

BUILDINGS AND BUILT ENVIRONMENT

Liberty Care Developments Ltd
Yew Tree Care Home,
Northern Moor

Environmental Standards Statement

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Northern Moor

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EXECUTIVE SUMMARY

This Environmental Standards Statement has been produced for the Proposed Residential Care Home at Land to the North of Yew Tree Lane, Northern Moor in accordance with Manchester City Council's Core Strategy (2012) Policy EN4 and EN6 following the guidance detailed in the Greater Manchester Places for Everyone Joint Development Plan (2021) Policy JP-S 2.

This Environmental Standards Statement sets a framework for the Energy and Sustainability Strategy for the Proposed Development Site and outlines the Proposed Development's approach to energy efficiency, renewable energy generation and sustainable development incorporating climate change resilience and carbon management measures. It summarises the key planning policy which is pertinent at the time of writing and is aimed at satisfying both energy and sustainable design related requirements.

The Proposed Development will adopt the use of an energy hierarchy and a holistic approach to sustainability to meet National best practice guidance and Manchester City Council's objectives for energy consumption reduction, carbon dioxide emissions [CO₂] reduction and sustainable design and construction. The energy hierarchy aims to reduce energy demand and CO₂ emissions through passive design measures and a 'fabric first' approach (Be Lean) before seeking to reduce the remaining demand by the cleanest means possible. This includes exploiting local energy resources/supplying energy efficiently and cleanly (Be Clean), and finally exploring the opportunities for producing, storing, and using renewable energy on-site (Be Green).

Energy Summary

Be Lean Summary: The Proposed Development envelope and services will be specified to exceed the minimum standards set in Building Regulations Part L to ensure energy consumption via space heating/cooling is reduced. In addition, passive solar considerations have formed an integral part of the Proposed Development design. Analysis using Part L Criterion 3 has been carried out on the facades to ensure solar gains and heating loads are reduced, hence providing a more comfortable internal environment for occupants.

Be Clean Summary: A study into the feasibility of connecting to a district heating network was undertaken. Result shows that there are no nearby operational district heating or planned district heat networks within 500m of the development site. Accordingly, district heating will not be considered for the project. Nevertheless, the Proposed Development could be left with spare valve connections, capable for connection into the future heat network, should the applicant wish. In addition, on-site heat generating technology such as CHP was investigated. However, the benefit of this technology is significantly reduced as more grid energy is produced from renewable sources i.e., the rapid decarbonisation of the electricity grid means that technologies such as CHP will not achieve the carbon savings they have to date.

Be Green Summary: The feasibility of renewable energy generation concluded that the most appropriate and cost-effective renewable energy technologies for the Proposed Development is Air Source Heat Pump (ASHP) for space heating and domestic hot water based on a balanced consideration of the policy requirements, financial viability, and technical feasibility. Consequently, this Environmental Standards Statement proposes to reduce the CO₂ emissions of the Proposed Development by a total of **19.83 %** when compared

with Building Regulations Approved Document Part L2 Target Emissions Rate (TER) Baseline. This exceeds Greater Manchester Places for Everyone Joint Development Plan requirement of achieving at least **19.00 %** CO₂ reduction against Part L of the 2013 Building Regulations.

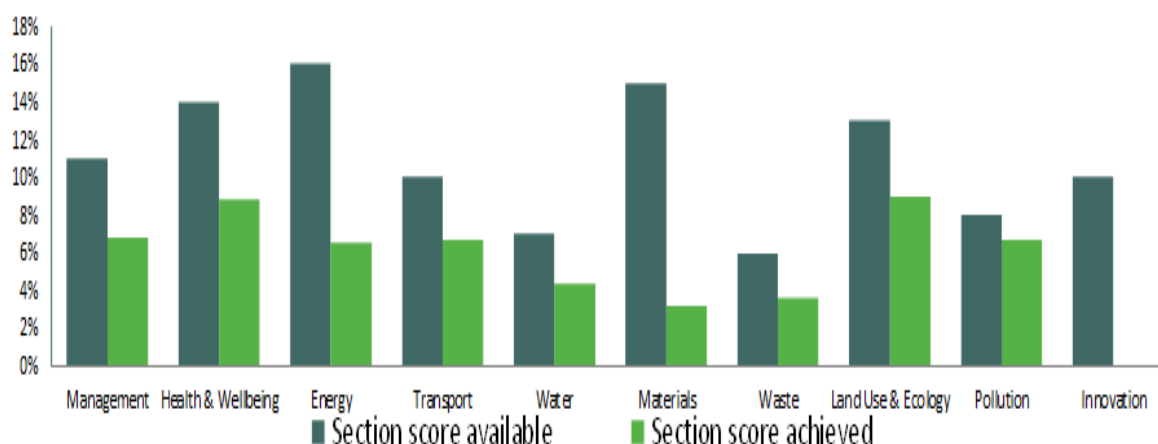
Sustainability (BREEAM Pre-Assessment) Summary

A BREEAM New Construction 2018 Pre-Assessment has also been carried out by Jim Benson (a licensed BREEAM Assessor No. JB41) to establish the rating of this Proposed Development based on information and commitments provided by the Project design team.

The BREEAM assessment process awards a number of credits depending upon whether or not the sufficient evidence can be provided to demonstrate that the BREEAM requirements have been fulfilled. For each BREEAM section the number of credits awarded must be determined by a BREEAM assessor in accordance with BREEAM's assessment criteria (detailed in the technical sections of the scheme manual).

Given the consultation with the design team and workshop during which the credit criteria were explained and examined, and each credit evaluated we (BWB Consulting) are confident this pre-assessment provides a robust forecast of the likely BREEAM rating as detailed below:

Building Performance by Environment Section



The BREEAM pre-assessment has demonstrated how the Proposed Development can achieve a BREEAM **'Very Good'** rating. An expected BREEAM score of **55.70%** will be achieved if the recommendations are followed.

It should be ensured that all mandatory credits are achieved as required for BREEAM 'Very Good,' otherwise this target rating cannot be achieved. As it stands the mandatory credits have been achieved to "Excellent" level. It is felt prudent at this stage to look at potential additional credits to provide a buffer should any current credits fail to be achieved.

This Environmental Standards Statement presents a vision for the Proposed Residential Care Home at Land to the North of Yew Tree Lane, Northern Moor to deliver a secure, sustainable, low carbon design driven by innovative technologies, enabling the Proposed Development to achieve any National and Local carbon/energy reduction targets whilst reducing its reliance on the UK National Grid.

CONTENTS

EXECUTIVE SUMMARY	iii
Energy Summary	iii
Sustainability (BREEAM Pre-Assessment) Summary	iv
1. INTRODUCTION.....	1
Instruction	1
Development Description	1
Purpose of the document	1
Energy Modelling Methodology (Apache DSM)	1
2. POLICY BACKGROUND	2
Introduction	2
Climate Change.....	2
United Nations Framework Convention on Climate Change.....	2
The Paris Agreement	2
The Paris Agreement and Nationally Determined Contributions	3
United Kingdom's (UK's) Nationally Determined Contributions	3
Climate Change Act	4
Planning and Energy Act.....	4
UK Sustainable Development Strategy	5
Directive 2009/28/EC of the European Parliament and of the Council	5
Building Regulations	5
Building Regulation Circular Letter	6
The Future Buildings/Homes Standard	7
Forthcoming Changes to Building Regulations.....	8
Approved Document L Volume 2: Buildings other than dwellings 2021	8
Clean Growth Strategy.....	9
National Design Guide (2019)	9
National Planning Policy Framework.....	9
Planning Policy Guidance (The Guidance)	10
Manchester Core Strategy 2012.....	11
Greater Manchester Places for Everyone Joint Development Plan (2021)	13
3. BASELINE: TARGET ENERGY AND CO ₂ EMISSIONS	14
Baseline Energy and Carbon Dioxide Emissions (TER)	14
4. ENERGY AND CO ₂ REDUCTION STRATEGY METHODOLOGY	15
5. BE LEAN: ENERGY EFFICIENT DESIGN MEASURES	16
Layout and Orientation Analysis.....	16

Building Fabric Analysis	16
Building Services Analysis	17
6. BE CLEAN: SUPPLYING ENERGY EFFICIENCY	19
Heat Network	19
7. BE GREEN: PROPOSALS FOR RENEWABLE ENERGY GENERATION	20
Low and Zero Carbon Feasibility Study	20
8. LOW CARBON DESIGN STRATEGY RESULTS	25
9. BREEAM PRE-ASSESSMENT	26
Objectives	26
Context	26
Assessment Process	26
BREEAM Thresholds	27
Minimum Standards	28
10. BREEAM ASSESSMENT CRITERIA	29
BREEAM Fully Fitted Assessment	29
Scoring Scenarios	30
11. CONCLUSION	31
12. APPENDICES	33

FIGURES

Figure 1.1: Proposed Development Thermal Model in IES VE
Figure 2.1: Everyone Joint Development Plan Policy JP-S 2 Extract
Figure 4.1: Energy Hierarchy
Figure 6.1: District Heating System Schematic
Figure 10.1: Assessment Summary

TABLES

Table 3.1: Baseline Energy Consumption (TER)
Table 3.2: Baseline Carbon Dioxide Emissions (TER)
Table 5.1: Proposed Fabric Specification
Table 5.2: Proposed Light and Solar Transmittance Specification
Table 7.1: Renewable Energy Feasibility Matrix
Table 8.1: Energy Efficiency Measures – Energy Consumption Summary
Table 8.2: Energy Efficiency Measures - CO₂ Emissions Consumption Summary
Table 9.1: BREEAM Scoring Thresholds
Table 9.2: Minimum Standards by BREEAM Rating Level

APPENDICES

APPENDIX 1: Part L (Be-Lean) BRUKL Report
APPENDIX 2: Part L (Be-Green) BRUKL Report
APPENDIX 3: BREEAM Assessment Breakdown

1. INTRODUCTION

Instruction

- 1.1 BWB Consulting (BWB) was instructed by Liberty Care Developments Ltd (the Client) to carry out an Environmental Standards Statement (ESS) in support of a full planning application for the Proposed Residential Care Home at Land to the North of Yew Tree Lane, Northern Moor.

Development Description

- 1.2 The Proposed Development involves (**Figure 1.1**) the demolition of existing buildings and structures and the construction of a new care home facility including access, landscaping, and associated infrastructure.

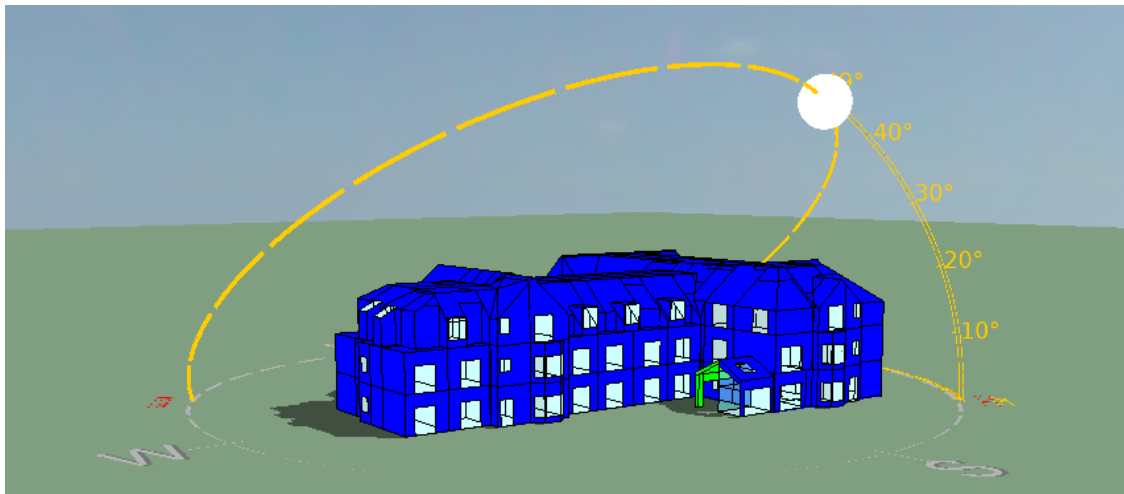


Figure 1.1: Proposed Development Thermal Model in IES VE

Purpose of the document

- 1.3 The purpose of this ESS is to demonstrate that climate change mitigation measures will be integrated into the scheme's design and that the proposed measures are appropriate to the site environment and energy demands of the development.
- 1.4 This document will describe the policy context to which this ESS responds before presenting the baseline energy and carbon dioxide emissions and demonstrating how it is proposed to reduce these through a: lean, energy efficient design; clean energy supply; and green on-site renewable energy generation. This document also identifies and highlight the key sustainable practices (using BREEAM Pre-Assessment) to be incorporated into the design and construction of the Proposed Development.

Energy Modelling Methodology (Apache DSM)

- 1.5 Energy models using the ApacheSim Dynamic Simulation Modelling (DSM) have been produced to predict the CO₂ emissions from the Proposed Development. DSM is one of the Government adopted methodologies for calculating the energy performance of non-domestic buildings within the UK.

2. POLICY BACKGROUND

Introduction

- 2.1 This section of the ESS reviews relevant policy at the international, national, regional, and local levels and then discusses key issues for the Statement.

Climate Change

- 2.2 Climate change is a long-term change in the average weather patterns that have come to define Earth's local, regional, and global climates. These changes have a broad range of observed effects that are synonymous with the term.
- 2.3 Changes observed in Earth's climate since the early 20th century are primarily driven by human activities, particularly fossil fuel burning, which increases heat-trapping greenhouse gas levels in Earth's atmosphere, raising Earth's average surface temperature. These human-produced temperature increases are commonly referred to as global warming. Natural processes can also contribute to climate change, including internal variability (e.g., cyclical ocean patterns like El Niño, La Niña, and the Pacific Decadal Oscillation) and external forcing (e.g., volcanic activity, changes in the Sun's energy output, variations in Earth's orbit).
- 2.4 Scientists use observations from the ground, air, and space, along with theoretical models, to monitor and study past, present and future climate change. Climate data records provide evidence of climate change key indicators, such as global land and ocean temperature increases; rising sea levels; ice loss at Earth's poles and in mountain glaciers; frequency and severity changes in extreme weather such as hurricanes, heatwaves, wildfires, droughts, floods, and precipitation; and cloud and vegetation cover changes, to name but a few.

United Nations Framework Convention on Climate Change

- 2.5 The international mechanism for addressing climate change is the United Nations Framework Convention on Climate Change (UNFCCC). Signed in 1992 at the United Nations Conference on Environment and Development, the Convention constitutes the foundational climate agreement that has provided the platform for most subsequent international climate agreements.
- 2.6 The Kyoto Protocol, which was signed in 1997 and which entered into force in 2005, was the first implementation of measures under the UNFCCC until 31 December 2020. The protocol was superseded by the Paris Agreement. Its supreme decision-making body, the Conference of the Parties (COP), meets annually to assess progress in dealing with climate change.

The Paris Agreement

- 2.7 The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at the 2015 United Nations Climate Change Conference in 2015 and entered into force in 2016. The 196 Parties to the UNFCCC reached a landmark

agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future.

- 2.8 The Paris Agreement builds upon the Convention and for the first time brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. As such, it charts a new course in the global climate effort. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.
- 2.9 To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century.
- 2.10 The Paris Agreement works on a 5-year cycle of increasingly ambitious climate action carried out by countries. Countries are required to submit their plans for climate action known as nationally determined contributions (NDCs).

The Paris Agreement and Nationally Determined Contributions

- 2.11 Through the Paris Agreement, Parties also agreed to a long-term goal for adaptation – to increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production. Nationally determined contributions (NDCs) are at the heart of the Paris Agreement and the achievement of these long-term goals. NDCs embody efforts by each country to reduce national emissions and adapt to the impacts of climate change.
- 2.12 The Paris Agreement (Article 4, paragraph 2) requires each Party to prepare, communicate and maintain successive nationally determined contributions (NDCs) that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions.

United Kingdom's (UK's) Nationally Determined Contributions

- 2.13 The UK's target under the Paris Agreement of 2015, when it shared a common plan on emissions with the EU, was for a 53% cut by 2030. However, that was widely regarded as not stretching, and the UK also had a domestic carbon budget under the Climate Change Act requiring a 57% reduction on average from 2028 to 2032.
- 2.14 In December 2020, the UK announced that it will cut its carbon emissions by 68% compared with 1990 levels before 2030, a significant increase on the current target of about 57% reductions. This represents the UK's nationally determined contribution towards meeting the Paris Agreement.
- 2.15 The UK was already committed to reducing carbon emissions to zero by 2050, with an interim target of 53%. The ambitious target would see the UK cutting emissions faster than any major economy so far and follows the advice of the government's statutory advisers, the committee on climate change, which found the costs of cutting emissions had fallen rapidly in the past few years.

- 2.16 In April 2021 at the climate summit, the U.K. government confirmed its plan to put the U.K. on course to meet its target of reaching net zero carbon emissions by 2050.

Climate Change Act

- 2.17 The Climate Change Act (2008) sets a legally binding target for reducing UK CO₂ emissions.
- 2.18 On 20th April 2021 the UK Government announced to set place 'the world's most ambitious climate target' by cutting emissions by least 100% on 1990 levels by 2050. It established the Committee on Climate Change, which is responsible for setting binding interim carbon budgets for the Government over successive five-year periods.
- 2.19 To meet these targets, the government has set five-yearly carbon budgets which currently run until 2032. The carbon budgets restrict the amount of greenhouse gas the UK can legally emit in a five-year period. The UK is currently in the fifth carbon budget period (2028 to 2032).
- 2.20 The Climate Change Committee (CCC) has published its recommendation on the level of the Sixth Carbon Budget in December 2020. The Sixth Carbon budget limits the amount greenhouse gases emitted over a five-year period from 2033 to 2037, It sets the path to the UK's Net Zero emissions target in 2050, as the first carbon budget to be set into law following that commitment.
- 2.21 The CCC's annual assessment of UK progress in reducing emissions and biennial assessment of progress in adapting to climate change was published in June 2021. This double report – Progress in reducing emissions and Progress in adapting to climate change provides a comprehensive overview of the UK Government's progress to date on reducing emissions and climate change adaptation. Together, the assessment offers more than 200 policy recommendations.

