(h.m²) at 50 Pa | 5             | 3             |

Project name

Shell and Core

Retail Units

As designed

Date: Thu Feb 10 13:27:25 2022

## Administrative information

## Building Details

Address: 98 Wilmslow Road, Rusholme, Manchester, M1

## Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v6.1.8

BRUKL compliance check version: v5.6.b.0

## Certifier details

Name: Colin Sowerbutts

Telephone number: 07415 922970

Address: , ,

Criterion 1: The calculated CO<sub>2</sub> emission rate for the building must not exceed the target

|                                                                                                    |                     |
|----------------------------------------------------------------------------------------------------|---------------------|
| CO <sub>2</sub> emission rate from the notional building, kgCO <sub>2</sub> /m <sup>2</sup> .annum | 104.8               |
| Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum               | 104.8               |
| Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum             | 93.7                |
| Are emissions from the building less than or equal to the target?                                  | BER ≤ TER           |
| Are as built details the same as used in the BER calculations?                                     | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

## Building fabric

| Element                                                                                                                                                                                                                                                                           | U <sub>a</sub> -Limit | U <sub>a</sub> -Calc | U <sub>i</sub> -Calc | Surface where the maximum value occurs* |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|----------------------|-----------------------------------------|
| Wall**                                                                                                                                                                                                                                                                            | 0.35                  | 0.15                 | 0.15                 | "Block 1 - Retail 3_W_5"                |
| Floor                                                                                                                                                                                                                                                                             | 0.25                  | 0.1                  | 0.1                  | "Block 1 - Retail 3_S_3"                |
| Roof                                                                                                                                                                                                                                                                              | 0.25                  | -                    | -                    | "No heat loss roofs"                    |
| Windows***, roof windows, and rooflights                                                                                                                                                                                                                                          | 2.2                   | 1.4                  | 1.4                  | "Block 1 - Retail 3_G_6"                |
| Personnel doors                                                                                                                                                                                                                                                                   | 2.2                   | -                    | -                    | "No external personnel doors"           |
| Vehicle access & similar large doors                                                                                                                                                                                                                                              | 1.5                   | -                    | -                    | "No external vehicle access doors"      |
| High usage entrance doors                                                                                                                                                                                                                                                         | 3.5                   | -                    | -                    | "No external high usage entrance doors" |
| U <sub>a</sub> -Limit = Limiting area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>a</sub> -Calc = Calculated area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>i</sub> -Calc = Calculated maximum individual element U-values [W/(m <sup>2</sup> K)] |                       |                      |                      |                                         |
| * There might be more than one surface where the maximum U-value occurs.                                                                                                                                                                                                          |                       |                      |                      |                                         |
| ** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.                                                                                                                                                    |                       |                      |                      |                                         |
| *** Display windows and similar glazing are excluded from the U-value check.                                                                                                                                                                                                      |                       |                      |                      |                                         |
| N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.                                                                                                                                    |                       |                      |                      |                                         |

| Air Permeability                             | Worst acceptable standard | This building |
|----------------------------------------------|---------------------------|---------------|
| m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa | 10                        | 3             |

## Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

|                                                                                              |      |
|----------------------------------------------------------------------------------------------|------|
| Whole building lighting automatic monitoring & targeting with alarms for out-of-range values | NO   |
| Whole building electric power factor achieved by power factor correction                     | <0.9 |

### 1- Wilmslow

|                                                                                                                                                                   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------|---------------|
| This system                                                                                                                                                       | 5                  | 5                  | -                  | -             | -             |
| Standard value                                                                                                                                                    | 2.5*               | N/A                | N/A                | N/A           | N/A           |
| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system                                                                         |                    |                    |                    |               | NO            |
| * Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards. |                    |                    |                    |               |               |

### 1- POU

|                | 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"

### Shell and core configuration

| Zone               | Assumed shell? |
|--------------------|----------------|
| Block 1 - Retail 3 | YES            |

| General lighting and display lighting |                | Luminous efficacy [lm/W] |      |              | General lighting [W] |
|---------------------------------------|----------------|--------------------------|------|--------------|----------------------|
| Zone name                             |                | Luminaire                | Lamp | Display lamp |                      |
|                                       | Standard value | 60                       | 60   | 22           |                      |
| Block 1 - Retail 3                    |                | -                        | 150  | 150          | 107                  |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone               | Solar gain limit exceeded? (%) | Internal blinds used? |
|--------------------|--------------------------------|-----------------------|
| Block 1 - Retail 3 | NO (-8.1%)                     | NO                    |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of 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?                     | NO  |
| Are any such measures included in the proposed design?                                 | YES |