Planning and Energy Act

- 2.22 The Planning and Energy Act (2008) allows local planning authorities' policies to impose reasonable requirements for a proportion of energy used in developments to be from renewable and low carbon sources in the locality of the development.
- 2.23 This means local planning authorities have the power to set local energy efficiency standards for new homes that go beyond the minimum standards set through the Building Regulations.
- 2.24 For example, the local council could require developers to source at least 10 per cent of any new building's energy from renewable sources, implementing the so-called 'Merton Rule', named after the sustainable planning policy, first adopted by the London Borough of Merton.
- 2.25 It is however expected that the new planning reforms (expected to come into force in 2025) will clarify the longer-term role of local planning authorities in determining local energy efficiency standards.

UK Sustainable Development Strategy

- 2.26 The UK Sustainable Development Strategy recognises that everybody has the right to a healthy, clean and safe environment. In 2005, the government published an updated strategy for implementing sustainable development across the UK.
- 2.27 This strategy acts as an overarching document from which a range of specific policies and legislation was derived. Although published in 2005, the strategy has taken a recently renewed focus in light of the government's definition of Sustainable Development in the National Planning Policy Framework (NPPF).
- 2.28 One of the keys aims of this strategy is to recognise the threats of climate change and ensure that the UK develops a strategy to mitigate and adapt to this phenomenon. The document established five key principles that will underpin the national sustainable development strategy:
- i. Living within Environmental Limits;
 - ii. Ensuring a Strong, Healthy and Just Society;
 - iii. Achieving a Sustainable Economy;
 - iv. Promoting Good Governance; and
 - v. Using sound science responsibly
- 2.29 The strategy will be implemented at a national level through the development of more specific strategies at a government department or sector level.
- 2.30 With regards to planning and the built environment, this document set the basis for the development of plans and policies that promote development that mitigates and adapts to climate change.

Directive 2009/28/EC of the European Parliament and of the Council

- 2.31 The Directive 2009/28/EC of the European Parliament and of the Council on renewable energy, implemented by Member States by December 2010, sets ambitious targets for all Member States. The directive, which amends and repeals earlier Directives 2001/77/EC and 2003/30/EC, creates a common set of rules for the use of renewable energy in the EU so as to limit greenhouse gas (GHG) emissions.
- 2.32 The UK's departure from the European Union may have major implications for future UK and EU climate policy. Although the United Kingdom (UK) Government has signalled its intention to enhance its current carbon reduction commitments, it remains to be seen how the withdrawal of the United Kingdom from the European Union (Brexit) may impact this.

Building Regulations

- 2.33 Whilst not planning policy, the Building Regulations and specifically Approved Document Part L: Conservation of Fuel and Power has relevance to the requirements for energy efficiency and carbon emissions of new buildings.

- 2.34 The primary mechanism for reducing carbon emissions in new domestic and non-domestic development is progressive changes to Part L aiming to deliver zero carbon buildings. On this basis, a minimum requirement for the reduction in carbon emissions to be delivered by new buildings' is set within the Building Regulations, with each update requiring lower carbon emissions than the previous version to achieve compliance.
- 2.35 The update in 2014 required new residential and non-residential development to achieve an aggregated 6% and 9% reduction in carbon emissions over the 2010 Regulations.
- 2.36 The government has also confirmed that it will introduce an interim uplift in building standards from 2021 as a first step towards the Future Homes Standard in 2025. Buildings built to the interim standard are expected to produce 31% less carbon dioxide emissions compared to current levels.
- 2.37 This change aims to strike a balance between the commitment to reducing carbon emissions and improving energy efficiency and ensuring that the overall effect of regulation does not stifle growth. The government has stated that developers will continue to have flexibility in how they meet carbon reduction target.

Building Regulation Circular Letter

- 2.38 Whilst This letter clarifies the implementation of the requirements for nearly zero energy buildings for new buildings with respect to Regulation 25B of the Building Regulations 2010 from 31 December 2020.
- 2.39 Nearly zero-energy buildings in accordance with the EU Directive is defined as a building that has a very high energy performance with a significant proportion of that energy being generated from on-site or nearby renewable sources.
- 2.40 However, it does not define a specific standard of performance (i.e., a numerical indicator) that might be considered 'nearly zero'.
- 2.41 Nevertheless, the circular letter sets out guidance for new buildings, which are required to meet Regulation 25B from 31 December 2020. This applies to buildings and building work in England and excludes buildings owned and occupied by public authorities.
- 2.42 Regulation 25B states that 'where a building is erected, it must be a nearly zero-energy building' and compliance with this requirement can be achieved by both:
- i. Meeting the Target Emission Rate required under Regulation 26 and;
 - ii. Undertaking an analysis of the technical, environmental, and economic feasibility of using high-efficiency alternative systems, which include decentralised energy supply systems based on energy from renewable sources and taking this analysis into account as required by Regulation 25A.
- 2.43 The energy efficiency standards of the building regulations are currently under review. Subsequently, an interim increase to the energy efficiency standards for new homes as a first step towards the Future Homes Standard has been proposed.

The Future Buildings/Homes Standard

- 2.44 In the 2019 Spring Statement, the UK Government's made a commitment that by 2025 they will introduce a Future Homes Standard for new build homes to be future-proofed with low carbon heating and world-leading levels of energy efficiency. The introduction of the Future Homes Standard will achieve a considerable improvement in energy efficiency standards for new homes.
- 2.45 The Future Homes Standard consultation, launched in October 2019, represented a first step in incentivising these changes by providing a clear vision for implementation and setting an ambitious uplift to the energy performance requirements in the Building Regulations for new homes.
- 2.46 On 19 January 2021, the government published the outcome of its 2019 consultation on the Future Homes Standard. This consultation set out the government's plans for a new green Future Homes Standard and sought views on changes to building regulations in England to improve energy efficiency and cut carbon emissions in new build homes.
- 2.47 The government has confirmed that it will change building regulations so that from 2025 the Future Homes Standard will deliver homes that are zero-carbon ready. Homes built under the Future Homes Standard should produce 75-80% less carbon emissions compared with current levels and become net zero as the electricity grid continues to decarbonise.
- 2.48 The intention is that homes built to the Future Homes Standard will not need to be retrofitted with any additional measures or technology to become net zero. The Future Homes Standard should see homes fitted with low carbon forms of heating. The expectation is that heat pumps will become the main source of heating system for most new homes.
- 2.49 The government has also confirmed that it will introduce an interim uplift in building standards from 2021 as a first step towards the Future Homes Standard in 2025. Homes built to the interim standard should produce 31% less carbon dioxide emissions compared to current levels.
- 2.50 The interim uplift in standards will be delivered through an updated Part L of the Building Regulations. The final version of Part L is expected to be published in December 2021 and will come into force in June 2022.
- 2.51 A full technical specification for the Future Homes Standard will be consulted on in 2023. Legislation will be introduced in 2024, ahead of implementation in 2025.
- 2.52 The government confirmed that once a new house has been built, no refurbishment will be necessary to reach zero-carbon as the electricity grid continues to decarbonise – and no new home built under the Future Homes Standard will be reliant on fossil fuels.
- 2.53 The government has also launched a second consultation on additional changes to Part L (conservation of fuel and power) and Part F (ventilation) of the Building Regulations, and on proposals to address overheating in residential buildings.

Forthcoming Changes to Building Regulations

- 2.54 The government recently published its updated Building Regulations for England which includes amendments to Approved Documents Part F (ventilation), and Part L (conservation of fuel and power), as well as the release of a new Approved Document for overheating (Part O). They are all viewed as a part of the country's journey towards net zero and are aimed at driving energy efficiency up and carbon emissions down in commercial and residential buildings.
- 2.55 The new regulations are set to come into force on 15 June 2022, when new homes and buildings in England will have to produce around 30% less CO₂ than current standards, and emissions from other new buildings, including offices and shops, must be reduced by 27%. This is regarded as a first step towards making all buildings 'net zero ready' from 2025 when the Future Homes Standard (FHS) comes into effect, mandating a 75% reduction in emissions.
- 2.56 The scope of the new regulations will affect both existing and new build properties and will change how heating and ventilation is specified. For existing homes, uplifts to both Part L and F mandate new minimum efficiency standards. This includes a new way of calculating whole house heat losses for new extensions.
- 2.57 All new residential buildings, including care and children's homes, and student accommodation, will have to be designed to reduce overheating under changes to Part F, and with the introduction of Part O. Higher standards of ventilation will be introduced to improve IAQ and reduce the spread of airborne viruses in new non-residential buildings, including additional standards for recirculating ventilation systems in new offices, along with the compulsory installation of CO₂ monitors.
- 2.58 Amendments to Part L are focused on measures that enable a building to produce less carbon emissions and will act as an interim uplift before the stricter demands of the Future Homes/Building Standard come into force in 2025.
- 2.59 The new edition raises the threshold for efficiency with new requirements for insulation, thermal bridging, primary energy targets and air leakage testing requirements. In addition, there has been a change in carbon factor of electricity, meaning the use of electrically powered heating systems (especially heat pumps) is especially incentivised.

Approved Document L Volume 2: Buildings other than dwellings 2021

- 2.60 This approved document takes effect on 15 June 2022 for use in England. It does not apply to work subject to a building notice, full plans application or initial notice submitted before that date, provided the work for each building is started before 15 June 2023.
- 2.61 Part L amendments introduce a new principal performance metric measuring energy efficiency. 'Primary energy' will be used in combination with CO₂ metrics to assess compliance with Part L. Primary energy calculations take into account factors such as the efficiency of the building's heating system; power station efficiency for electricity; and energy used to produce fuel and deliver it to the building.

Clean Growth Strategy

- 2.62 This strategy sets out the Government's proposals for de-carbonising all sectors of the UK economy through the 2020s. It provides a route for the UK to take advantage of low carbon opportunities, while meeting national and international commitments to tackle climate change.

National Design Guide (2019)

- 2.63 Published in October 2019 the National Design Guide prepared by the Government sets out the characteristics of well-designed places and demonstrates what good design means in practice.
- 2.64 Sustainability is a key theme running through the Guide, particularly in the ninth section Resources which provides guidance on the delivery of efficient and resilient development. This includes development, which is designed in accordance with the energy hierarchy, utilises sustainable materials & maximise resilience to climate change.

National Planning Policy Framework

- 2.65 The National Planning Policy Framework (NPPF) published 2012 and as revised from time to time sets out the Government's planning policies for England and how these should be applied. The NPPF introduced the presumption in favour of sustainable development. It states that.

"[...] The purpose of the planning system is to contribute to the achievement of sustainable development. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

- i. an economic objective: to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;*
- ii. a social objective: to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and*
- iii. an environmental objective: to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy. [...]"*

- 2.66 The NPPF supports the transition to a low carbon future in a changing climate, taking full account of flood risk & coastal change. It helps to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability & improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; & support renewable & low carbon energy & associated infrastructure.
- 2.67 For the NPPF to support the move to a low carbon future, the local planning authorities should ensure new developments are planned for in ways that:
- i. *"[...] Avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and*
 - ii. *Can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards. [...]"*
- 2.68 For the NPPF to support the move to a low carbon future, the local planning authorities should ensure new developments are planned to help increase the use and supply of renewable and low carbon energy and heat by:
- i. *"[...] Provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);*
 - ii. *Consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and*
 - iii. *Identify opportunities for development to draw its energy supply from decentralised, renewable, or low carbon energy supply. [...]"*
- 2.69 For the NPPF to support the move to a low carbon future, the local planning authorities should ensure new development:
- i. *"[...] Comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable); and*
 - ii. *Take account of landform, layout, building orientation, massing, and landscaping to minimise energy consumption. [...]"*
- 2.70 The key focus of the National Planning Policy Framework (NPPF) is to support local and regional planning authorities.

Planning Policy Guidance (The Guidance)

- 2.71 The National Planning Practice Guidance (NPPG) published 2014 and as revised from time to time provides further advice on various planning issues associated with development, including those linked to sustainability and renewable energy and underpins the policies within the NPPF. The PPG Guidance is an important material

consideration in planning decisions and should generally be followed unless there are clear reasons not to.

- 2.72 It sets out how local authorities should include policies that protect the local environment and strategies to mitigate and adapt to climate change and supports developments that are functional and adaptable for the future.
- 2.73 The PPG confirms Local Authorities have the option to set technical requirements exceeding the minimum requirements of the Building Regulations in respect of access, water, and space where sufficient evidence is produced to justify the target. The Guidance also states that Local Authorities can set carbon reduction targets equivalent to a 19% reduction beyond the 2013 Building Regulations and renewable energy policies for non-domestic buildings.
- 2.74 The Guidance states that the distribution and design of new development, and the potential for servicing sites through sustainable transport solutions, are particularly important considerations and that good design is an integral part of sustainable development to deliver a wide range of planning objectives.

Manchester Core Strategy 2012

- 2.75 The Manchester Core Strategy was adopted by Manchester City Council on 11th July 2012, and it is the key document in Manchester's Local Development Framework. The strategy describes the vision for Manchester in 2027 and contains planning policies that should be implemented in order to support the delivery of that vision.
- 2.76 With respect to the wider Greater Manchester Strategy (GMS), and in reference to the relevance of this document, there is a recognition of the fact that climate change is an issue that must be addressed, and that growth will only be sustainable if it includes measures to mitigate the levels of CO₂ that accompany it. The Core Strategy supports this, with the vision of making Manchester a "sustainable and accessible city" which meets the challenge of climate change at the forefront of environmental initiatives and improvements. There is a drive to continue to deliver sustainable development and more effective green infrastructure.
- 2.77 The policies relevant to the delivery of a compliant energy strategy are covered in Policy EN4 and EN6 (Target Framework for CO₂ reductions from low or zero carbon energy supplies). **Policy EN4** (Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development) states that:

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

- i. All development must follow the principle of the Energy Hierarchy, being designed*
 - to reduce the need for energy through design features that provide passive heating, natural lighting, and cooling*
 - to reduce the need for energy through energy efficient features such as improved insulation and glazing*

- to meet residual energy requirements through the use of low or zero carbon energy generating technologies
- ii. Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies.
- iii. Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings.
- iv. Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing / potential decentralised energy schemes.
- v. The use of building materials with low embodied carbon in new development and refurbishment schemes. [...]"

2.78 **Policy EN6** (Target Framework for CO₂ reductions from low or zero carbon energy supplies) states that:

"[...] Applications for residential development of 10 or more units and all other development over 1,000 sq m will be expected as a minimum to meet the target shown in Tables 12.1 or 12.2, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated CO₂ emissions for all phases of the development.

Developments smaller than the above threshold, but involving the erection of a building or substantial improvement to an existing building will also be expected to meet the minimum target, where viable, but will not be expected to submit an energy statement.

The target framework relates to three broad development locations and their potential for low and zero carbon, decentralised energy. The areas are defined as follows:

- i. Target 1 Network development areas: Locations where the proximity of new and existing buildings, the mix of uses and density of development provide the right conditions to support district heating (and cooling).
- ii. Target 2 Electricity intense areas: Locations where the predominant building type has an all-electric fit-out such as retail units and leisure complexes.
- iii. Target 3 Micro-generation areas: Locations where lower densities and a fragmented mix of uses tend to mean that only building scale solutions are practical. [...]"

Target	% Minimum Requirement
Target 1: Network development area	CHP/district heating anchor or where not feasible, a 15% increase on Part L 2010
Target 2: Electricity intense buildings	+10% increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

Greater Manchester Places for Everyone Joint Development Plan (2021)

- 2.79 Places for Everyone is a 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 published by the Greater Manchester Combined Authority (GMCA) on behalf of the nine districts.
- 2.80 The policy relevant to the delivery of a compliant energy strategy is covered in Policy JP-S 2. **Policy JP-S 2** (Carbon and Energy) as shown in **Figure 2.1** states that:

Policy JP-S 2

Carbon and Energy

The aim of delivering a carbon neutral Greater Manchester no later than 2038, with a dramatic reduction in greenhouse gas emissions, will be supported through a range of measures including:

1. Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling;
2. Promoting the use of life cycle cost and carbon assessment tools to ensure the long term impacts from development can be captured;
3. Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities;
4. Keeping fossil fuels in the ground;
5. Planning for a balanced and smart electricity grid by identifying geographical locations which could support energy assets⁽³⁰⁾;
6. Increasing the range of nature based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, tree-planting and natural flood management techniques;
7. Development of Local Area Energy plans to develop cost effective pathways to achieve carbon targets;
8. An expectation that new development will:
 - a. Be net zero⁽³¹⁾ carbon from 2028 by following the energy hierarchy (with any residual carbon emissions offset), which in order of importance seeks to:
 - i. Minimise energy demand;
 - ii. Maximise energy efficiency;
 - iii. Utilise renewable energy;
 - iv. Utilise low carbon energy; and
 - v. Utilise other energy sources.