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

|                                                       | Actual | Notional |
|-------------------------------------------------------|--------|----------|
| Area [m <sup>2</sup> ]                                | 68.4   | 68.4     |
| External area [m <sup>2</sup> ]                       | 118    | 118      |
| Weather                                               | MAN    | MAN      |
| Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa] | 3      | 5        |
| Average conductance [W/K]                             | 50.03  | 54.53    |
| Average U-value [W/m <sup>2</sup> K]                  | 0.42   | 0.46     |
| Alpha value* [%]                                      | 22.09  | 19.12    |

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

## Building Use

| % Area | Building Type                                                      |
|--------|--------------------------------------------------------------------|
|        | A1/A2 Retail/Financial and Professional services                   |
| 100    | <b>A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways</b>      |
|        | B1 Offices and Workshop businesses                                 |
|        | B2 to B7 General Industrial and Special Industrial Groups          |
|        | B8 Storage or Distribution                                         |
|        | C1 Hotels                                                          |
|        | C2 Residential Institutions: Hospitals and Care Homes              |
|        | C2 Residential Institutions: Residential schools                   |
|        | C2 Residential Institutions: Universities and colleges             |
|        | C2A Secure Residential Institutions                                |
|        | Residential spaces                                                 |
|        | D1 Non-residential Institutions: Community/Day Centre              |
|        | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
|        | D1 Non-residential Institutions: Education                         |
|        | D1 Non-residential Institutions: Primary Health Care Building      |
|        | D1 Non-residential Institutions: Crown and County Courts           |
|        | D2 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/m<sup>2</sup>]

|                 | Actual        | Notional     |
|-----------------|---------------|--------------|
| Heating         | 19.13         | 36.67        |
| Cooling         | 25.87         | 29.32        |
| Auxiliary       | 0             | 0            |
| Lighting        | 14.94         | 53.08        |
| Hot water       | 120.62        | 139.53       |
| Equipment*      | 115.14        | 115.14       |
| <b>TOTAL **</b> | <b>180.55</b> | <b>258.6</b> |

\* 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/m<sup>2</sup>]

|                       | Actual | Notional |
|-----------------------|--------|----------|
| Photovoltaic systems  | 0      | 0        |
| Wind turbines         | 0      | 0        |
| CHP generators        | 0      | 0        |
| Solar thermal systems | 0      | 0        |

## Energy & CO<sub>2</sub> Emissions Summary

|                                               | Actual | Notional |
|-----------------------------------------------|--------|----------|
| Heating + cooling demand [MJ/m <sup>2</sup> ] | 651.44 | 700.72   |
| Primary energy* [kWh/m <sup>2</sup> ]         | 554.3  | 509.88   |
| Total emissions [kg/m <sup>2</sup> ]          | 93.7   | 104.8    |

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

## HVAC Systems Performance

| System Type                                                                                                   | Heat dem<br>MJ/m2 | Cool dem<br>MJ/m2 | Heat con<br>kWh/m2 | Cool con<br>kWh/m2 | Aux con<br>kWh/m2 | Heat<br>SSEEF | Cool<br>SSEER | Heat gen<br>SEFF | Cool gen<br>SEER |
|---------------------------------------------------------------------------------------------------------------|-------------------|-------------------|--------------------|--------------------|-------------------|---------------|---------------|------------------|------------------|
| [ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual                                                                                                        | 320.8             | 330.6             | 19.1               | 25.9               | 0                 | 4.66          | 3.55          | 5                | 5                |
| Notional                                                                                                      | 320.8             | 379.9             | 36.7               | 29.3               | 0                 | 2.43          | 3.6           | ----             | ----             |

### 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                                                                                   |

# Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

## Building fabric

| Element                                                                  | U <sub>i-Typ</sub> | U <sub>i-Min</sub>                                                 | Surface where the minimum value occurs* |
|--------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------|-----------------------------------------|
| Wall                                                                     | 0.23               | 0.15                                                               | "Block 1 - Retail 3_W_5"                |
| Floor                                                                    | 0.2                | 0.1                                                                | "Block 1 - Retail 3_S_3"                |
| Roof                                                                     | 0.15               | -                                                                  | "No heat loss roofs"                    |
| Windows, roof windows, and rooflights                                    | 1.5                | 1.4                                                                | "Block 1 - Retail 3_G_6"                |
| Personnel doors                                                          | 1.5                | -                                                                  | "No external personnel doors"           |
| Vehicle access & similar large doors                                     | 1.5                | -                                                                  | "No external vehicle access doors"      |
| High usage entrance doors                                                | 1.5                | -                                                                  | "No external high usage entrance doors" |
| U <sub>i-Typ</sub> = Typical individual element U-values [W/(m²K)]       |                    | U <sub>i-Min</sub> = Minimum individual element U-values [W/(m²K)] |                                         |
| * There might be more than one surface where the minimum U-value occurs. |                    |                                                                    |                                         |

| Air Permeability   | Typical value | This building |
|--------------------|---------------|---------------|
| m³/(h.m²) at 50 Pa | 5             | 3             |