With an interim requirement that all new dwellings should seek a minimum 19% carbon reduction against Part L of the 2013 Building Regulations.⁽³²⁾
 - b. Incorporate adequate electric vehicle charging points to future proof for the likely long-term demand, taking account of the potential maximum energy demand for the site;

Figure 2.1: Everyone Joint Development Plan Policy JP-S 2 Extract

- 2.81 The Greater Manchester Places for Everyone Joint Development Plan Policy JP-S 2 in addition with the Policy EN4 and EN6 provides detailed guidance for the required content of an energy statement & are the key documents that this report responds to.

3. BASELINE: TARGET ENERGY AND CO₂ EMISSIONS

- 3.1 Policy JP-S 2 states that new developments must achieve at least 19% carbon reduction against Part L of the 2013 Building Regulations.
- 3.2 The energy demand and CO₂ emissions due to end-uses regulated by Building Regulations have been calculated using the National Calculation Methodology (NCM) ApacheSim DSM. Unlike SBEM, DSM is a much more accurate tool providing full annual simulation performed multiple times per hour using real hourly weather data.
- 3.3 DSM is one of the Government's adopted methodologies for calculating the energy performance of non-residential buildings within the UK. Performing the DSM calculation involves creating a three-dimensional model of the Proposed Development and then populating the model with the fabric and services specification
- 3.4 Energy models using the DSM software (IES VE) have been produced to predict the energy demands and carbon dioxide emissions from the Proposed Development.

Baseline Energy and Carbon Dioxide Emissions (TER)

- 3.5 The baseline energy and carbon dioxide emissions are equivalent to the Building Regulations Approved Document Part L worst allowable Target Emissions Rate (TER) calculated within the DSM assessments of the proposed development. Please note that all total figures include regulated consumption assessed within Building Regulations only.
- 3.6 **Table 3.1** and **3.2** shows the baseline energy demand and CO₂ emissions through regulated end uses, based on the notional Target Emission Rate (TER) from approved software. This is further detailed in **Appendix 1** (BRUKL document):

Table 3.1: Baseline Energy Consumption (TER)

BASELINE (TER): ENERGY CONSUMPTION	
	Energy Consumption (kWh/m ² /yr)
Heating	36.47
Cooling	1.23
Hot Water	80.94
Auxiliary	13.33
Lighting	21.20
TOTAL PART L 2013 BASELINE (TER)	153.16

Table 3.2: Baseline Carbon Dioxide Emissions (TER)

BASELINE (TER): CARBON DIOXIDE EMISSIONS	
	CO ₂ Emissions (kgCO ₂ /m ² /yr)
Part L 2013 Baseline (TER)	43.50
TOTAL PART L 2013 BASELINE (TER)	43.50

4. ENERGY AND CO₂ REDUCTION STRATEGY METHODOLOGY

- 4.1 The design of the Proposed Development has been developed to reduce its annual energy consumption, provide energy in an environmentally friendly way, and to minimise its annual CO₂ footprint.
- 4.2 To achieve this, the Proposed Development will adopt an energy hierarchy (**Figure 4.1**) approach to meet Manchester City Council's Core Strategy (2012) Policy EN4 and EN6 including Policy JP-S 2 of the Joint Plan objectives for carbon emissions reduction:
- Use Less Energy (**Be Lean**); then
 - Supply Energy Efficiently (**Be Clean**); and finally
 - Use Renewable Energy (**Be Green**).



Figure 4.1: Energy Hierarchy

- 4.3 Energy saving measures following the Fabric First Approach is encouraged. This will reduce energy demand and consequently the energy bills by investing in improving the building fabric's thermal properties and using efficient building services. This is often referred to as 'Be Lean'. The Fabric First approach provides protection against fluctuations in both gas and electricity supply tariffs by inherently reducing energy consumption and expands the number of suitable energy generation and delivery options.
- 4.4 Further improvements in building services, over and above the minimum requirements to comply with Building Regulations Part L, can reduce energy demand further and shall be described within the 'Be Clean' section. This includes identifying the Proposed Development site heat demand, investigating existing/planned decentralised energy and heat network, and the potential for a new heat district network as part of the Proposed Development.
- 4.5 An investigation into a combined heat and power (CHP) system shall also be conducted based on the Proposed Development estimated annual baseload. CHP systems generate electricity from burning fossil fuels and capture the heat generated in the process for heating purposes. In order for CHP technology to be appropriate the site needs to have a suitable base-load heat demand. However, the benefit of this technology is significantly reduced as more grid energy is produced from renewable sources i.e., the rapid decarbonisation of the electricity grid means that technologies such as CHP will not achieve the carbon savings they have to date.
- 4.6 Finally, the use of on-site renewable technologies will be assessed. The use of the energy hierarchy will help to reduce the size of any on-site renewable technologies required by ensuring that energy consumption and CO₂ emissions is driven out of the scheme by the Fabric First approach.

5. BE LEAN: ENERGY EFFICIENT DESIGN MEASURES

- 5.1 Energy demand and CO₂ reduction has been considered in three stages: layout and orientation; building fabric; and building services. The proposals to reduce energy at each of these stages are described within this section.

Layout and Orientation Analysis

- 5.2 The opportunities for orientation and layout of the Proposed Development have been maximised. The development plan has been designed to enable passive solar gain and availability of natural light to be maximised into each bedroom with majority of the bedrooms provided with either a north, east, west, and/or south glazed opening as possible.
- 5.3 Furthermore, the site is sheltered by residential developments to the north, east, west, and south. These surrounding buildings are likely to provide considerable protection from winds, including prevailing winds, hence passively reducing the heating demand.

Building Fabric Analysis

- 5.4 In order to reduce the demand for heating energy, it is proposed to construct the development with a highly thermal efficient building envelope.
- 5.5 To meet Building Regulations Approved Document Part L2A, the Proposed Development fabric elements making up the envelope shall therefore be specified to exceed the minimum standards set in Part L2A to ensure energy consumption via space heating and cooling is reduced. **Table 5.1** shows the proposed level of performance in comparison with the worst allowable standards for each element.

Table 5.1: Proposed Fabric Specification

PROPOSED FABRIC SPECIFICATION			
Element	Proposed U-values	Part L1A 2013 Worst Allowable U-values	Percentage Improvement (%)
External Wall	0.18 W/m ² .K	0.35 W/m ² .K	48.57 %
Roof	0.15 W/m ² .K	0.25 W/m ² .K	40.00 %
Ground/Exposed Floor	0.15 W/m ² .K	0.25 W/m ² .K	40.00 %
Semi-Conditioned Wall	0.18 W/m ² .K	0.35 W/m ² .K	48.57 %
Semi-Conditioned Floor	0.15 W/m ² .K	0.25 W/m ² .K	40.00 %
Glazed Windows (inc. frame)	1.40 W/m ² .K	2.20 W/m ² .K	36.36 %
Glazed Entrance Door	1.40 W/m ² .K	2.20 W/m ² .K	36.36 %
Air Permeability	3.00 m ³ /(hr.m ²)	10.00 m ³ /(hr.m ²)	70.00 %

- 5.6 Light and Solar Transmittance (g-values) are factors that measure the amount of light and solar energy that pass through glazed openings. They are important as they affect the control of solar gains and availability of natural light into the building.

- 5.7 **Table 5.2** shows the proposed light and solar transmittance values recommended for the Proposed Development.

Table 5.2: Proposed Light and Solar Transmittance Specification

PROPOSED GLAZING SPECIFICATION			
Element	Description/ Notes	Proposed Solar Transmittance	Proposed Light Transmission
Glazing Element Window/Door	Glazing Specification	0.40	0.71
Glazing Element Rooflight	Glazing Specification	0.55	0.60

- 5.8 In addition to the Proposed Development improved envelope u-values, a key area of construction which could result in a significant reduction in heating demand are junction details where two elements of the development envelop meet (thermal bridging).
- 5.9 For the ApacheSim Dynamic Simulation Modelling (DSM) software, the non-repeating thermal bridge [Psi (Ψ)] heat losses for each element (including windows etc) are automatically allowed for by adding 10% to the standard area weighted average U-values – this is consistently applied to both Actual and Notional building.
- 5.10 Consequently, for the proposed development DSM analysis, an additional 10% heat loss is automatically added to make an allowance for the extra conduction via non-repeating thermal bridges. As such, an Alpha value of 10% in the Technical Data Sheet within the BRUKL document can be observed. Therefore, it is proposed that the details between different envelope elements should be carefully designed in order to maintain continuity of insulation.

Building Services Analysis

- 5.11 The following services are proposed for the development in order to reduce energy consumption and carbon dioxide emissions through energy efficient equipment and services strategy.

Space Heating and/or Cooling:

- 5.12 Space heating (*for comparison*) to the proposed development (excluding dining area, offices, and lounge area) is proposed to be provided via gas-fired boiler [using underfloor heat emitter] with a minimum seasonal efficiency of 91.00%.
- 5.13 Space heating and cooling (*for comparison*) to the dining area, offices and lounge area is proposed to be provided via a gas-fired boiler with a minimum seasonal efficiency of 91.00% and cooling via chiller with a minimum seasonal efficiency of 510% (SEER/EER).
- 5.14 Space heating and cooling controllers to the Proposed Development is proposed to include central time control, optimum start/stop control, local time control/temperature control (i.e., room by room), and weather compensation control - BMS.

Domestic Hot Water:

- 5.15 Domestic Hot Water (*for comparison*) to the Proposed Development is proposed to be provided via a gas-fired water heater with a minimum seasonal efficiency of 96%. A total storage capacity of 800 litres with a storage loss of 0.0054 kWh/l/day has been assumed.

Ventilation:

- 5.16 Ventilation to the bedrooms, dining area, offices and lounge area, kitchen and changing rooms is provided via an Air Handling Unit with 85.00% efficient heat recovery. Such Air Handling Unit with heat recovery system can significantly reduce the winter heat demand by pre-heating supply air with extract air. The system shall therefore be selected to have a specific fan power (SFP) of no greater than 1.60 W/(l/s).
- 5.17 Extract ventilation fans are proposed to serve 'wet rooms' including assisted bathroom, assisted WC and sluice. The extract fans shall be selected to have a specific fan power (SFP) of no greater than 0.30 W/(l/s).

Lighting:

- 5.18 Bedrooms, dining area, offices and lounge area are proposed to have a light efficacy of no less than 120 lm/W. It is proposed that lighting to these spaces shall be provided with photoelectric dimming and PIR (passive infra-red) sensors to provide auto-on-off control with a parasitic power of no greater than 0.10 W/m². This is to ensure that artificial lightings shall not be fully utilised when there is sufficient natural light or space is unoccupied.
- 5.19 Lighting to the WCs, circulation areas, store room etc are proposed to be served by LED lightings with efficacy of no less than 95 lumens per circuit Watt. Lighting to these spaces shall also be provided with PIR (passive infra-red) sensors to provide auto on-off control with a parasitic power of no greater than 0.10 W/m². This is to ensure that artificial lightings shall not be utilised when spaces are unoccupied.
- 5.20 Lighting to other areas (including ensuite, reception, comms, activity room, kitchen, changing room etc are proposed to be served by LED lightings with efficacy of no less than 100 lumens per circuit Watt. Lighting to these spaces shall also be provided with PIR (passive infra-red) sensors to provide auto on-off control with a parasitic power of no greater than 0.10 W/m². This is to ensure that artificial lightings shall not be utilised when spaces are unoccupied.

Metering and Power Factor Correction:

- 5.21 It is proposed that all Proposed Development's services shall be fitted with metering which will communicate meaningful information, enabling the building occupier to address & adjust the system to satisfy the requirements of paragraph 2.47/2.48 of ADL2A.
- 5.22 A power factor correction device can adjust the wavelength of the electricity supply to ensure that minimal electrical energy is wasted within the building. However, no power factor correction system has been assumed/proposed for the Proposed Development.

6. BE CLEAN: SUPPLYING ENERGY EFFICIENCY

- 6.1 The next stage in the energy hierarchy is exploiting local energy resources (such as secondary heat) and supply energy efficiently and cleanly to reduce CO₂ emissions.

Heat Network

- 6.2 The growth of decentralised energy generation is a core component of decarbonising the energy supply. District heat networks are an important part of a sustainable and flexible energy system of which each building is a part, and which enables a more circular approach to energy use by storing, using, and reusing energy sources. Heat networks (**Figure 6.1**) offer an efficient and competitive solution for heating buildings in areas with high heat density and provide the added benefit of enabling the use of secondary energy or waste heat sources.

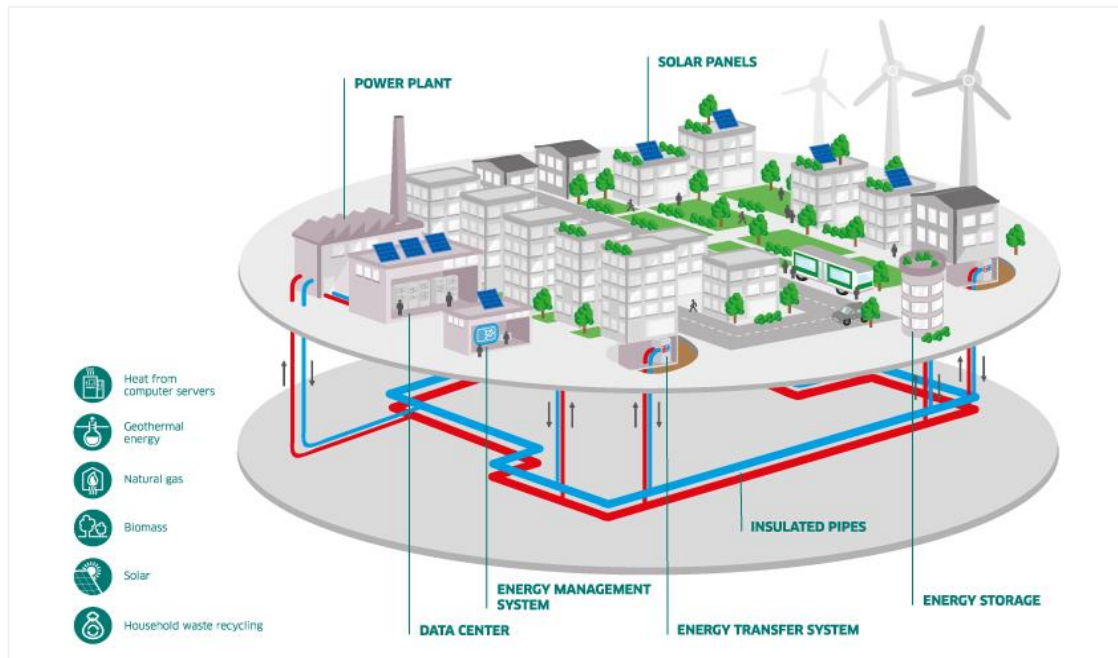


Figure 6.1: District Heating System Schematic

- 6.3 Desktop study was undertaken to investigate whether an existing distribution network was in place close to the site. However, there are no existing district heating networks within 500m of the site, therefore, connection to an existing network is not feasible. As such, whilst the Proposed Development will not rely on third parties to meet their heat or power requirement, some flexibility may be included to allow third party energy connection in the future. The Development could be left with spare valve connections, capable for connection into the future heat network, should the applicant wish.
- 6.4 CHP has also been investigated and may be suitable for the Proposed Development heat baseload. However, the rapid decarbonisation of the electricity grid means that technologies generating onsite electricity will not achieve the carbon savings they have to date. In addition, CHP can have negative impacts on the health of residents and occupiers of the Proposed Development due to link between CHP combustion process and poor air quality. Thus, this technology is not suitable for the development site.

7. BE GREEN: PROPOSALS FOR RENEWABLE ENERGY GENERATION

Low and Zero Carbon Feasibility Study

- 7.1 The next stage in the energy hierarchy is investigating opportunities for producing, storing, and using renewable energy on-site. Generating low carbon energy onsite can reduce reliance on fossil fuels and minimises energy lost through transmission, contributing to security of supply and better connections between energy demand and generation.