Project name

Shell and Core

Retail Units

As designed

Date: Thu Feb 10 13:28:19 2022

## Administrative information

## Building Details

Address: 98 Wilmslow Road, Rusholme, Manchester, M1

## Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v6.1.8

BRUKL compliance check version: v5.6.b.0

## Certifier details

Name: Colin Sowerbutts

Telephone number: 07415 922970

Address: , ,

Criterion 1: The calculated CO<sub>2</sub> emission rate for the building must not exceed the target

|                                                                                                    |                     |
|----------------------------------------------------------------------------------------------------|---------------------|
| CO <sub>2</sub> emission rate from the notional building, kgCO <sub>2</sub> /m <sup>2</sup> .annum | 99.9                |
| Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum               | 99.9                |
| Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum             | 90.2                |
| Are emissions from the building less than or equal to the target?                                  | BER ≤ TER           |
| Are as built details the same as used in the BER calculations?                                     | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

## Building fabric

| Element                                                                                                                                                                                                                                                                           | U <sub>a</sub> -Limit | U <sub>a</sub> -Calc | U <sub>i</sub> -Calc | Surface where the maximum value occurs* |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|----------------------|-----------------------------------------|
| Wall**                                                                                                                                                                                                                                                                            | 0.35                  | 0.15                 | 0.15                 | "Block 1 - Retail 4_W_5"                |
| Floor                                                                                                                                                                                                                                                                             | 0.25                  | 0.1                  | 0.1                  | "Block 1 - Retail 4_S_3"                |
| Roof                                                                                                                                                                                                                                                                              | 0.25                  | -                    | -                    | "No heat loss roofs"                    |
| Windows***, roof windows, and rooflights                                                                                                                                                                                                                                          | 2.2                   | 1.4                  | 1.4                  | "Block 1 - Retail 4_G_6"                |
| Personnel doors                                                                                                                                                                                                                                                                   | 2.2                   | -                    | -                    | "No external personnel doors"           |
| Vehicle access & similar large doors                                                                                                                                                                                                                                              | 1.5                   | -                    | -                    | "No external vehicle access doors"      |
| High usage entrance doors                                                                                                                                                                                                                                                         | 3.5                   | -                    | -                    | "No external high usage entrance doors" |
| U <sub>a</sub> -Limit = Limiting area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>a</sub> -Calc = Calculated area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>i</sub> -Calc = Calculated maximum individual element U-values [W/(m <sup>2</sup> K)] |                       |                      |                      |                                         |
| * There might be more than one surface where the maximum U-value occurs.                                                                                                                                                                                                          |                       |                      |                      |                                         |
| ** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.                                                                                                                                                    |                       |                      |                      |                                         |
| *** Display windows and similar glazing are excluded from the U-value check.                                                                                                                                                                                                      |                       |                      |                      |                                         |
| N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.                                                                                                                                    |                       |                      |                      |                                         |

| Air Permeability                             | Worst acceptable standard | This building |
|----------------------------------------------|---------------------------|---------------|
| m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa | 10                        | 3             |

## Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

|                                                                                              |      |
|----------------------------------------------------------------------------------------------|------|
| Whole building lighting automatic monitoring & targeting with alarms for out-of-range values | NO   |
| Whole building electric power factor achieved by power factor correction                     | <0.9 |

### 1- Wilmslow

|                                                                                                                                                                   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------|---------------|
| This system                                                                                                                                                       | 5                  | 5                  | -                  | -             | -             |
| Standard value                                                                                                                                                    | 2.5*               | N/A                | N/A                | N/A           | N/A           |
| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system                                                                         |                    |                    |                    |               | NO            |
| * Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards. |                    |                    |                    |               |               |

### 1- POU

|                | 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"

### Shell and core configuration

| Zone               | Assumed shell? |
|--------------------|----------------|
| Block 1 - Retail 4 | YES            |

| General lighting and display lighting |                | Luminous efficacy [lm/W] |      |              | General lighting [W] |
|---------------------------------------|----------------|--------------------------|------|--------------|----------------------|
| Zone name                             |                | Luminaire                | Lamp | Display lamp |                      |
|                                       | Standard value | 60                       | 60   | 22           |                      |
| Block 1 - Retail 4                    |                | -                        | 150  | 90           | 142                  |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone               | Solar gain limit exceeded? (%) | Internal blinds used? |
|--------------------|--------------------------------|-----------------------|
| Block 1 - Retail 4 | NO (-38.2%)                    | NO                    |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of 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?                     | NO  |
| Are any such measures included in the proposed design?                                 | YES |