Table 7.1: Renewable Energy Feasibility Matrix

TECHNOLOGY PRE-FEASIBILITY		
TECHNOLOGY	OVERVIEW	FEASIBLE
Solar Photovoltaic	Solar Photovoltaic or Photovoltaic Panels (PV) utilise energy in the form of rays of light from the sun and are therefore required to be mounted on either a south facing unobstructed roof or wall to ensure energy output is maximised. Photovoltaic systems convert energy from the sun into electricity through semiconductor cells. Systems consist of semi-conductor cells connected and mounted into modules. Modules are connected to an inverter to turn their direct current (DC) output into alternating current (AC) electricity for use in buildings. Photovoltaics supply electricity to the building they are attached to or to any other load connected to the electricity grid. Excess electricity can be sold to the national grid when the generated power exceeds the local need. PV systems require only daylight, not sunlight to generate electricity (although more electricity is produced with more sunlight), so energy can still be produced in overcast or cloudy conditions. Ideally photovoltaics should face between south-east and south-west, at an elevation of about 30-40°. However, in the UK even flat roofs receive 90% of the energy of an optimum system. PV arrays do not create a nuisance from noise, vibration, odour or fumes and do not impact on air quality. The effectiveness of PV can be maximised with battery technology at a community level and within an individual house. By storing the energy generated in the day rather than exporting unused electricity back to the national grid, the electricity can be used when it is needed, avoiding distribution losses. This technology is becoming more cost effective and considering there is suitable shade free roof space available and daytime electricity demand expected. However, the roof layout could prove difficult to enable the installation and maintenance of PV due to the shape and style of the roof design.	Opportunity: Medium

Solar Thermal	Solar Thermal or Solar Water Heating Systems use the energy from the sun to heat water, most commonly in the UK for domestic hot water needs. The systems use a heat collector, generally mounted on the roof in which a fluid is heated by the sun. This fluid is used to heat up water that is stored in either a separate hot water cylinder or a twin coil hot water cylinder inside the building. The systems work very successfully in all parts of the UK, as they can work in diffuse light conditions. Ideally the collectors should be mounted on a south-facing roof, although south-east/south-west will also function successfully, at an elevation of between 10 and 60°. The panels can be bolted onto the roof or integrated into the roof with lead flashings. Solar water heating systems are suitable for any building type that has sufficient year-round hot water needs (ideally during the day). They require small amount of maintenance & do not create a nuisance from noise, vibration, odour, or fumes and do not impact on air quality. The technology is becoming more cost effective and may be suitable for the development site. However, considering the dominant energy requirement is for domestic hot water and space heating, this technology has therefore not been considered further due to the very large scale of Solar Thermal panels required to meet a portion of the domestic hot water demand.	Opportunity: Medium
Ground Source Heat Pump (GSHP)	Ground source heat pumps are used to extract heat from the ground to provide space and water heating to either individual houses or any type of non-domestic building. Heat pumps take in heat at a certain temperature and release it at a higher temperature, using the same process as a refrigerator. As the ground stays at a fairly constant temperature throughout the year heat pumps can use the ground as the source of heat. The ground temperature is not necessarily much higher than ambient air temperature in winter, but it is more stable whereas air has a vast temperature range. This makes system design more robust. The measure of efficiency of a heat pump is given by the Coefficient of Performance (CoP), which is defined as the ratio of the heat output, divided by quantity of energy put in. A CoP of 4 or more should be achievable with ground source heat pump systems, giving good energy and running cost savings. For ground source systems, the ground pipe system can be horizontal or vertical. For horizontal systems, a coiled or linear pipe network is buried at around two metres depth below ground level, thus requiring a large area of open space depending on the size of the system. For vertical systems, the pipes are placed in holes bored straight into the ground to a depth of 80 to 150 metres depending on ground conditions and size of system. Vertical systems thus require very little ground space but do require access for the drilling rig at the construction stage, though this is unlikely to be greater than for normal construction vehicles. Ground source heat pump systems can be used in almost any size of building. A particular use is where natural gas is not available making the ground source heat pump more economic. Ground source heat pumps cannot be seen from the outside of the building, so aesthetic design is not an issue. Ground source heat pumps will be cost prohibitive for this scheme and will not be explored further based on a balance consideration of the policy requirements, financial viability, and technical feasibility.	Opportunity: Low

Air Source Heat Pump (ASHP)	Air source heat pumps (ASHP) operate in a similar manner to ground source heat pumps but use the heat in external air rather than the ground to release heat at a higher temperature. A water heat pump is where heat from the air generates heat for water, which is then pushed around traditional heating systems like radiators and underfloor heating. As underfloor heating runs better with lower water temperatures than radiators (approx. 45 degrees), air to water heat pumps are considered ideal for the purpose. Air to water systems work by hoovering the air from outside into its body. This air is used to heat a liquid refrigerant, similar to the way a fridge works but in reverse. The liquids temperature is then increased via compression, which is powered by an internal pump. The compressed (now heated) liquid releases its stored heat and can be transferred around the home throughout the normal heating systems such as radiators and underfloor heating. Air source heat pumps systems can provide heating/cooling including DHW to the proposed development at a very high efficiencies (VRF: 3.4 [SCOP/COP] and 5.1 [SEER/EER]; ASHP Underfloor heating: 2.80 [SCOP/COP] and ASHP DHW: 2.70 [SCOP/COP]). This technology will integrate well with the proposed development. In addition, there are no technical feasibility restraints to this technology and only a suitable exterior location is required for the condenser; this can be wall/ground mounted.	Opportunity: High
Water Source Heat Pump (WSHP)	Water source heat pumps (WSHPs) move heat from a source of water into a building in an extremely efficient manner, especially if the water temperature is around 5 to 8 degrees Celsius. As such, there are numerous advantages of installing heat pumps. Depending on the type of heat pump, either the water from a river or small stream is pumped through the heat pump, or a special refrigerant fluid is pumped through pipes laid in the body of water. While both have their own advantages, the latter type requires less maintenance and an easier application process, making it a cheaper option. Water source heat pumps have been in use since the late 1940s. They use a rather constant temperature of the water as an exchange medium instead of extracting the heat from the outdoor air temperature. Thus, water source heat pumps can reach reasonably high efficiencies (300% to 600%) even on the coldest winter nights, in comparison to 175% to 250% for air-source heat pumps on cool days. However, there are no potential enough water sources on or nearby the Proposed Development site.	Opportunity: Low
Geothermal	Geothermal energy is the heat that comes from the sub-surface of the earth. It is contained in the rocks and fluids beneath the earth's crust and can be found as far down to the earth's hot molten rock, magma. To produce power from geothermal energy, wells are dug a mile deep into underground reservoirs to access the steam and hot water there, which can then be used to drive turbines connected to electricity generators. There are three types of geothermal power plants: dry steam, flash & binary. Dry steam is the oldest form of geothermal technology and takes steam out of the ground and uses it to directly drive a turbine. Flash plants use high-pressure hot water into cool, low-pressure water whilst binary plants pass hot water through a secondary liquid with a lower boiling point, which turns to vapour to drive the turbine. Geothermal energy will be cost prohibitive for this scheme and will not be explored further based on a balance consideration of the policy requirements, financial viability, and technical feasibility.	Opportunity: Low

Wind Turbine	Wind turbines are an established means of capturing wind energy and converting it into usable electricity. Wind turbines come in various sizes depending on requirements. A wind turbine usually consists of a nacelle containing a generator connected, sometimes via a gearbox, to a rotor consisting of three blades. Wind turbines harness the power of the wind and use it to generate electricity. For the Proposed development Site, this would be to use to offset the energy used in the energising of equipment and lighting. Excess electricity generated from the wind turbine could be exported to the grid or could be stored in batteries and used when there is no wind. Considering the average wind speed in the area of the development site is 4.5m/s at 10m hub height (less than 5.0 m/s min required for further investigation), wind turbine will be cost prohibitive for this scheme and will not be explored further at this stage.	Opportunity: Low
Small Scale Hydro Power	Small Scale Hydropower or hydroelectricity (typically 100 kW - 30 MW) refers to the conversion of energy from flowing water into electricity. It is considered a renewable energy source because the water cycle is constantly renewed by the sun. Historically, one of the first uses of hydro power was for mechanical milling, such as grinding grains. Today, modern hydro plants produce electricity using turbines and generators, where mechanical energy is created when moving water spins rotors on a turbine. This turbine is connected to an electromagnetic generator, which produce electricity when the turbine spins. However, there are no potential hydro resource on-site in the area of the development site. Moreover, this technology will be cost prohibitive for this scheme and will not be explored further based on a balance consideration of the policy requirements, financial viability, and technical feasibility.	Opportunity: Low
Wave and Tidal Power	Wave and tidal energy harvesting have been around for a few decades. But it has only been in recent years that it has started to become more realistic due to advance in research and technology. Some speculates that wave and tidal energy can supply at least 10 percent of the world's energy consumption. How much power can be harvested is determined mainly on the wave activity. However, the proposed development is not located within reasonable distance to a coastal location. Thus, this technology is not considered feasible and will not be explored further.	Opportunity: Low
Biomass Boiler	Biomass can be burnt directly to provide heat in buildings. Wood from forests, urban tree pruning, farmed coppices or farm and factory waste, is the most common fuel and nowadays is used commercially in the form of wood chips or pellets, although traditional logs are also used. There must be a local and adequate supply of appropriate biomass fuel (normally wood chips or pellets) and room for delivery and storage. Biomass boilers can replace conventional boilers and have no aesthetic impact. However, given the scale of the proposed development including the potential adverse effect on local air quality, biomass boilers are not considered feasible due to potential fuel deliveries issues and Air Quality Management Area (AQMA) for Nitrogen Oxides (NOx) emissions.	Opportunity: Low

Waste Heat	Waste heat is the unused heat given to the surrounding environment (in the form of thermal energy) by a heat engine in a thermodynamic process in which it converts heat to useful work. Waste heat is inevitable for any heat engine and the amount it produces compared to the amount of input heat are factors that make up its thermal efficiency. Waste heat is often dissipated into the atmosphere, or large bodies of water like rivers, lakes and even the ocean. Since waste heat is a necessary product of heat engines, efficiencies of power plants are limited and therefore must burn more fuels in order to achieve their desired energy output. This increases greenhouse gas emissions and contributes more to global warming. Harnessing Waste Heat is mostly seen in industrial processes where more than half of the input energy is turned into waste heat. Capturing waste heat enables it to be redirected to a function that would otherwise be using energy from the grid, and this in turn prevents consumption of power used to counteract the very effects of the waste heat itself. However, it is assumed that the use of the Proposed Development will not involve processes which generate waste heat to be utilised in reducing fossil fuel demand.	Opportunity: Low
Transpired Solar Air Collectors	Transpired Solar Collectors (TSCs) are solar air heating systems made of pre-finished perforated steel skins. Treated to enhance its absorbance of solar energy, the steel skins are installed onto south-facing walls or roofs creating a cavity between the metal skin and the walls or roofs. The most common application of a TSC is for preheating ventilation air, where the ventilation air supply is heated as it passes through the TSC perforated sheet. The heated air is then generally heated further as it passes through the building's HVAC system to reach the desired delivery temperature. In summer, when there may be no requirement to heat the ventilation air supply, TSC systems have a means of bypassing the absorber. Transpired solar collectors are used to pre-heat building. However, this technology is more suited to warehouses or industrial type buildings.	Opportunity: Low
Hydrogen Fuel Cell	Hydrogen is an energy storage medium and environmental benefits are only found where hydrogen is generated from renewable energy sources. However, there is limited market available, high capital and maintenance costs and life expected from fuel stacks is less than 10 years. Hence, the proposed development is not expected to incorporate hydrogen fuel.	Opportunity: Low

Low and Zero Carbon Feasibility Study Summary

- 7.2 From the site-specific renewable energy feasibility assessment, it was found that the most appropriate and cost-effective renewable energy technology for the proposed development is ASHP. Other technologies such as Solar PV, solar thermal, GSHP, WSHP, Waste heat, etc have been discounted based on site constraint, proposed development energy profile and a balanced consideration of the policy requirements, financial viability, and technical feasibility.

8. LOW CARBON DESIGN STRATEGY RESULTS

- 8.1 **Table 8.1** and **8.2** shows the reduction in energy (5.13%) and CO₂ emissions (5.73%) due to the energy efficiency measures, and this is compared with the baseline energy consumption and CO₂ emissions. Refer to **Figure 8.1** & **Appendix 2** for the BRUKL output:

Table 8.1: Energy Efficiency Measures – Energy Consumption Summary

BER: ENERGY EFFICIENCY MEASURES			
	TER Energy (kWh/m ² /yr)	Lean-BER Energy (kWh/m ² /yr)	Green-BER Energy (kWh/m ² /yr)
Heating	36.47	31.37	11.24
Cooling	1.23	1.00	1.00
Hot Water	80.94	77.26	27.47
Auxiliary	13.33	18.04	17.73
Lighting	21.20	11.48	11.48
Total Energy Consumption	153.16	139.15	68.93
Part L 2013 Reduction (%)		9.15 %	50.46 %
Total Savings (%)	59.61 %		

Table 8.2: Energy Efficiency Measures - CO₂ Emissions Consumption Summary

BER: CARBON DIOXIDE EMISSIONS			
	TER CO ₂ (kgCO ₂ /m ² /yr)	Lean-BER CO ₂ (kgCO ₂ /m ² /yr)	Lean-BER CO ₂ (kgCO ₂ /m ² /yr)
CO ₂ Emissions	43.50	39.30	35.30
Part L 2013 Reduction (%)		9.66 %	10.18 %
Total Savings (%)	19.83 %		

- 8.2 The feasibility of renewable energy generation concluded that the most appropriate and cost-effective renewable energy technologies for the Proposed Development is Air Source Heat Pump (ASHP) for space heating and domestic hot water based on a balanced consideration of the policy requirements, financial viability, and technical feasibility.
- 8.3 The following assumptions have been assumed for the ASHP seasonal efficiencies: (VRF: 3.4 [SCOP/COP] and 5.1 [SEER/EER]; ASHP Underfloor heating: 2.80 [SCOP/COP]; and ASHP DHW: 2.70 [SCOP/COP].
- 8.4 Consequently, this Environmental Standards Statement proposes to reduce the CO₂ emissions of the Proposed Development by a total of **19.83 %** when compared with Building Regulations Approved Document Part L2 Target Emissions Rate (TER) Baseline.
- 8.5 This exceeds both the National target to exceed the Part L2 TER Baseline, and Greater Manchester Places for Everyone Joint Development Plan requirement of achieving at least **19.00 %** CO₂ reduction against Part L of the 2013 Building Regulations.

9. BREEAM PRE-ASSESSMENT

- 9.1 BREEAM, which stands for Building Research Establishment Environmental Assessment Method, is a widely used sustainability assessment method which guides and informs developers and architects to masterplan projects, infrastructure, and buildings within the built environment.
- 9.2 This section of the document has therefore been prepared by BWB Consulting to demonstrate the results of the assessment exercise undertaken.

Objectives

- 9.3 One of the requirements relating to the Proposed Development is the achievement of a BREEAM rating of "Very Good".
- 9.4 A BREEAM New Construction 2018 Pre-Assessment has been carried out by BWB Consulting Limited (Jim Benson – a licensed BREEAM Assessor No. JB41) to establish the rating of this proposed development based on information and commitments provided by the Project design team.
- 9.5 The project has been assessed under the 2018 version, Residential Institution (long term stay) – Residential Care Home scheme.

Context

- 9.6 The BRE Environmental Assessment Method (BREEAM) is a holistic measure of the sustainability of both new and majorly refurbished non-domestic buildings.
- 9.7 BREEAM is the leading and most widely used environmental assessment method for buildings and sets the standard for best practice in sustainable design. The objectives of BREEAM are as follows:
- Provide market recognition for low environmental impact buildings
 - Ensure best environmental practice is incorporated in buildings
 - Set criteria and standards surpassing those required by regulations
 - Challenge the market to provide innovative solutions to minimise the environmental impact of the built environment
 - Raise awareness of the benefits of low environmental impact buildings to owners, occupants and operators
 - Allow organisations to demonstrate progress towards corporate environmental objectives

Assessment Process

- 9.8 The BREEAM assessment process awards a number of credits depending upon whether or not the sufficient evidence can be provided to demonstrate that the BREEAM requirements have been fulfilled. For each BREEAM section the number of credits awarded must be determined by a BREEAM assessor in accordance with BREEAM's assessment criteria (detailed in the technical sections of the scheme manual).

- 9.9 One of the strengths of the BREEAM Assessment process is that it examines the performance of a development over a wide range of issues. These issues are weighted according to their perceived importance, with the credits in some sections being more valuable than others.
- 9.10 In order to standardise the BREEAM Assessment process there are a number of issues that are common to all building types. Within these common credits there are a number of mandatory minimum performance requirements that all building types need to achieve in order to secure a particular rating.
- 9.11 Please refer to Table 2 for details of the minimum performance standards for the BREEAM New Construction 2018 scheme. The remaining credits are tradable and give the design team the flexibility to choose which credits to target in order to achieve a particular rating.
- 9.12 The requirements of individual credits vary considerably, both between credits and between schemes. BREEAM aims to assess many aspects of a project, from the initial decisions taken by clients and architects, through the detail of engineering design, to the policies, and agreements reached by, prospective tenants and building owners. was then average to account for the number of dwellings type and area.
- 9.13 The BREEAM assessment is carried out by awarding credits for environmental improvement on each of the issues. Each credit awarded must be supported by full evidence in the form of details documented in the design drawings and specification.
- 9.14 There are additional Innovation Credits available as recognition for buildings that either meets exemplary performance standards for an existing BREEAM credit or for a particular building feature, system or process that is exemplary. This is determined by the BRE on a case by case basis. An additional 1% can be awarded for each innovation credit achieved, up to a maximum of 10%.
- 9.15 On submission and successful QA of the Design Stage Assessment, an interim BREEAM rating is awarded to the development. The development is then assessed again at Post Construction stage upon successful submissions and QA of this report, the final BREEAM rating is awarded by the BRE. Formal certification cannot be achieved until this assessment is completed and submitted to BREEAM for approval.
- 9.16 BWB can make no warranty in respect of BREEAM predictions, as all credits are dependent on supporting evidence being provided to the BREEAM assessor at the time of the formal BREEAM assessment.
- 9.17 Until a formal BREEAM assessment takes place, with supporting evidence provided to a certified BREEAM Assessor and the BRE complete their quality assurance process, no building can claim to hold a BREEAM rating.

BREEAM Thresholds

- 9.18 BREEAM ratings range between 'Pass' and 'Outstanding.' The rating achieved is dependent on the % score achieved and achieving the required minimum standards appropriate to each rating level. Percentage thresholds are given in **Table 9.1:**

Table 9.1: BREEAM Scoring Thresholds

BREEAM Rating	% Score	Sustainability Performance	% Of UK new non-domestic buildings
Outstanding	≥85	Innovator	Less than top 1%
Excellent	≥70	Best Practice	Top 10%
Very Good	≥55	Advanced Good Practice	Top 25%
Good	≥45	Intermediate Good Practice	Top 50%
Pass	≥30	Standard Good Practice	Top 75%
Unclassified	<30		

Minimum Standards

- 9.19 BREEAM requires minimum standards to be met. The minimum standards for Pass, Good, Very Good, Excellent and Outstanding ratings are outlined in **Table 9.2**:

Table 9.2: Minimum Standards by BREEAM Rating Level

BREEAM Issue	Minimum Standards by BREEAM rating level				
	Pass	Good	Very Good	Excellent	Outstanding
Man 03 - Responsible Construction Practices	None	None	None	One credit (Responsible construction management)	One credit (Responsible construction management)
Man 04 - Commissioning & Handover	None	None	One credit (Commissioning-test schedule & responsibilities)	One credit (Commissioning-test schedule & responsibilities)	One credit (Commissioning-test schedule & responsibilities)
Man 04 - Commissioning & Handover	None	None	Criterion 11 (Building User Guide)	Criterion 11 (Building User Guide)	Criterion 11 (Building User Guide)
Man 05 - Aftercare	None	None	None	One credit (Commissioning implementing)	One credit (Commissioning implementing)
Ene 01 - Reduction of energy use and carbon emissions	None	None	None	Four credits (Energy performance)	Six credits (Energy performance), Four credits (Energy modelling)
Ene 02 - Energy Monitoring	None	None	One credit (First sub-metering credit)	One credit (First sub-metering credit)	One credit (First sub-metering credit)
Wat 01 - Water consumption	None	One credit	One credit	One credit	Two credits

Wat 02 - Water monitoring	None	Criterion one only	Criterion one only	Criterion one only	Criterion one only
Mat 03 - Responsible sourcing of materials	Criterion one only	Criterion one only	Criterion one only	Criterion one only	Criterion one only
Wst 01 - Construction Waste Management	None	None	None	None	One credit
Wst 03 - Operational Waste	None	None	None	One credit	One credit

10. BREEAM ASSESSMENT CRITERIA

BREEAM Fully Fitted Assessment

- 10.1 The proposed development will be assessed under 'New Construction' compliance notes. The BREEAM assessment will include all aspects of the design as the building will be fully-fitted.
- 10.2 '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/use for the first time upon completion of the works.
- 10.3 It should be noted that if the required minimum standards are not met then the BREEAM 'Very Good' target rating will not be achieved regardless of overall score. The Minimum Standards Required for Very Good Rating (Fully-Fitted) are:
- i. Man 04 – It is mandatory to prepare a schedule of commissioning and testing, identify the appropriate standards, appoint a project team member to monitor and programme pre-commissioning and for the principal contractor to account for commission within their budget.
 - ii. Man 04 – Building User Guide (Criterion 11 only): It is mandatory to develop two building user guides (non-technical for the occupier) & (technical for manager) prior to handover.
 - iii. Ene 02 – It is mandatory that at least 90% of the estimated energy consumption of each fuel shall be metered using an appropriate energy monitoring and management system.
 - iv. Wat 01 – It must be demonstrated that a reduction of at least 12.5% is achieved for the predicted development water consumption compared to a notional baseline.
 - v. Wat 02 – Water Monitoring (Criterion 1 only): It is mandatory that each unit is provided with a water meter on the main supply to the building.
 - vi. Mat 03 – Responsible Sourcing of Materials (Criterion 1 only): It is mandatory that all timber and timber-based products used on the project are legally harvested and traded timber as per the UK Government's Timber Procurement Policy (TPP).

Scoring Scenarios

- 10.4 The pre—assessment has been undertaken by BWB Consulting Ltd. The proposed development requires a minimum score of at least 55% which equates to a building rating of “Very Good”. The Pre-assessment shows a preliminary score of 55.70%.
- 10.5 The pre-assessment scores have been based on close consultation with the project design team. Given the consultation with the design team and workshops during which the credit criteria were explained and examined, and each credit evaluated and challenged we (BWB Consulting) are confident this pre-assessment provides a robust forecast of the likely BREEAM rating.
- 10.6 There are several additional credits available to the design team and client and these should be considered further to provide a buffer against any current credits not being achieved. **Figure 10.1** below shows the current assessment summary.

Overall Building Performance

Building name	Yew Tree Care Home
BREEAM rating	Very Good
Total Score	55.70%
Min. standards level achieved	Excellent level

Building Performance by Environment Section

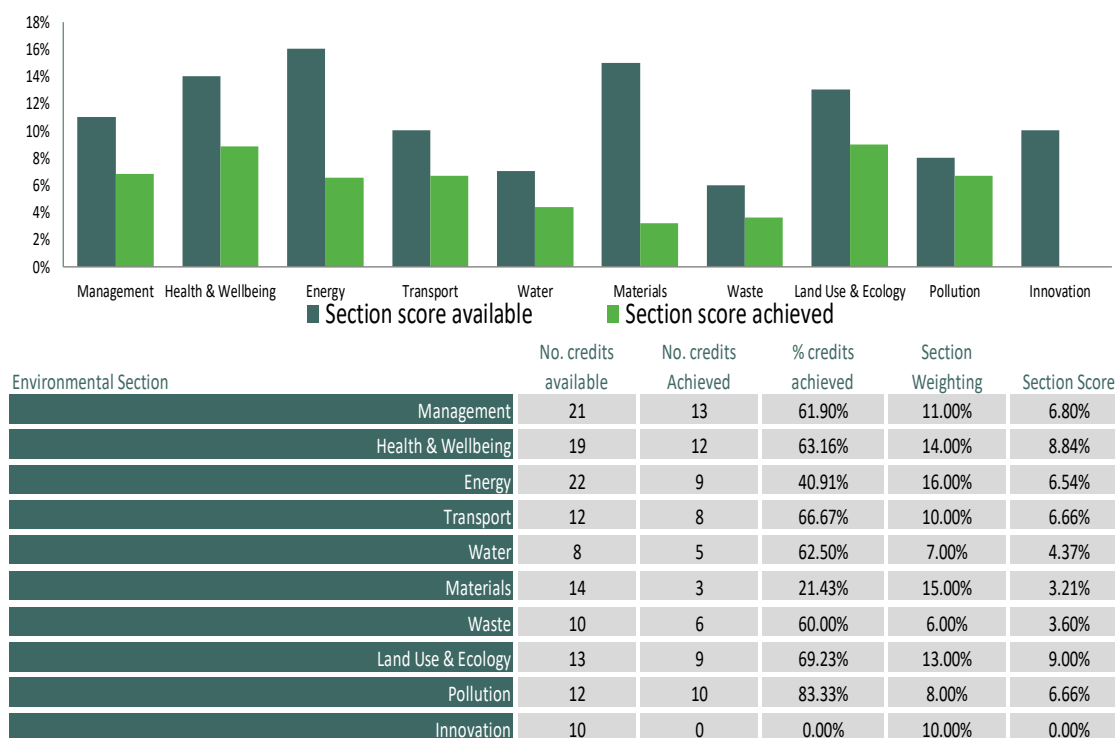


Figure 10.1: Assessment Summary

- 10.7 The individual credit by credit breakdown for each section and contribution to overall rating is contained within the **Appendix 3**.

11. CONCLUSION

- 11.1 This Environmental Standards Statement has been produced for the Proposed Residential Care Home at Land to the North of Yew Tree Lane, Northern Moor in accordance with Manchester City Council's Core Strategy (2012) Policy EN4 and EN6 following the guidance detailed in the Greater Manchester Places for Everyone Joint Development Plan (2021) Policy JP-S 2.
- 11.2 This Environmental Standards Statement sets a framework for the Energy and Sustainability Strategy for the Proposed Development Site and outlines the Proposed Development's approach to energy efficiency, renewable energy generation and sustainable development incorporating climate change resilience and carbon management measures. It summarises the key planning policy which is pertinent at the time of writing and is aimed at satisfying both energy and sustainable design related requirements.
- 11.3 The Proposed Development will adopt the use of an energy hierarchy and a holistic approach to sustainability to meet National best practice guidance and Manchester City Council's objectives for energy consumption reduction, carbon dioxide emissions [CO₂] reduction and sustainable design and construction. The energy hierarchy aims to reduce energy demand and CO₂ emissions through passive design measures and a 'fabric first' approach (Be Lean) before seeking to reduce the remaining demand by the cleanest means possible. This includes exploiting local energy resources/supplying energy efficiently and cleanly (Be Clean), and finally exploring the opportunities for producing, storing, and using renewable energy on-site (Be Green).

Energy Summary

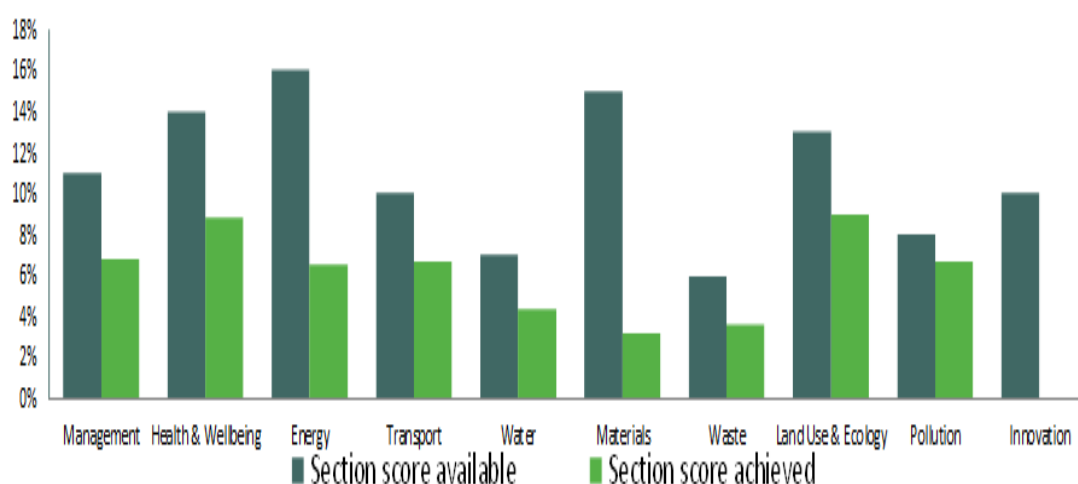
- 11.4 Be Lean Summary: The Proposed Development envelope and services will be specified to exceed the minimum standards set in Building Regulations Part L to ensure energy consumption via space heating/cooling is reduced. In addition, passive solar considerations have formed an integral part of the Proposed Development design. Analysis using Part L Criterion 3 has been carried out on the facades to ensure solar gains and heating loads are reduced, hence providing a more comfortable internal environment for occupants.
- 11.5 Be Clean Summary: A study into the feasibility of connecting to a district heating network was undertaken. Result shows that there are no nearby operational district heating or planned district heat networks within 500m of the development site. Accordingly, district heating will not be considered for the project. Nevertheless, the Proposed Development could be left with spare valve connections, capable for connection into the future heat network, should the applicant wish. In addition, on-site heat generating technology such as CHP was investigated. However, the benefit of this technology is significantly reduced as more grid energy is produced from renewable sources i.e., the rapid decarbonisation of the electricity grid means that technologies such as CHP will not achieve the carbon savings they have to date.
- 11.6 Be Green Summary: The feasibility of renewable energy generation concluded that the most appropriate and cost-effective renewable energy technologies for the Proposed Development is Air Source Heat Pump (ASHP) for space heating and domestic hot water

based on a balanced consideration of the policy requirements, financial viability, and technical feasibility. Consequently, this Environmental Standards Statement proposes to reduce the CO₂ emissions of the Proposed Development by a total of **19.83 %** when compared with Building Regulations Approved Document Part L2 Target Emissions Rate (TER) Baseline. This exceeds Greater Manchester Places for Everyone Joint Development Plan requirement of achieving at least **19.00 %** CO₂ reduction against Part L of the 2013 Building Regulations.

Sustainability (BREEAM Pre-Assessment) Summary

- 11.7 A BREEAM New Construction 2018 Pre-Assessment has also been carried out by Jim Benson (licensed BREEAM Assessor) to establish the rating of the Proposed Development based on information and commitments provided by the Project design team.
- 11.8 Given the consultation with the design team and workshop during which the credit criteria were explained and examined, and each credit evaluated we (BWB Consulting) are confident this pre-assessment provides a robust forecast of the likely BREEAM rating as detailed below:

Building Performance by Environment Section



- 11.9 The BREEAM pre-assessment has demonstrated how the Proposed Development can achieve a BREEAM **'Very Good'** rating. An expected BREEAM score of **55.70%** will be achieved if the recommendations are followed.
- 11.10 It should be ensured that all mandatory credits are achieved as required for BREEAM 'Very Good,' otherwise this target rating cannot be achieved. As it stands the mandatory credits have been achieved to "Excellent" level. It is felt prudent at this stage to look at potential additional credits to provide a buffer should any current credits fail to be achieved.
- 11.11 This Environmental Standards Statement presents a vision for the Proposed Residential Care Home at Land to the North of Yew Tree Lane, Northern Moor to deliver a secure, sustainable, low carbon design driven by innovative technologies, enabling the Proposed Development to achieve any National and Local carbon/energy reduction targets whilst reducing its reliance on the UK National Grid.

12. APPENDICES

APPENDIX 1: Part L (Be-Lean) BRUKL Report

Project name

Proposed Care Home Yewtree Lane**As designed****Date:** Thu Jun 30 13:06:33 2022**Administrative information****Building Details****Address:** Proposed Care Home, Yewtree Lane, Northern Moor, Wythenshawe, M23 0EA**Certification tool****Calculation engine:** Apache**Calculation engine version:** 7.0.15**Interface to calculation engine:** IES Virtual Environment**Interface to calculation engine version:** 7.0.15**BRUKL compliance check version:** v5.6.b.0**Certifier details****Name:** BWB Consulting Limited**Telephone number:** 0113 233 8000**Address:** Whitehall Waterfront, 2 Riverside Way, Leeds, LS1 4EH**Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target**

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	43.5
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	43.5
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	39.3
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

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

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

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.18	0.18	SH000046:Surf[0]
Floor	0.25	0.15	0.15	SH000046:Surf[2]
Roof	0.25	0.15	0.15	0000002E:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.4	1.6	SH000028:Surf[6]
Personnel doors	2.2	-	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² 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 ³ /(h.m ²) 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	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- Underfloor Heating (Boiler) Be-Lean

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.5	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- Split System (ASHP - Comms)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.4	5.1	-	-	-
Standard value	2.5*	2.6	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- AHU (Underfloor - Boiler) Be-Lean

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.5	1.5	0.85
Standard value	0.91	N/A	N/A	1.5^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

4- AHU (Boiler and Chiller) Be-Lean

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	5.1	0	1.5	0.85
Standard value	0.91*	3.2	N/A	1.6^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

1- Gas-Fired Water Heater (Be-Lean)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.96	0.005
Standard value	0.8	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		Zone	Standard
00_BF_WC	-	-	0.3	-	-	-	-	-	-	-	-	N/A
00_GF_Assisted Bathroom	-	-	0.3	-	-	-	-	-	-	-	-	N/A
00_GF_Assisted WC	-	-	0.3	-	-	-	-	-	-	-	-	N/A
00_GF_Sluice	-	-	0.3	-	-	-	-	-	-	-	-	N/A
00_GF_Visitor WC	-	-	0.3	-	-	-	-	-	-	-	-	N/A
01_FF_Assisted Bathroom	-	-	0.3	-	-	-	-	-	-	-	-	N/A
01_FF_Assisted WC	-	-	0.3	-	-	-	-	-	-	-	-	N/A
01_FF_Assisted WC	-	-	0.3	-	-	-	-	-	-	-	-	N/A
01_FF_Sluice	-	-	0.3	-	-	-	-	-	-	-	-	N/A
02_SF_Assisted Bathroom	-	-	0.3	-	-	-	-	-	-	-	-	N/A
02_SF_Assisted WC	-	-	0.3	-	-	-	-	-	-	-	-	N/A
02_SF_Sluice	-	-	0.3	-	-	-	-	-	-	-	-	N/A

"LENI calculation for lighting energy provided in a separate submission."