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

|                                                       | Actual | Notional |
|-------------------------------------------------------|--------|----------|
| Area [m <sup>2</sup> ]                                | 91.4   | 91.4     |
| External area [m <sup>2</sup> ]                       | 107.3  | 107.3    |
| Weather                                               | MAN    | MAN      |
| Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa] | 3      | 5        |
| Average conductance [W/K]                             | 21.03  | 24.34    |
| Average U-value [W/m <sup>2</sup> K]                  | 0.2    | 0.23     |
| Alpha value* [%]                                      | 21.78  | 16.26    |

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

## Building Use

| % Area | Building Type                                                      |
|--------|--------------------------------------------------------------------|
|        | A1/A2 Retail/Financial and Professional services                   |
| 100    | <b>A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways</b>      |
|        | B1 Offices and Workshop businesses                                 |
|        | B2 to B7 General Industrial and Special Industrial Groups          |
|        | B8 Storage or Distribution                                         |
|        | C1 Hotels                                                          |
|        | C2 Residential Institutions: Hospitals and Care Homes              |
|        | C2 Residential Institutions: Residential schools                   |
|        | C2 Residential Institutions: Universities and colleges             |
|        | C2A Secure Residential Institutions                                |
|        | Residential spaces                                                 |
|        | D1 Non-residential Institutions: Community/Day Centre              |
|        | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
|        | D1 Non-residential Institutions: Education                         |
|        | D1 Non-residential Institutions: Primary Health Care Building      |
|        | D1 Non-residential Institutions: Crown and County Courts           |
|        | D2 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/m<sup>2</sup>]

|                 | Actual        | Notional      |
|-----------------|---------------|---------------|
| Heating         | 13.38         | 22.3          |
| Cooling         | 21.02         | 29.22         |
| Auxiliary       | 0             | 0             |
| Lighting        | 18.8          | 57.99         |
| Hot water       | 120.62        | 139.53        |
| Equipment*      | 115.14        | 115.14        |
| <b>TOTAL **</b> | <b>173.82</b> | <b>249.04</b> |

\* 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/m<sup>2</sup>]

|                       | Actual | Notional |
|-----------------------|--------|----------|
| Photovoltaic systems  | 0      | 0        |
| Wind turbines         | 0      | 0        |
| CHP generators        | 0      | 0        |
| Solar thermal systems | 0      | 0        |

## Energy & CO<sub>2</sub> Emissions Summary

|                                               | Actual | Notional |
|-----------------------------------------------|--------|----------|
| Heating + cooling demand [MJ/m <sup>2</sup> ] | 493.07 | 573.8    |
| Primary energy* [kWh/m <sup>2</sup> ]         | 533.62 | 481.28   |
| Total emissions [kg/m <sup>2</sup> ]          | 90.2   | 99.9     |

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

| HVAC Systems Performance                                                                                      |                   |                   |                    |                    |                   |               |               |                  |                  |
|---------------------------------------------------------------------------------------------------------------|-------------------|-------------------|--------------------|--------------------|-------------------|---------------|---------------|------------------|------------------|
| System Type                                                                                                   | Heat dem<br>MJ/m2 | Cool dem<br>MJ/m2 | Heat con<br>kWh/m2 | Cool con<br>kWh/m2 | Aux con<br>kWh/m2 | Heat<br>SSEEF | Cool<br>SSEER | Heat gen<br>SEFF | Cool gen<br>SEER |
| [ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual                                                                                                        | 224.5             | 268.6             | 13.4               | 21                 | 0                 | 4.66          | 3.55          | 5                | 5                |
| Notional                                                                                                      | 195               | 378.8             | 22.3               | 29.2               | 0                 | 2.43          | 3.6           | ----             | ----             |

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

# Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

## Building fabric

| Element                                                                  | U <sub>i-Typ</sub> | U <sub>i-Min</sub>                                                 | Surface where the minimum value occurs* |
|--------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------|-----------------------------------------|
| Wall                                                                     | 0.23               | 0.15                                                               | "Block 1 - Retail 4_W_5"                |
| Floor                                                                    | 0.2                | 0.1                                                                | "Block 1 - Retail 4_S_3"                |
| Roof                                                                     | 0.15               | -                                                                  | "No heat loss roofs"                    |
| Windows, roof windows, and rooflights                                    | 1.5                | 1.4                                                                | "Block 1 - Retail 4_G_6"                |
| Personnel doors                                                          | 1.5                | -                                                                  | "No external personnel doors"           |
| Vehicle access & similar large doors                                     | 1.5                | -                                                                  | "No external vehicle access doors"      |
| High usage entrance doors                                                | 1.5                | -                                                                  | "No external high usage entrance doors" |
| U <sub>i-Typ</sub> = Typical individual element U-values [W/(m²K)]       |                    | U <sub>i-Min</sub> = Minimum individual element U-values [W/(m²K)] |                                         |
| * There might be more than one surface where the minimum U-value occurs. |                    |                                                                    |                                         |

| Air Permeability   | Typical value | This building |
|--------------------|---------------|---------------|
| m³/(h.m²) at 50 Pa | 5             | 3             |

Project name

Shell and Core

Retail Units

As designed

Date: Thu Feb 10 13:29:20 2022

## Administrative information

## Building Details

Address: 98 Wilmslow Road, Rusholme, Manchester, M1

## Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v6.1.8

BRUKL compliance check version: v5.6.b.0

## Certifier details

Name: Colin Sowerbutts

Telephone number: 07415 922970

Address: , ,

Criterion 1: The calculated CO<sub>2</sub> emission rate for the building must not exceed the target

|                                                                                                    |                     |
|----------------------------------------------------------------------------------------------------|---------------------|
| CO <sub>2</sub> emission rate from the notional building, kgCO <sub>2</sub> /m <sup>2</sup> .annum | 99.8                |
| Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum               | 99.8                |
| Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum             | 90.2                |
| Are emissions from the building less than or equal to the target?                                  | BER ≤ TER           |
| Are as built details the same as used in the BER calculations?                                     | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

## Building fabric

| Element                                                                                                                                                                                                                                                                                                                                                                                                                                      | U <sub>a</sub> -Limit | U <sub>a</sub> -Calc | U <sub>i</sub> -Calc | Surface where the maximum value occurs* |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|----------------------|-----------------------------------------|
| Wall**                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.35                  | 0.15                 | 0.15                 | "Block 1 - Retail 5_W_6"                |
| Floor                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.25                  | 0.1                  | 0.1                  | "Block 1 - Retail 5_S_3"                |
| Roof                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.25                  | -                    | -                    | "No heat loss roofs"                    |
| Windows***, roof windows, and rooflights                                                                                                                                                                                                                                                                                                                                                                                                     | 2.2                   | 1.4                  | 1.4                  | "Block 1 - Retail 5_G_7"                |
| Personnel doors                                                                                                                                                                                                                                                                                                                                                                                                                              | 2.2                   | -                    | -                    | "No external personnel doors"           |
| Vehicle access & similar large doors                                                                                                                                                                                                                                                                                                                                                                                                         | 1.5                   | -                    | -                    | "No external vehicle access doors"      |
| High usage entrance doors                                                                                                                                                                                                                                                                                                                                                                                                                    | 3.5                   | -                    | -                    | "No external high usage entrance doors" |
| U <sub>a</sub> -Limit = Limiting area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>a</sub> -Calc = Calculated area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>i</sub> -Calc = Calculated maximum individual element U-values [W/(m <sup>2</sup> K)]                                                                                                                                                            |                       |                      |                      |                                         |
| * There might be more than one surface where the maximum U-value occurs.<br>** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.<br>*** Display windows and similar glazing are excluded from the U-value check.<br>N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool. |                       |                      |                      |                                         |

| Air Permeability                             | Worst acceptable standard | This building |
|----------------------------------------------|---------------------------|---------------|
| m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa | 10                        | 3             |

## Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

|                                                                                              |      |
|----------------------------------------------------------------------------------------------|------|
| Whole building lighting automatic monitoring & targeting with alarms for out-of-range values | NO   |
| Whole building electric power factor achieved by power factor correction                     | <0.9 |

### 1- Wilmslow

|                                                                                                                                                                   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------|---------------|
| This system                                                                                                                                                       | 5                  | 5                  | -                  | -             | -             |
| Standard value                                                                                                                                                    | 2.5*               | N/A                | N/A                | N/A           | N/A           |
| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system                                                                         |                    |                    |                    |               | NO            |
| * Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards. |                    |                    |                    |               |               |

### 1- POU

|                | 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"

### Shell and core configuration

| Zone               | Assumed shell? |
|--------------------|----------------|
| Block 1 - Retail 5 | YES            |

| General lighting and display lighting |                | Luminous efficacy [lm/W] |      |              | General lighting [W] |
|---------------------------------------|----------------|--------------------------|------|--------------|----------------------|
| Zone name                             |                | Luminaire                | Lamp | Display lamp |                      |
|                                       | Standard value | 60                       | 60   | 22           |                      |
| Block 1 - Retail 5                    |                | -                        | 150  | 90           | 158                  |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone               | Solar gain limit exceeded? (%) | Internal blinds used? |
|--------------------|--------------------------------|-----------------------|
| Block 1 - Retail 5 | NO (-34.3%)                    | NO                    |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of 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?                     | NO  |
| Are any such measures included in the proposed design?                                 | YES |