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?
00_BF_Comms	N/A	N/A
00_BF_Staff Room	N/A	N/A
00_GF_Admin Office	NO (-92.6%)	NO
00_GF_Bedroom_001	NO (-73.8%)	NO
00_GF_Bedroom_002	NO (-66.9%)	NO
00_GF_Bedroom_003	NO (-63.4%)	NO
00_GF_Bedroom_004	NO (-63.7%)	NO
00_GF_Bedroom_006	NO (-62.4%)	NO
00_GF_Bedroom_006	NO (-65.8%)	NO
00_GF_Bedroom_007	NO (-79.8%)	NO
00_GF_Bedroom_008	NO (-86.2%)	NO
00_GF_Bedroom_009	NO (-75.4%)	NO
00_GF_Bedroom_010	NO (-82.6%)	NO
00_GF_Bedroom_011	NO (-83%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00_GF_Bedroom_012	NO (-77.6%)	NO
00_GF_Bedroom_013	NO (-65.5%)	NO
00_GF_Bedroom_014	NO (-79%)	NO
00_GF_Bedroom_015	NO (-77.7%)	NO
00_GF_Bedroom_016	NO (-63.9%)	NO
00_GF_Bedroom_017	NO (-54.2%)	NO
00_GF_Bedroom_018	NO (-54%)	NO
00_GF_Bedroom_019	NO (-54.9%)	NO
00_GF_Bedroom_020	NO (-62.4%)	NO
00_GF_Dining	NO (-77.7%)	NO
00_GF_Lounge	NO (-81.3%)	NO
00_GF_Manager Office	NO (-39.1%)	NO
00_GF_Nurse Station	N/A	N/A
00_GF_Reception	NO (-71.8%)	NO
01_FF_Bedroom_021	NO (-69.1%)	NO
01_FF_Bedroom_022	NO (-63.7%)	NO
01_FF_Bedroom_023	NO (-61.9%)	NO
01_FF_Bedroom_024	NO (-62.8%)	NO
01_FF_Bedroom_025	NO (-64.7%)	NO
01_FF_Bedroom_026	NO (-62.4%)	NO
01_FF_Bedroom_027	NO (-79.7%)	NO
01_FF_Bedroom_028	NO (-86%)	NO
01_FF_Bedroom_029	NO (-75.2%)	NO
01_FF_Bedroom_030	NO (-82.3%)	NO
01_FF_Bedroom_031	NO (-82.7%)	NO
01_FF_Bedroom_032	NO (-76.5%)	NO
01_FF_Bedroom_033	NO (-62.7%)	NO
01_FF_Bedroom_034	NO (-78.3%)	NO
01_FF_Bedroom_035	NO (-77.6%)	NO
01_FF_Bedroom_036	NO (-63.9%)	NO
01_FF_Bedroom_037	NO (-54.1%)	NO
01_FF_Bedroom_038	NO (-54%)	NO
01_FF_Bedroom_039	NO (-54.8%)	NO
01_FF_Bedroom_040	NO (-62.4%)	NO
01_FF_Bedroom_041	NO (-62.4%)	NO
01_FF_Bedroom_042	NO (-64.8%)	NO
01_FF_Dining	NO (-74.8%)	NO
01_FF_Hair & Beauty Salon	NO (-78.4%)	NO
01_FF_Lounge	NO (-82.7%)	NO
01_FF_Nurse Station	N/A	N/A
02_SF_Lounge	NO (-74.5%)	NO
02_SF_Nurse Station	N/A	N/A
02_SF_Activity Room	NO (-83.4%)	NO
02_SF_Bedroom_043	NO (-84.4%)	NO
02_SF_Bedroom_044	NO (-84.2%)	NO
02_SF_Bedroom_045	NO (-84.1%)	NO
02_SF_Bedroom_046	NO (-75.2%)	NO
02_SF_Bedroom_047	NO (-83.5%)	NO
02_SF_Bedroom_048	NO (-89.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
02_SF_Bedroom_049	NO (-84.4%)	NO
02_SF_Bedroom_050	NO (-86.3%)	NO
02_SF_Bedroom_051	NO (-89.4%)	NO
02_SF_Bedroom_052	NO (-78.8%)	NO
02_SF_Bedroom_053	NO (-79.3%)	NO
02_SF_Bedroom_054	NO (-62.3%)	NO
02_SF_Bedroom_055	NO (-62.1%)	NO
02_SF_Bedroom_056	NO (-62.5%)	NO
02_SF_Bedroom_057	NO (-62.3%)	NO
02_SF_Bedroom_058	NO (-62.3%)	NO
02_SF_Bedroom_059	NO (-61.8%)	NO
02_SF_Dining	NO (-61.3%)	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?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	3062.1	3062.1
External area [m ²]	3878.2	3878.2
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	1091.75	1719.53
Average U-value [W/m ² K]	0.28	0.44
Alpha value* [%]	10	10

* 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
A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
B1 Offices and Workshop businesses
B2 to B7 General Industrial and Special Industrial Groups
B8 Storage or Distribution
C1 Hotels
100 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/m²]

	Actual	Notional
Heating	31.37	36.47
Cooling	1	1.23
Auxiliary	18.04	13.33
Lighting	11.48	21.2
Hot water	77.26	80.94
Equipment*	51.33	51.33
TOTAL**	139.15	153.16

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

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

Energy Production by Technology [kWh/m²]

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

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	110.71	129.95
Primary energy* [kWh/m ²]	226.23	250.27
Total emissions [kg/m ²]	39.3	43.5

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

HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Constant volume system (fixed fresh air rate), [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	0.3	95.3	0.1	8.9	74	1.1	2.98	0.91	5.1
	Notional	1.6	148.7	0.5	10.9	41.4	0.86	3.79	----	----
[ST] Central heating using water: floor heating, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	197.4	0	64.2	0	5.9	0.85	0	0.91	0
	Notional	215.3	0	69.4	0	5	0.86	0	----	----
[ST] Central heating using air distribution, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	43.8	0	11.8	0	15.8	1.03	0	0.91	0
	Notional	56.4	0	18.2	0	14.3	0.86	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	0	0	0	0	0	3.33	3.81	3.4	5.1
	Notional	0	0	0	0	0	2.56	3.79	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

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 _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.18	SH000046:Surf[0]
Floor	0.2	0.15	SH000046:Surf[2]
Roof	0.15	0.15	0000002E:Surf[0]
Windows, roof windows, and rooflights	1.5	1.4	SH00002A:Surf[0]
Personnel doors	1.5	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building
U _{i-Typ} = Typical individual element U-values [W/(m²K)]			U _{i-Min} = 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

APPENDIX 2: Part L (Be-Green) BRUKL Report

Project name

Proposed Care Home Yewtree Lane**As designed****Date:** Thu Jun 30 12:54:48 2022**Administrative information****Building Details****Address:** Proposed Care Home, Yewtree Lane, Northern Moor, Wythenshawe, M23 0EA**Certification tool****Calculation engine:** Apache**Calculation engine version:** 7.0.15**Interface to calculation engine:** IES Virtual Environment**Interface to calculation engine version:** 7.0.15**BRUKL compliance check version:** v5.6.b.0**Certifier details****Name:** BWB Consulting Limited**Telephone number:** 0113 233 8000**Address:** Whitehall Waterfront, 2 Riverside Way, Leeds, LS1 4EH**Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target**

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	38.2
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	38.2
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	35.3
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

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

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

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.18	0.18	SH000046:Surf[0]
Floor	0.25	0.15	0.15	SH000046:Surf[2]
Roof	0.25	0.15	0.15	0000002E:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.4	1.6	SH000028:Surf[6]
Personnel doors	2.2	-	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² 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 ³ /(h.m ²) 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	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- Underfloor Heating (ASHP) Be-Green

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.8	-	0.5	-	-
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					YES
* 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.					

2- Split System (ASHP - Comms)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.4	5.1	-	-	-
Standard value	2.5*	2.6	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- AHU (Underfloor - ASHP) Be-Green

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.8	-	0.5	1.5	0.85
Standard value	2.5*	N/A	N/A	1.5^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

4- AHU (ASHP - VRF System) Be-Green

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.4	5.1	0	1.5	0.85
Standard value	2.5*	3.2	N/A	1.6^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

5- Underfloor Heating (Boiler) Be-Lean

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.5	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

1- ASHP Water Heater (Be Green)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	2.7	0.005
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		Zone	Standard
00_BF_WC	-	-	0.3	-	-	-	-	-	-	-	-	N/A
00_GF_Assisted Bathroom	-	-	0.3	-	-	-	-	-	-	-	-	N/A
00_GF_Assisted WC	-	-	0.3	-	-	-	-	-	-	-	-	N/A
00_GF_Sluice	-	-	0.3	-	-	-	-	-	-	-	-	N/A
00_GF_Visitor WC	-	-	0.3	-	-	-	-	-	-	-	-	N/A
01_FF_Assisted Bathroom	-	-	0.3	-	-	-	-	-	-	-	-	N/A
01_FF_Assisted WC	-	-	0.3	-	-	-	-	-	-	-	-	N/A
01_FF_Assisted WC	-	-	0.3	-	-	-	-	-	-	-	-	N/A
01_FF_Sluice	-	-	0.3	-	-	-	-	-	-	-	-	N/A
02_SF_Assisted Bathroom	-	-	0.3	-	-	-	-	-	-	-	-	N/A
02_SF_Assisted WC	-	-	0.3	-	-	-	-	-	-	-	-	N/A
02_SF_Sluice	-	-	0.3	-	-	-	-	-	-	-	-	N/A

"LENI calculation for lighting energy provided in a separate submission."

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?
00_BF_Comms	N/A	N/A
00_BF_Staff Room	N/A	N/A
00_GF_Admin Office	NO (-92.6%)	NO
00_GF_Bedroom_001	NO (-73.8%)	NO
00_GF_Bedroom_002	NO (-66.9%)	NO
00_GF_Bedroom_003	NO (-63.4%)	NO
00_GF_Bedroom_004	NO (-63.7%)	NO
00_GF_Bedroom_006	NO (-62.4%)	NO
00_GF_Bedroom_006	NO (-65.8%)	NO
00_GF_Bedroom_007	NO (-79.8%)	NO
00_GF_Bedroom_008	NO (-86.2%)	NO
00_GF_Bedroom_009	NO (-75.4%)	NO
00_GF_Bedroom_010	NO (-82.6%)	NO
00_GF_Bedroom_011	NO (-83%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00_GF_Bedroom_012	NO (-77.6%)	NO
00_GF_Bedroom_013	NO (-65.5%)	NO
00_GF_Bedroom_014	NO (-79%)	NO
00_GF_Bedroom_015	NO (-77.7%)	NO
00_GF_Bedroom_016	NO (-63.9%)	NO
00_GF_Bedroom_017	NO (-54.2%)	NO
00_GF_Bedroom_018	NO (-54%)	NO
00_GF_Bedroom_019	NO (-54.9%)	NO
00_GF_Bedroom_020	NO (-62.4%)	NO
00_GF_Dining	NO (-77.7%)	NO
00_GF_Lounge	NO (-81.3%)	NO
00_GF_Manager Office	NO (-39.1%)	NO
00_GF_Nurse Station	N/A	N/A
00_GF_Reception	NO (-71.8%)	NO
01_FF_Bedroom_021	NO (-69.1%)	NO
01_FF_Bedroom_022	NO (-63.7%)	NO
01_FF_Bedroom_023	NO (-61.9%)	NO
01_FF_Bedroom_024	NO (-62.8%)	NO
01_FF_Bedroom_025	NO (-64.7%)	NO
01_FF_Bedroom_026	NO (-62.4%)	NO
01_FF_Bedroom_027	NO (-79.7%)	NO
01_FF_Bedroom_028	NO (-86%)	NO
01_FF_Bedroom_029	NO (-75.2%)	NO
01_FF_Bedroom_030	NO (-82.3%)	NO
01_FF_Bedroom_031	NO (-82.7%)	NO
01_FF_Bedroom_032	NO (-76.5%)	NO
01_FF_Bedroom_033	NO (-62.7%)	NO
01_FF_Bedroom_034	NO (-78.3%)	NO
01_FF_Bedroom_035	NO (-77.6%)	NO
01_FF_Bedroom_036	NO (-63.9%)	NO
01_FF_Bedroom_037	NO (-54.1%)	NO
01_FF_Bedroom_038	NO (-54%)	NO
01_FF_Bedroom_039	NO (-54.8%)	NO
01_FF_Bedroom_040	NO (-62.4%)	NO
01_FF_Bedroom_041	NO (-62.4%)	NO
01_FF_Bedroom_042	NO (-64.8%)	NO
01_FF_Dining	NO (-74.8%)	NO
01_FF_Hair & Beauty Salon	NO (-78.4%)	NO
01_FF_Lounge	NO (-82.7%)	NO
01_FF_Nurse Station	N/A	N/A
02_SF_Lounge	NO (-74.5%)	NO
02_SF_Nurse Station	N/A	N/A
02_SF_Activity Room	NO (-83.4%)	NO
02_SF_Bedroom_043	NO (-84.4%)	NO
02_SF_Bedroom_044	NO (-84.2%)	NO
02_SF_Bedroom_045	NO (-84.1%)	NO
02_SF_Bedroom_046	NO (-75.2%)	NO
02_SF_Bedroom_047	NO (-83.5%)	NO
02_SF_Bedroom_048	NO (-89.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
02_SF_Bedroom_049	NO (-84.4%)	NO
02_SF_Bedroom_050	NO (-86.3%)	NO
02_SF_Bedroom_051	NO (-89.4%)	NO
02_SF_Bedroom_052	NO (-78.8%)	NO
02_SF_Bedroom_053	NO (-79.3%)	NO
02_SF_Bedroom_054	NO (-62.3%)	NO
02_SF_Bedroom_055	NO (-62.1%)	NO
02_SF_Bedroom_056	NO (-62.5%)	NO
02_SF_Bedroom_057	NO (-62.3%)	NO
02_SF_Bedroom_058	NO (-62.3%)	NO
02_SF_Bedroom_059	NO (-61.8%)	NO
02_SF_Dining	NO (-61.3%)	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?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	3062.1	3062.1
External area [m ²]	3878.2	3878.2
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	1091.75	1719.53
Average U-value [W/m ² K]	0.28	0.44
Alpha value* [%]	10	10

* 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
A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
B1 Offices and Workshop businesses
B2 to B7 General Industrial and Special Industrial Groups
B8 Storage or Distribution
C1 Hotels
100 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/m²]

	Actual	Notional
Heating	11.24	12.96
Cooling	1	1.23
Auxiliary	17.73	13.33
Lighting	11.48	21.2
Hot water	27.47	27.28
Equipment*	51.33	51.33
TOTAL**	68.93	76

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

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

Energy Production by Technology [kWh/m²]

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

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	110.71	129.95
Primary energy* [kWh/m ²]	208.74	225.69
Total emissions [kg/m ²]	35.3	38.2

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

HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Constant volume system (fixed fresh air rate), [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	0.3	95.3	0	8.9	74	4.1	2.98	3.4	5.1	
Notional	1.6	148.7	0.2	10.9	41.4	2.56	3.79	----	----	
[ST] Central heating using water: floor heating, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	1523.9	0	495.3	0	5	0.85	0	0.91	0	
Notional	998.3	0	321.7	0	2.5	0.86	0	----	----	
[ST] Central heating using water: floor heating, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	187	0	19.8	0	5.2	2.63	0	2.8	0	
Notional	209.1	0	22.7	0	5.1	2.56	0	----	----	
[ST] Central heating using air distribution, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	43.8	0	3.8	0	15.8	3.17	0	2.8	0	
Notional	56.4	0	6.1	0	14.3	2.56	0	----	----	
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	0	0	0	0	0	3.33	3.81	3.4	5.1	
Notional	0	0	0	0	0	2.56	3.79	----	----	
[ST] No Heating or Cooling										
Actual	0	0	0	0	0	0	0	0	0	
Notional	0	0	0	0	0	0	0	----	----	

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEEF	= 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 _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.18	SH000046:Surf[0]
Floor	0.2	0.15	SH000046:Surf[2]
Roof	0.15	0.15	0000002E:Surf[0]
Windows, roof windows, and rooflights	1.5	1.4	SH00002A:Surf[0]
Personnel doors	1.5	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building
U _{i-Typ} = Typical individual element U-values [W/(m²K)]			U _{i-Min} = 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

APPENDIX 3: BREEAM Assessment Breakdown

General information

BRE Assessment reference no.	TBC	*
Client name	Liberty Care	*
Building end user/occupier	Liberty Care	
Assessor name	Jim Benson	*
Assessors role	Assessor	*
Assessor organisation	BWB Consulting	*

Building details

Building name	Yew Tree Care Home	*
Building address	Yewtree Lane	*
	Wythenshawe	
County	Greater Manchester	*
Post code		
Country	England	*
BREEAM scheme	New Construction	
BREEAM version	2018 (SD5078)	
BREEAM UK 2018 technical manual issue number	SD5078 Issue 3.0	*
Project scope	Fully fitted	*
Building type (main description)	Residential institution (long term stay)	*
Building type (sub-group)	Residential institution (long term stay) - Residential care home	*
Does this healthcare building have inpatient areas?		*
Does this industrial building have an office area, or other occupied spaces?		*
Does this prison building/development have an publicly accessible buildings/areas or car parking areas?		*
Assessment stage	Design (interim)	*
Building floor area (GIA) m ²	3056	*
Building floor area (NIFA) m ²	2700	*
Is the building designed to be untreated?	No	*
Building services - heating system type	Wet system	*
Building services - cooling system type	Comfort cooling	*
Are commercial or industrial-sized refrigeration and storage systems specified?	No	*
Are building user lifts present?	Yes	*
Are building user escalators or moving walks present?	No	*
Are laboratories present?	No	*
What percentage of total building area do laboratories represent?		*
Are there fume cupboard(s) and/or other containment devices present?		*
Are there any water demands present other than those assessed in Wat 01?	No	*
Does the building have external areas within the boundary of the assessed development?	Yes	*
Are there statutory requirements, or other issues outside of the control of the project, that impact the ability to provide outdoor space?	No	*
Are there any systems specified that contribute to the unregulated energy load?	Yes	*
Are the post-occupancy stage credits targeted in Ene 01?	No	*

Project team details

Developer	Liberty Carre
Principal contractor	TBC
Architect	C Squared Architects
Project management	
Building services	
BREEAM Accredited Professional	
Other project team member 1	
Other project team member 2	
Other project team member 3	
Other project team member 4	

BREEAM assessor declaration of assessment accuracy and quality

I, Jim Benson, a qualified BREEAM assessor working on behalf of BWB Consulting confirm that the content of this report is to the best of my knowledge a true and accurate reflection of the performance of the above named building, as measured against the assessment criteria and reporting requirements of the BREEAM Scheme Document (SD5078). Furthermore, I confirm that this assessment and the information on which it is based has been checked and verified in accordance with BRE Global Ltd's UKAS accredited BREEAM operating procedures for BREEAM assessments and assessors, as described in the technical scheme document (SD5078) and associated BREEAM operational documents.

BREEAM Assessor Signature:	Date
----------------------------	------

Disclaimer

This report is made on behalf of BWB Consulting. By receiving the report and acting on it, the client - or any third party relying on it - accepts that no individual is personally liable in contract, tort or breach of statutory duty (including negligence).

Disclaimer

Conflict of Interest - Where an assessor is employed by the same company as a project/design team member(s) (e.g. energy assessor, suitably qualified ecologist or client representative etc) they must identify and manage any potential conflicts of interest and inform BRE Global Ltd as soon as they become aware of such a conflict. Where possible this should be made clear to BREEAM upon registration of the assessment.