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

|                                                       | Actual | Notional |
|-------------------------------------------------------|--------|----------|
| Area [m <sup>2</sup> ]                                | 103.2  | 103.2    |
| External area [m <sup>2</sup> ]                       | 118.9  | 118.9    |
| Weather                                               | MAN    | MAN      |
| Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa] | 3      | 5        |
| Average conductance [W/K]                             | 22.68  | 24.41    |
| Average U-value [W/m <sup>2</sup> K]                  | 0.19   | 0.21     |
| Alpha value* [%]                                      | 20.32  | 16.07    |

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

## Building Use

| % Area | Building Type                                                      |
|--------|--------------------------------------------------------------------|
|        | A1/A2 Retail/Financial and Professional services                   |
| 100    | <b>A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways</b>      |
|        | B1 Offices and Workshop businesses                                 |
|        | B2 to B7 General Industrial and Special Industrial Groups          |
|        | B8 Storage or Distribution                                         |
|        | C1 Hotels                                                          |
|        | C2 Residential Institutions: Hospitals and Care Homes              |
|        | C2 Residential Institutions: Residential schools                   |
|        | C2 Residential Institutions: Universities and colleges             |
|        | C2A Secure Residential Institutions                                |
|        | Residential spaces                                                 |
|        | D1 Non-residential Institutions: Community/Day Centre              |
|        | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
|        | D1 Non-residential Institutions: Education                         |
|        | D1 Non-residential Institutions: Primary Health Care Building      |
|        | D1 Non-residential Institutions: Crown and County Courts           |
|        | D2 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/m<sup>2</sup>]

|                 | Actual        | Notional      |
|-----------------|---------------|---------------|
| Heating         | 13.28         | 21.5          |
| Cooling         | 21.19         | 29.61         |
| Auxiliary       | 0             | 0             |
| Lighting        | 18.7          | 58.12         |
| Hot water       | 120.62        | 139.53        |
| Equipment*      | 115.14        | 115.14        |
| <b>TOTAL **</b> | <b>173.79</b> | <b>248.75</b> |

\* 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/m<sup>2</sup>]

|                       | Actual | Notional |
|-----------------------|--------|----------|
| Photovoltaic systems  | 0      | 0        |
| Wind turbines         | 0      | 0        |
| CHP generators        | 0      | 0        |
| Solar thermal systems | 0      | 0        |

## Energy & CO<sub>2</sub> Emissions Summary

|                                               | Actual | Notional |
|-----------------------------------------------|--------|----------|
| Heating + cooling demand [MJ/m <sup>2</sup> ] | 493.52 | 571.78   |
| Primary energy* [kWh/m <sup>2</sup> ]         | 533.54 | 480.41   |
| Total emissions [kg/m <sup>2</sup> ]          | 90.2   | 99.8     |

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

| HVAC Systems Performance                                                                                      |                   |                   |                    |                    |                   |               |               |                  |                  |
|---------------------------------------------------------------------------------------------------------------|-------------------|-------------------|--------------------|--------------------|-------------------|---------------|---------------|------------------|------------------|
| System Type                                                                                                   | Heat dem<br>MJ/m2 | Cool dem<br>MJ/m2 | Heat con<br>kWh/m2 | Cool con<br>kWh/m2 | Aux con<br>kWh/m2 | Heat<br>SSEEF | Cool<br>SSEER | Heat gen<br>SEFF | Cool gen<br>SEER |
| [ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual                                                                                                        | 222.7             | 270.9             | 13.3               | 21.2               | 0                 | 4.66          | 3.55          | 5                | 5                |
| Notional                                                                                                      | 188.1             | 383.7             | 21.5               | 29.6               | 0                 | 2.43          | 3.6           | ----             | ----             |

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

# Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

## Building fabric

| Element                                                                  | U <sub>i-Typ</sub> | U <sub>i-Min</sub>                                                 | Surface where the minimum value occurs* |
|--------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------|-----------------------------------------|
| Wall                                                                     | 0.23               | 0.15                                                               | "Block 1 - Retail 5_W_6"                |
| Floor                                                                    | 0.2                | 0.1                                                                | "Block 1 - Retail 5_S_3"                |
| Roof                                                                     | 0.15               | -                                                                  | "No heat loss roofs"                    |
| Windows, roof windows, and rooflights                                    | 1.5                | 1.4                                                                | "Block 1 - Retail 5_G_7"                |
| Personnel doors                                                          | 1.5                | -                                                                  | "No external personnel doors"           |
| Vehicle access & similar large doors                                     | 1.5                | -                                                                  | "No external vehicle access doors"      |
| High usage entrance doors                                                | 1.5                | -                                                                  | "No external high usage entrance doors" |
| U <sub>i-Typ</sub> = Typical individual element U-values [W/(m²K)]       |                    | U <sub>i-Min</sub> = Minimum individual element U-values [W/(m²K)] |                                         |
| * There might be more than one surface where the minimum U-value occurs. |                    |                                                                    |                                         |

| Air Permeability   | Typical value | This building |
|--------------------|---------------|---------------|
| m³/(h.m²) at 50 Pa | 5             | 3             |

Project name

Shell and Core

Retail Units

As designed

Date: Thu Feb 10 13:30:08 2022

## Administrative information

## Building Details

Address: 98 Wilmslow Road, Rusholme, Manchester, M1

## Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v6.1.8

BRUKL compliance check version: v5.6.b.0

## Certifier details

Name: Colin Sowerbutts

Telephone number: 07415 922970

Address: , ,

Criterion 1: The calculated CO<sub>2</sub> emission rate for the building must not exceed the target

|                                                                                                    |                     |
|----------------------------------------------------------------------------------------------------|---------------------|
| CO <sub>2</sub> emission rate from the notional building, kgCO <sub>2</sub> /m <sup>2</sup> .annum | 102.3               |
| Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum               | 102.3               |
| Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum             | 89.1                |
| Are emissions from the building less than or equal to the target?                                  | BER ≤ TER           |
| Are as built details the same as used in the BER calculations?                                     | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

## Building fabric

| Element                                                                                                                                                                                                                                                                                                                                                                                                                                      | U <sub>a</sub> -Limit | U <sub>a</sub> -Calc | U <sub>i</sub> -Calc | Surface where the maximum value occurs* |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|----------------------|-----------------------------------------|
| Wall**                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.35                  | 0.15                 | 0.15                 | "Block 1 - Retail 6_W_6"                |
| Floor                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.25                  | 0.1                  | 0.1                  | "Block 1 - Retail 6_S_3"                |
| Roof                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.25                  | -                    | -                    | "No heat loss roofs"                    |
| Windows***, roof windows, and rooflights                                                                                                                                                                                                                                                                                                                                                                                                     | 2.2                   | 1.4                  | 1.4                  | "Block 1 - Retail 6_G_7"                |
| Personnel doors                                                                                                                                                                                                                                                                                                                                                                                                                              | 2.2                   | -                    | -                    | "No external personnel doors"           |
| Vehicle access & similar large doors                                                                                                                                                                                                                                                                                                                                                                                                         | 1.5                   | -                    | -                    | "No external vehicle access doors"      |
| High usage entrance doors                                                                                                                                                                                                                                                                                                                                                                                                                    | 3.5                   | -                    | -                    | "No external high usage entrance doors" |
| U <sub>a</sub> -Limit = Limiting area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>a</sub> -Calc = Calculated area-weighted average U-values [W/(m <sup>2</sup> K)]<br>U <sub>i</sub> -Calc = Calculated maximum individual element U-values [W/(m <sup>2</sup> K)]                                                                                                                                                            |                       |                      |                      |                                         |
| * There might be more than one surface where the maximum U-value occurs.<br>** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.<br>*** Display windows and similar glazing are excluded from the U-value check.<br>N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool. |                       |                      |                      |                                         |

| Air Permeability                             | Worst acceptable standard | This building |
|----------------------------------------------|---------------------------|---------------|
| m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa | 10                        | 3             |

## Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

|                                                                                              |      |
|----------------------------------------------------------------------------------------------|------|
| Whole building lighting automatic monitoring & targeting with alarms for out-of-range values | NO   |
| Whole building electric power factor achieved by power factor correction                     | <0.9 |

### 1- Wilmslow

|                                                                                                                                                                   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------|---------------|
| This system                                                                                                                                                       | 5                  | 5                  | -                  | -             | -             |
| Standard value                                                                                                                                                    | 2.5*               | N/A                | N/A                | N/A           | N/A           |
| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system                                                                         |                    |                    |                    |               | NO            |
| * Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards. |                    |                    |                    |               |               |

### 1- POU

|                | 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"

### Shell and core configuration

| Zone               | Assumed shell? |
|--------------------|----------------|
| Block 1 - Retail 6 | YES            |

| General lighting and display lighting |                | Luminous efficacy [lm/W] |      |              | General lighting [W] |
|---------------------------------------|----------------|--------------------------|------|--------------|----------------------|
| Zone name                             |                | Luminaire                | Lamp | Display lamp |                      |
|                                       | Standard value | 60                       | 60   | 22           |                      |
| Block 1 - Retail 6                    |                | -                        | 150  | 90           | 200                  |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone               | Solar gain limit exceeded? (%) | Internal blinds used? |
|--------------------|--------------------------------|-----------------------|
| Block 1 - Retail 6 | NO (-84.8%)                    | NO                    |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of 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?                     | NO  |
| Are any such measures included in the proposed design?                                 | YES |