BRE Global do prohibit an assessor from verifying compliance with scheme criteria where they themselves have been directly involved in achieving or implementing a compliant solution, i.e. an assessor cannot assess their own work, for example they cannot be the architect on a project and the assessor. A current exception to this rule is where the assessor is also acting as an accredited BREEAM Advisory Professional on the project.

Where there is a conflict of interest or potential for one, BRE Global Ltd will escalate the assessment report to a more detailed level of quality assurance checking. This will be done to reduce the risk to assessors and clients in the event that a certification outcome is challenged. Additional levels of monitoring may result in additional charges (FS036) being made to the licensed organisation that employs the assessor.

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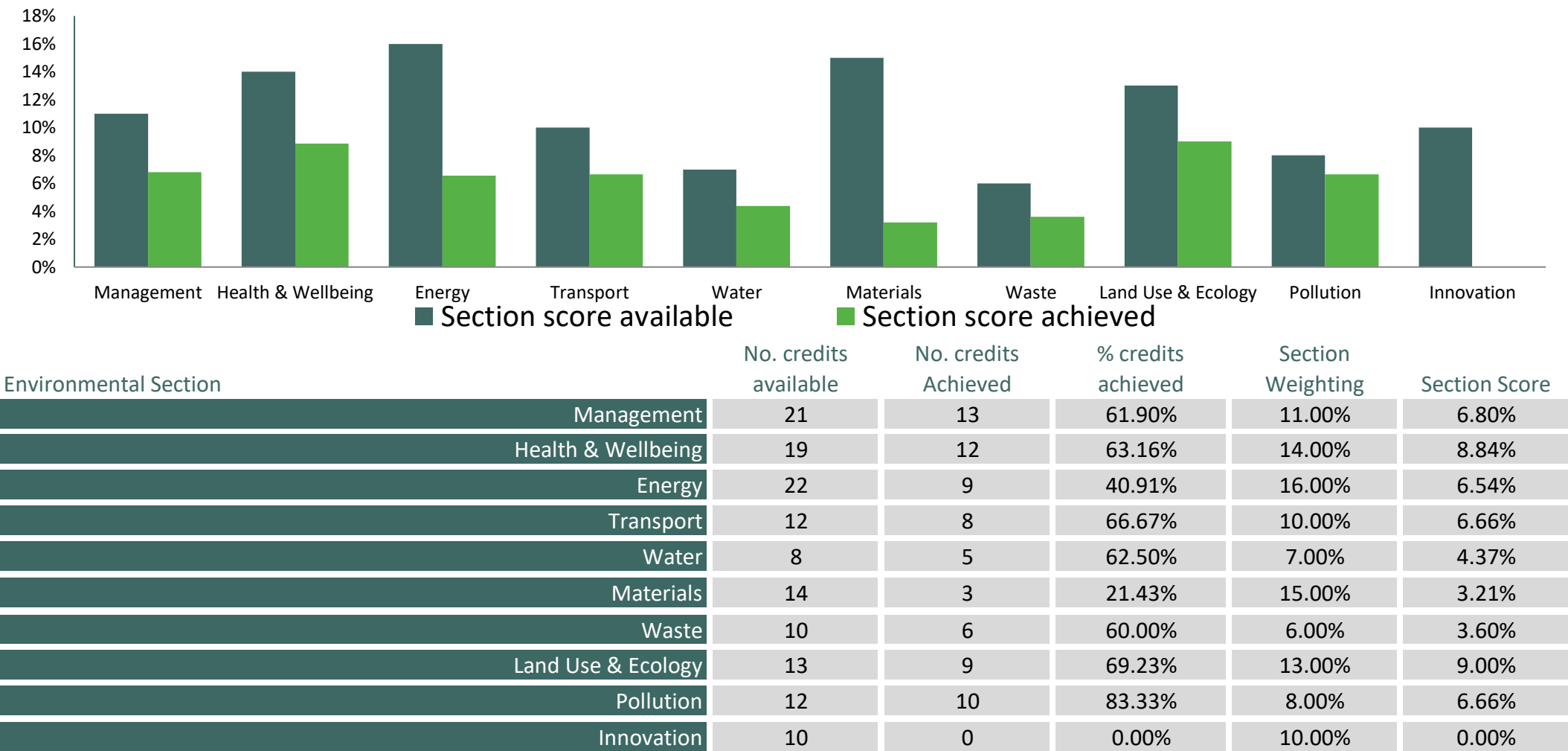
BREEAM UK New Construction 2018 Assessment Report: Rating & Key Performance Indicators

BREEAM® UK
delivered by bre

Overall Building Performance

Building name	Yew Tree Care Home
BREEAM rating	Very Good
Total Score	55.70%
Min. standards level achieved	Excellent level

Building Performance by Environment Section



Building Performance by Key Environmental Performance Indicator

Energy (consumption/production)	Life cycle stage	Measurement	Intensity	Units	Total	Units
Building operation ^[1]	Use	Modelled	1000.00	kWh/m ² /yr	3056000	kWh/yr
Energy production ^[2]	Use	Modelled	INA	kWh/m ² /yr	INA	kWh/yr
Construction process ^[3]	INA	INA	INA	INA	INA	INA

Carbon dioxide Emissions

BREEAM UK 2018 technical manual issue number						
Building operation ^[1]	Use	Modelled	INA	kgCO ₂ eq/m ² /yr	INA	kgCO ₂ eq/yr
Construction process ^[3]	INA	INA	INA	INA	INA	INA
Transport ^[4]	INA	INA	INA	INA	INA	INA
Direct GHG emissions - Refrigerants ^[6]	Use	Modelled	900.00	KgCO ₂ eq/kW _{coolth}	INA	KgCO ₂ eq

Use of freshwater resource

Building operation ^[8]	INA	INA	INA	INA	INA	INA
Construction process ^[9]	INA	INA	INA	INA	INA	INA

Construction waste and recovery

Construction waste ^[10]	Construction	Target	2.00	tonnes/100m2	10	tonnes
Construction waste diverted from landfill ^[10]	Construction	Target	80	%	10	tonnes
Demolition waste diverted from landfill ^[11]	Construction	Target	20	%	INA	INA
Demolition waste to disposal ^[11]	Construction	Target	-19	%	INA	INA
Material for re-use ^[12]	Construction	Target	0.03	tonnes/100m2	80	tonnes
Material for recycling ^[12]	Construction	Target	INA	tonnes/100m2	INA	tonnes
Material for energy recovery ^[12]	Construction	Target	INA	tonnes/100m2	INA	tonnes
Hazardous waste to disposal ^[12]	Construction	Target	INA	tonnes/100m2	INA	tonnes

Sourcing of materials

Materials responsibly sourced ^[13]	Construction	Measured	0	%	-	-
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Thermal comfort

Predicted Mean Vote (PMV)	Use	Modelled	INA	Index	-	-
Predicted Percentage Dissatisfied (PPD)	Use	Modelled	INA	%	-	-

Indoor Air Quality

Formaldehyde concentration level ^[14]	INA	INA	-	INA	INA	INA
Total volatile organic compound concentration ^[14]	INA	INA	INA	INA	INA	INA

Notes

- 1
- Modelled using approved software compliant with the UK's National Calculation Method which in turn is compliant with Article 3 of The Energy Performance of Buildings Directive (EPBD) 2002/91/EC. Modelling includes building energy consumption resulting from the specification of a 'controlled', 'fixed building service' (as defined in the relevant Approved Document or Guidance produced for each UK territory).
- 2
- The reported impact includes technologies that produce energy (on-site and/or near-site) as defined by Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.
- 3
- The reported impact includes energy consumption from construction plant, equipment and site accommodation. This KPI is not assessed/reported at the design stage of assessment/certification.
- 4
- The reported impact covers transport of the construction materials that make-up the main building elements and ground works and landscaping materials (from the factory gate to the site) and construction waste (from the construction gate to waste disposal processing / recovery centre gate). Main building elements are defined in the BREEAM 2018 New Construction Technical Guide (SD5076). This KPI is not assessed/reported at the design stage of assessment/certification.
- 5
- The reported impact covers the construction materials that make-up the main building elements (over a 60 year study period). Main building elements are defined in the BREEAM UK New Construction 2018 Technical Guide (SD5076). The data is quantified using BRE's Environmental Profiles Methodology. The Environmental Profiles Methodology has been peer reviewed to comply with BS ISO 14040 and represents the Product Category Rules for BRE Global's environmental labelling scheme (EPD - ISO 14025, Type III) for construction products and elements.
- 6
- The reported impact is for a 10 year study period. The calculation of the Direct Effect Life Cycle CO₂eq emissions used by BREEAM is based on the Total Equivalent Warming Impact (TEWI) calculation method for new stationary refrigeration and air conditioning systems, as described in Annex B of BS EN 378-1:2008.
- 7
- The reported impact covers emissions from either one or a combination of space heating, cooling and hot water heating (refer to Pol02 Assessment Issue for scope of emissions)
- 8
- The reported impact includes net water consumption from the micro-components utilised by building occupants for sanitary purposes. The impact accounts for water recycling/rainwater collection, where used for permissible non-potable water demands (For further detail refer to BREEAM UK New Construction 2018 Technical Guide (SD5076)).
- 9
- The reported impact is net water consumption i.e. accounts for any water recycling/rainwater collection used to off-set a potable site demand. This KPI is not assessed/reported at the design stage of assessment/certification.
- 10
- The reported impact covers non-hazardous waste from new construction materials, it therefore excludes hazardous and demolition and excavation waste. Where assessed and reported at the design stage of assessment this KPI is based on a target as reported in a compliant Resource Management Plan.
- 11
- The reported impact covers non-hazardous waste from site demolition. Where assessed and reported at the design stage at the design stage of assessment this KPI is based on the target demolition waste diverted from landfill, as reported in a compliant Site Waste Management Plan. If no demolition taking place on site this KPI is not applicable.
- 12
- Where assessed and reported at the design stage of assessment this KPI is based on a target as reported in a compliant Site Waste Management Plan.
- 13
- The reported impact covers the proportion of the key building elements present and assessed by BREEAM that are responsibly sourced. Responsibly sourced and key building elements are defined in the BREEAM UK New Construction 2018 Technical Guide (SD5076).
- 14
- The total volatile organic compound (TVOC) concentration is measured post construction (but pre-occupancy) over 8 hours. Formaldehyde concentration level is measured post construction (but pre-occupancy) averaged over 30 minutes. Both KPI's are measured in accordance with European and/or ISO standards (refer to the BREEAM New Construction Technical Manual for relevant standard numbers). At the design stage of assessment no data is available for this KPI as they are both measured once the building has been constructed (but pre-occupancy) for the purpose of post construction assessment.

"INA" = Indicator Not Assessed. This will be the case where either the data required for the KPI is not gathered/measured by the building's project team or not assessed/quantified in BREEAM for a particular
"-" = KPI not applicable to building being assessed.

BREEAM UK New Construction 2018 Assessment Report: Assessment Issue Scoring

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Cells that are white with a black border require the user to input information, either by selecting from the available options or entering the required data.

Cells that are light grey (with/without black border) contain information for the user and/or automated calculation. They do not require the user to input or select data.

Building name	Yew Tree Care Home
Building score (%)	55.70%
Building rating	Very Good
Minimum standards level achieved	Excellent level

BREEAM Scheme	New Construction
Building Type	Residential institution (long term stay)
Assessment stage	Design (interim)
Project Scope	Fully fitted

MANAGEMENT

Man 01 Project brief and design

No. of BREEAM credits available	4	Available contribution to overall score	2.10%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No
Assessment Criteria	Compliant?	Credits available	Credits achieved
Project delivery planning	Yes	1	1
Stakeholder consultation (interested parties)	No	1	0
Prerequisite: Have the client and the contractor formally agreed performance targets?	Yes		
BREEAM Advisory Professional (Concept Design)		1	0
BREEAM Advisory Professional (Developed Design)		1	0
Total BREEAM credits achieved	1		
Total contribution to overall building score	0.52%		
Total BREEAM exemplary credits achieved	N/A		
Minimum standard(s) level	N/A		

Assessor comments/notes:

Man 02 Life cycle cost and service life planning

No. of BREEAM credits available	4	Available contribution to overall score	2.10%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No
Assessment Criteria	Compliant?	Credits available	Credits achieved
Elemental LCC	No	2	0
Component level LCC options appraisal	No	1	0
Capital cost reporting	Yes	1	1
Capital cost of the project	£2,850	£/m²	
Total BREEAM credits achieved	1		
Total contribution to overall building score	0.52%		
Total BREEAM exemplary credits achieved	N/A		
Minimum standard(s) level	N/A		

Assessor comments/notes:

Man 03 Responsible construction practices

No. of BREEAM credits available	6	Available contribution to overall score	3.14%
No. of BREEAM exemplary credits available	1	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Prerequisite: Are all timber and timber-based products used during the construction process of the project 'legally harvested and traded timber'?	Yes		

Environmental management	Yes	1	1
Prerequisite: Have the client and the contractor formally agreed performance targets?	Yes		
BREEAM Advisory Professional (site)	No	1	0
Responsible construction management	2	2	2
Monitoring of construction site impacts	Yes		
Utility consumption	Yes	1	1
Transport of construction materials and waste	Yes	1	1
Exemplary level criteria - Responsible construction management	No	1	0

Note: The KPI data is required to be completed in order to award the credit.
Note: The KPI data is required to be completed in order to award the credit.

Key Performance Indicators: Construction site energy use

Energy consumption (total) - site processes	1000	kWh
Energy consumption (intensity) - site processes	0.5	kWh/project value
Distance (total) - materials transport to site		km
Distance (total) - waste transport from site		km

Key Performance Indicators: Construction site greenhouse gas emissions

Process greenhouse gas emissions (total) - site processes	1000	KgCO ₂ -eq
Carbon dioxide emissions (intensity) - site processes	0.5	KgCO ₂ -eq/project value
Carbon dioxide emissions (total) - materials transport to site		KgCO ₂ -eq
Carbon dioxide emissions (total) - waste transport from site		KgCO ₂ -eq
Carbon dioxide emissions (intensity) - materials transport to site		KgCO ₂ -eq/project value
Carbon dioxide emissions (intensity) - waste transport from site		KgCO ₂ -eq/project value

Key Performance Indicators: Construction site use of freshwater resources

Use of potable water resource (total) - site processes		m ³
Use of potable water resource (intensity) - site processes		m ³ /£100k

Total BREEAM credits achieved	5
Total contribution to overall building score	2.62%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Man 04 Commisioning and handover

No. of BREEAM credits available	4	Available contribution to overall score	2.10%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Commissioning and testing schedule and responsibilities	Yes	1	1
Commissioning - design and preparation	Yes	1	1
Testing and inspecting building fabric	Yes	1	1
Handover - Has a Building User Guide been developed prior to handover?	Yes		
Handover - Has a training schedule been prepared for building occupiers/managers?	Yes	1	1

Total BREEAM credits achieved	4
Total contribution to overall building score	2.10%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Man 05 Aftercare

No. of BREEAM credits available	3	Available contribution to overall score	1.57%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	Yes

Is this a speculative development?		Please select	
Assessment Criteria	Compliant?	Credits available	Credits achieved
Aftercare support	Yes	1	1
Commissioning - implementation	Yes	1	1
Post occupancy evaluation	No	1	0
The client or building occupier commits funds to pay for the POE in advance			

Total BREEAM credits achieved	2
Total contribution to overall building score	1.05%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

HEALTH & WELLBEING

Hea 01 Visual Comfort

No. of BREEAM credits available	5	Available contribution to overall score	3.68%
No. of BREEAM exemplary credits available	2	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Control of glare from sunlight	Yes	1	1
Daylighting (building type dependent)	0	2	0
View out	Yes	1	1
Internal and external lighting levels, zoning and controls	Yes	1	1

Exemplary level daylighting	No	1	0
Exemplary level criteria - Internal and external lighting levels, zoning and control	Please select	1	0

Total BREEAM credits achieved	3
Total contribution to overall building score	2.21%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

Note: 1 credit is available for Law courts, Industrial and all Other building types not listed below

- Up to 2 credits are available for Education buildings- higher education occupied spaces, Healthcare buildings, Retail buildings, Office buildings and Other buildings- creche
- 2 credits are available for Education buildings- preschools, schools and further education spaces, Residential Institutions (long term stay), and Prison buildings.
- For View out, 2 credits are available for Healthcare buildings with inpatient areas only
- For shell and core, and shell only; only external lighting is applicable (criteria 10-11).

Hea 02 Indoor Air Quality

No. of BREEAM credits available	4	Available contribution to overall score	2.95%
No. of BREEAM exemplary credits available	1	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Prerequisite: Indoor air quality (IAQ) plan	Yes		
Ventilation	Yes	1	1
Emissions from building products	1	2	1
Post-construction indoor air quality measurement	No	1	0
Exemplary level criteria - Emissions from building products	No	1	0

Key Performance Indicators: Indoor air quality		
Formaldehyde concentration		µg/m ³
Total volatile organic compound (TVOC) concentration		µg/m ³

Total BREEAM credits achieved	2
Total contribution to overall building score	1.47%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

Hea 04 Thermal comfort

No. of BREEAM credits available	3	Available contribution to overall score	2.21%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Thermal modelling	Yes	1	1
Design for future thermal comfort	No	1	0
Thermal zoning and control	Yes	1	1

Key Performance Indicators	Thermal comfort	For a projected climate scenario
Predicted Mean Vote (PMV)		
Predicted Percentage Dissatisfied (PPD)		

Instruction: If thermal modelling has not been undertaken or has not resulted in a PMV/PPD output, then insert "INA" (Indicator Not Assessed) in the relevant cell(s).