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

|                                                       | Actual | Notional |
|-------------------------------------------------------|--------|----------|
| Area [m <sup>2</sup> ]                                | 129.9  | 129.9    |
| External area [m <sup>2</sup> ]                       | 206    | 206      |
| Weather                                               | MAN    | MAN      |
| Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa] | 3      | 5        |
| Average conductance [W/K]                             | 35.66  | 89.15    |
| Average U-value [W/m <sup>2</sup> K]                  | 0.17   | 0.43     |
| Alpha value* [%]                                      | 28.3   | 16.76    |

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

## Building Use

| % Area | Building Type                                                      |
|--------|--------------------------------------------------------------------|
|        | A1/A2 Retail/Financial and Professional services                   |
| 100    | <b>A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways</b>      |
|        | B1 Offices and Workshop businesses                                 |
|        | B2 to B7 General Industrial and Special Industrial Groups          |
|        | B8 Storage or Distribution                                         |
|        | C1 Hotels                                                          |
|        | C2 Residential Institutions: Hospitals and Care Homes              |
|        | C2 Residential Institutions: Residential schools                   |
|        | C2 Residential Institutions: Universities and colleges             |
|        | C2A Secure Residential Institutions                                |
|        | Residential spaces                                                 |
|        | D1 Non-residential Institutions: Community/Day Centre              |
|        | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
|        | D1 Non-residential Institutions: Education                         |
|        | D1 Non-residential Institutions: Primary Health Care Building      |
|        | D1 Non-residential Institutions: Crown and County Courts           |
|        | D2 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/m<sup>2</sup>]

|                 | Actual        | Notional      |
|-----------------|---------------|---------------|
| Heating         | 13.83         | 34.76         |
| Cooling         | 18.5          | 26.48         |
| Auxiliary       | 0             | 0             |
| Lighting        | 18.74         | 52.97         |
| Hot water       | 120.62        | 139.53        |
| Equipment*      | 115.14        | 115.14        |
| <b>TOTAL **</b> | <b>171.69</b> | <b>253.74</b> |

\* 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/m<sup>2</sup>]

|                       | Actual | Notional |
|-----------------------|--------|----------|
| Photovoltaic systems  | 0      | 0        |
| Wind turbines         | 0      | 0        |
| CHP generators        | 0      | 0        |
| Solar thermal systems | 0      | 0        |

## Energy & CO<sub>2</sub> Emissions Summary

|                                               | Actual | Notional |
|-----------------------------------------------|--------|----------|
| Heating + cooling demand [MJ/m <sup>2</sup> ] | 468.33 | 647.32   |
| Primary energy* [kWh/m <sup>2</sup> ]         | 527.09 | 495.35   |
| Total emissions [kg/m <sup>2</sup> ]          | 89.1   | 102.3    |

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

## HVAC Systems Performance

| System Type                                                                                                   | Heat dem<br>MJ/m2 | Cool dem<br>MJ/m2 | Heat con<br>kWh/m2 | Cool con<br>kWh/m2 | Aux con<br>kWh/m2 | Heat<br>SSEEF | Cool<br>SSEER | Heat gen<br>SEFF | Cool gen<br>SEER |
|---------------------------------------------------------------------------------------------------------------|-------------------|-------------------|--------------------|--------------------|-------------------|---------------|---------------|------------------|------------------|
| [ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual                                                                                                        | 231.9             | 236.4             | 13.8               | 18.5               | 0                 | 4.66          | 3.55          | 5                | 5                |
| Notional                                                                                                      | 304.1             | 343.2             | 34.8               | 26.5               | 0                 | 2.43          | 3.6           | ----             | ----             |

### 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                                                                                   |

# Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

## Building fabric

| Element                                                                  | U <sub>i-Typ</sub> | U <sub>i-Min</sub>                                                 | Surface where the minimum value occurs* |
|--------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------|-----------------------------------------|
| Wall                                                                     | 0.23               | 0.15                                                               | "Block 1 - Retail 6_W_6"                |
| Floor                                                                    | 0.2                | 0.1                                                                | "Block 1 - Retail 6_S_3"                |
| Roof                                                                     | 0.15               | -                                                                  | "No heat loss roofs"                    |
| Windows, roof windows, and rooflights                                    | 1.5                | 1.4                                                                | "Block 1 - Retail 6_G_7"                |
| Personnel doors                                                          | 1.5                | -                                                                  | "No external personnel doors"           |
| Vehicle access & similar large doors                                     | 1.5                | -                                                                  | "No external vehicle access doors"      |
| High usage entrance doors                                                | 1.5                | -                                                                  | "No external high usage entrance doors" |
| U <sub>i-Typ</sub> = Typical individual element U-values [W/(m²K)]       |                    | U <sub>i-Min</sub> = Minimum individual element U-values [W/(m²K)] |                                         |
| * There might be more than one surface where the minimum U-value occurs. |                    |                                                                    |                                         |

| Air Permeability   | Typical value | This building |
|--------------------|---------------|---------------|
| m³/(h.m²) at 50 Pa | 5             | 3             |