Total BREEAM credits achieved	2
Total contribution to overall building score	1.47%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Hea 05 Acoustic Performance

No. of BREEAM credits available	4	Available contribution to overall score	2.95%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Criteria performance requirements or SQA bespoke requirements?	
--	--

Assessment Criteria		Credits	Credits available	Credits achieved
	Sound insulation	1	2	1
	Indoor ambient noise level	Yes	1	1
	Room acoustics	Yes	1	1

Total BREEAM credits achieved	3
Total contribution to overall building score	2.21%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Note: 4 credits available for Multi-Residential Accomodation & Other-Residential institutions (restricted to 1 for shell only projects). 3 credits available for all other building types.

Hea 06 Security

No. of BREEAM credits available	1	Available contribution to overall score	0.74%
No. of BREEAM exemplary credits available	1	Minimum standards applicable	No

Assessment Criteria		Compliant?	Credits available	Credits achieved
	Security of site and building	Yes	1	1
	Exemplary level criteria	No	1	0

Total BREEAM credits achieved	1
Total contribution to overall building score	0.74%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

Hea 07 Safe & Healthy Surroundings

No. of BREEAM credits available	2	Available contribution to overall score	1.47%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No
Assessment Criteria	Compliant?	Credits available	Credits achieved
Safe Access	No	1	0
Outside Space	Yes	1	1
Total BREEAM credits achieved	1		
Total contribution to overall building score	0.74%		
Total BREEAM exemplary credits achieved	N/A		
Minimum standard(s) level	N/A		

Assessor comments/notes:

ENERGY

Ene 01 Reduction of energy use and carbon emissions

No. of BREEAM credits available	13	Available contribution to overall score	9.45%
No. of BREEAM exemplary credits available	5	Minimum standards applicable	Yes

Country of the UK where the building is located	England			
Assessment Criteria	Actual	Notional		
Photovoltaic systems			kWh/m ²	Please note: The offline assessment scoring and reporting tool is not compatible with the alternative calculation methodology for Ene 01. To use the alternative methodology please use the scoring and reporting tool available on BREEAM Projects.
Wind turbines			kWh/m ²	
CHP generators			kWh/m ²	
Solar thermal systems			kWh/m ²	
Building energy demand	800.000	1000.000	MJ/m ² yr	
Building primary energy consumption	800.000	1000.000	kWh/m ² yr	
Building CO ₂ -eq emissions	800.000	1000.000	KgCO ₂ -eq/m ² yr	
Does this building contain areas that require a SAP assessment?	No			
What % of the building's total floor area (GIA) does it apply to?				
SAP Building energy demand			MJ/m ² yr	
SAP Building primary energy consumption			kWh/m ² yr	
SAP Building CO ₂ -eq emissions			KgCO ₂ -eq/m ² yr	
Building Score				
Total BREEAM credits achieved	4			
Heating and cooling demand energy performance ratio (EPRdem)	0.154			
Primary consumption energy performance ratio (EPRpc)	0.133			
CO ₂ -eq energy performance ratio (EPRCO ₂ -eq)	0.142			
Overall building energy performance ratio (EPRnc)	0.429			
% improvement over building regulations (CO2-eq)	0			

Zero net CO ₂ -eq emissions	No	3	0
Equivalent % of additional emissions from unregulated energy that are offset by LZC sources			
Is the building designed to be carbon negative?			
If the building is defined as 'carbon negative' what is the total (modelled) renewable/carbon neutral energy generated and exported?		kWh/yr	

Assessment criteria	Compliant?	Credits available	Credits achieved
Has a design workshop focusing on operational energy performance been carried out?	No		
Additional energy modelling to generate predicted operational energy consumption figures		4	0
carried out?			
Predicted energy consumption targets by end use, design assumptions and input data			
reported?			
Risk assessment to highlight any significant design, technical, and process risks?			
Has the operational energy performance of the building been substantially improved?			

Assessment criteria (exemplary credits)	Compliant?	Credits available	Credits achieved
Maximum credits achieved in Ene 02 Energy monitoring?	Yes	2	0
The client or building occupier commits funds to pay for the post-occupancy stage?	Please select		
The energy model is submitted to BRE and retained by the building owner?	Please select		

Note: this cell is linked to Ene 02 below and cannot be edited.

Total BREEAM credits achieved	4
Total contribution to overall building score	2.91%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	Excellent level

Assessor comments/notes:

Ene 02 Energy monitoring

No. of BREEAM credits available	1	Available contribution to overall score	0.73%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	Yes

Assessment criteria	Compliant?	Credits available	Credits achieved
Sub-metering of end use categories	Yes	1	1
Sub-metering of high energy load and tenancy areas		0	0

Total BREEAM credits achieved	1
Total contribution to overall building score	0.73%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	Outstanding level

Note: if all available credits have been achieved for this issue Exemplary credits Ene 01 are available

Assessor comments/notes:

Ene 03 External lighting

No. of BREEAM credits available	1	Available contribution to overall score	0.73%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment criteria	Compliant?	Credits available	Credits achieved
External lighting has been designed out	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.73%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Ene 04 Low carbon design			
No. of BREEAM credits available	3	Available contribution to overall score	2.18%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment criteria	Compliant?	Credits available	Credits achieved
Has the first credit within Hea 04 been achieved? Passive design analysis Free cooling Low and zero carbon technologies	Yes		
	No	1	0
	No	1	0
	Yes	1	1

Note: The first credit in issue Hea04 must be achieved to award the first credit in Ene04. This does not apply to Industrial building types with no office areas, where Hea04 is not applicable.

Key Performance Indicators - Low and/or zero carbon energy generation

Total on-site and/or near-site LZC energy generation		kWh/yr
Expected energy demand and CO ₂ -eq emissions reduction resulting from passive design measures as a percentage	Energy	
		KWh/m ² yr
Expected energy demand and CO ₂ -eq emissions reduction resulting from passive design measures as a percentage	CO ₂ emissions	
		KgCO ₂ -eq/m ² yr
	Energy	
		%
	CO ₂ emissions	
		%
Expected reduction in CO ₂ -eq emissions resulting from the LZC technologies		KgCO ₂ -eq/m ² yr
Expected reduction in CO ₂ -eq emissions resulting from the LZC technologies as a percentage		%

Total BREEAM credits achieved	1
Total contribution to overall building score	0.73%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Ene 05 Energy efficient cold storage

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM exemplary credits available	N/A	Minimum standards applicable	N/A

Note: You have stated in the building and project details tab that the assessed building does not have any commercial/industrial refrigeration and storage systems; therefore this issue is not applicable to the assessment.

Assessment criteria	Compliant?	Credits available	Credits achieved
Refrigeration energy consumption Indirect greenhouse gas emissions		N/A	N/A
		N/A	N/A
Total BREEAM credits achieved	N/A		

Total contribution to overall building score	N/A
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Ene 06 Energy efficient transportation systems

No. of BREEAM credits available	2	Available contribution to overall score	1.45%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	N/A

Assessment criteria	Compliant?	Credits available	Credits achieved
Energy consumption	Yes	1	1
Energy efficient features - Lifts	Yes	1	1
Energy efficient features - Escaltors or moving walks			

Total BREEAM credits achieved	2
Total contribution to overall building score	1.45%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Ene 07 Energy efficient laboratory systems

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM exemplary credits available	N/A	Minimum standards applicable	N/A

Assessment criteria	Compliant?	Credits available	Credits achieved
Design specification			
Laboratory containment devices and containment areas			
Best practice energy efficient measures (table 33)			
Fume cupboard volume flow rates			
Grouping / isolation of high filtration/ventilation activities			
Energy recovery - heat			
Energy recovery - cooling			
Grouping of cooling loads			
Free cooling			
Load responsiveness			
Clean rooms			
Diversity			
Room air-change rates			
Fan power			

Total BREEAM credits achieved	0
Total contribution to overall building score	N/A
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:



Ene 08 Energy efficient equipment

No. of BREEAM credits available	2	Available contribution to overall score	1.45%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment criteria

	Present?	Major impact
Swimming pool present?		
Laundry facilities with commercial-sized appliances present?	Yes	
Data centre present?		
IT-intensive operating areas present?		
Domestic scale appliances (individual and communal facilities) present?	Yes	
Healthcare equipment present?		
Kitchen and catering facilities present?	Yes	
Other contributors		

Instruction: Please confirm the building function area/equipment present and whether it contributes to the 'significant majority' of the unregulated energy consumption in the building.

	Compliant	Credits available	Credits achieved
Significant majority contributors BREEAM compliant	No	2	0

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

TRANSPORT

Tra 01 Transport assessment and travel plan

No. of BREEAM credits available	2	Available contribution to overall score	1.67%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria		Compliant	Credits available	Credits achieved
	Travel plan	Yes	2	2

Total BREEAM credits achieved	2
Total contribution to overall building score	1.67%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Tra 02 Sustainable transport measures

No. of BREEAM credits available	10	Available contribution to overall score	8.33%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria		Compliant?	Credits available	Credits achieved
	Prerequisite	Yes		
	Location type (based on existing AI)		AI <25	
	Number of points achieved overall	6	10	6

Total BREEAM credits achieved	6
Total contribution to overall building score	5.00%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

WATER

Wat 01 Water Consumption

No. of BREEAM credits available	5	Available contribution to overall score	4.38%
No. of BREEAM exemplary credits available	1	Minimum standards applicable	Yes

Assessment CriteriaCompliant?Credits availableCredits achieved

Please select the calculation procedure used	Standard approach		
Credits awarded	2	5	2
Exemplary performance	No	1	0

Standard approach data

Water Consumption from building micro-components		L/person/day
Water demand met via greywater/rainwater sources		L/person/day
Total net water consumption		L/person/day
Improvement on baseline performance		%

Key Performance Indicator - use of freshwater resource

Total net Water Consumption		m ³ /person/yr
Default building occupancy		

Alternative approach data

Overall microcomponent performance level achieved	
---	--

Total BREEAM credits achieved	2
Total contribution to overall building score	1.75%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Wat 02 Water Monitoring

No. of BREEAM credits available	1	Available contribution to overall score	0.88%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Water meter on the mains water supply to each building	Yes	1	1
Sub-metering/monitoring equipment on supply to plant/building areas	Yes		
Pulsed output or other open protocol communication output and BMS connection	Yes		
The water monitoring strategy used enables the identification of all water consumption for sanitary uses as assessed under Wat 01 (L/person/day)	Yes		

Total BREEAM credits achieved	1
Total contribution to overall building score	0.88%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Wat 03 Water Leak Detection and Prevention

No. of BREEAM credits available	2	Available contribution to overall score	1.75%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Leak detection system	Yes	1	1
Are WC facilities only provided within the residential areas of a long-term residential accommodation?	No		
Flow control devices	Yes	1	1

Total BREEAM credits achieved	2
Total contribution to overall building score	1.75%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Wat 04 Water Efficient Equipment

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM exemplary credits available	N/A	Minimum standards applicable	N/A

Note: You have stated in the building and project details tab that the assessed building does not have unregulated water uses (e.g.internal or external planting and/or soft landscaping or a vehicle wash system) therefore this issue is not applicable to the assessment.

Assessment Criteria	Compliant?	Credits available	Credits achieved
Water efficient consumption			
Total BREEAM credits achieved	N/A		
Total contribution to overall building score	N/A		
Total BREEAM exemplary credits achieved	N/A		
Minimum standard(s) level	N/A		

Assessor comments/notes:

MATERIALS

Mat 01 Environmental impacts from construction products - Building life cycle assessment (LCA)

No. of BREEAM credits available	7	Available contribution to overall score	7.50%
No. of BREEAM exemplary credits available	3	Minimum standards applicable	No

Note: The Mat01 data required for reporting purposes is sourced from BREEAM's Mat01 calculator.

Assessment Criteria	Compliant?	Credits available	Credits achieved
Total Mat 01 credits achieved - taken from the Mat 01/02 Results Submission Tool	0	7	0
Total Exemplary credits achieved - taken from the Mat 01/02 Results Submission Tool	0	3	0
Total BREEAM credits achieved	0		
Total contribution to overall building score	0.00%		
Total BREEAM exemplary credits achieved	0		
Minimum standard(s) level	N/A		

Note: Don't forget to upload your Mat 01/02 Results Submission Tool

Assessor comments/notes:

Mat 02 Environmental impacts from construction products - Environmental Product Declarations (EPD)

No. of BREEAM credits available	1	Available contribution to overall score	1.07%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Mat 02 credit achieved - Taken from the Mat 01/02 Results Submission Tool.	0	1	0
Total BREEAM credits achieved	0		
Total contribution to overall building score	0.00%		
Total BREEAM exemplary credits achieved	N/A		
Minimum standard(s) level	N/A		

Assessor comments/notes:

Mat 03 Responsible sourcing of construction products

No. of BREEAM credits available	4	Available contribution to overall score	4.29%
No. of BREEAM exemplary credits available	1	Minimum standards applicable	Yes

Note: The Mat 03 data required for reporting purposes is sourced from BREEAM's Mat 03 calculator.

Assessment Criteria	Compliant	Credits available	Credits achieved
Prerequisite - All timber and timber based products are 'Legally harvested and traded timber'	Yes		
Has the enabling sustainable procurement credit been achieved?	Yes	1	1
Mat 03 minimum scope level	Superstructure		
Percentage of available for percentage of RSM points achieved		3	0
Exemplary level performance		1	0
Total BREEAM credits achieved	1		
Total contribution to overall building score	1.07%		
Total BREEAM exemplary credits achieved	0		
Minimum standard(s) level	Outstanding level		

Assessor comments/notes:

Mat 05 Designing for durability and resilience

No. of BREEAM credits available	1	Available contribution to overall score	1.07%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	N/A

Assessment Criteria	Compliant?	Credits available	Credits achieved
Protecting vulnerable parts of the building from damage and exposed parts of the building from material degradation	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	1.07%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Mat 06 Material efficiency

No. of BREEAM credits available	1	Available contribution to overall score	1.07%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Material optimisation measures investigated and implemented at all relevant stages	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	1.07%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

WASTE

Wst 01 Construction Waste Management

No. of BREEAM credits available	5	Available contribution to overall score	3.00%
No. of BREEAM exemplary credits available	1	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Is demolition occurring under the developer's ownership for the purpose of enabling the assessed development?	Yes		
Pre-demolition audit	Yes	1	1
Compliant Resource Management Plan	Yes	3	3
Have waste materials been sorted into separate key waste groups?	Yes	1	0
Exemplary level criteria	No		
BREEAM exemplary level benchmark		1	0

Simple Buildings - Assessment Criteria	Compliant?	Credits available	Credits achieved
Pre-demolition audit			
Construction resource efficiency - compliant Resource Management Plan			
RMP measurements and reporting			
Diversion of resources from landfill			
Exemplary level criteria			
BREEAM exemplary level benchmark			

Key Performance Indicators - Construction Waste

Measure/units for the data being reported	tonnes	
Non-hazardous construction waste (excluding demolition/excavation) - fill in to award "Construction resource efficiency" credits	2.00	tonnes/100m2
Total non-hazardous construction waste generated	10.00	tonnes
Non-hazardous non-demolition construction waste diverted from landfill - fill in to award diversion from landfill credit	80.00	%
Total non-hazardous non-demolition construction waste diverted from landfill	10.00	tonnes
Non-hazardous demolition waste diverted from landfill - fill in to award diversion of landfill credit	80.00	%
Total non-hazardous demolition waste generated	20.00	tonnes
Total non-hazardous demolition waste to disposal	15.00	tonnes
Non-hazardous excavation waste diverted from landfill - fill in to award credit	80.00	%
Material for reuse		tonnes
Material for recycling		tonnes
Material for energy recovery		tonnes
Hazardous waste to disposal		tonnes

Total BREEAM credits achieved	4
Total contribution to overall building score	2.40%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	Outstanding level

Assessor comments/notes:



Wst 02 Use of recycled and sustainably sourced aggregates

No. of BREEAM credits available	1	Available contribution to overall score	0.60%
No. of BREEAM exemplary credits available	1	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Is demolition occurring under the developer's ownership for the purpose of enabling the assessed development?	Yes		
Pre-demolition audit	Yes		
Projects Sustainable Aggregate points		1	0
Exemplary performance credit		1	0

Key Performance Indicators

Total quantity of aggregate		Units - tonnes
% of high - grade aggregate that is recycled/ secondary aggregate by application		%

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

Wst 03 Operational Waste

No. of BREEAM credits available	1	Available contribution to overall score	0.60%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Compliant recycling and non-recyclable waste storage allocated	Yes	1	1
Static waste compactor(s) or baler(s)	N/A		
Vessel(s) for composting suitable organic waste and water outlet	N/A		
Multi-residential buildings with with individual bedrooms and communal facilities only criteria achieved	Yes		
Multi-residential buildings with self-contained dwellings or bedsits only criteria achieved			

Total BREEAM credits achieved	1
Total contribution to overall building score	0.60%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	Outstanding level

Assessor comments/notes:



Wst 04 Speculative finishes (Offices only)

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM exemplary credits available	N/A	Minimum standards applicable	N/A

Note: This issue is applicable to the assessment of office buildings only (and does not apply to shell only office building assessments).

Assessment Criteria	Compliant?	Credits available	Credits achieved

Total BREEAM credits achieved	N/A
Total contribution to overall building score	N/A
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Wst 05 Adaptation to climate change

No. of BREEAM credits available	1	Available contribution to overall score	0.60%
No. of BREEAM exemplary credits available	1	Minimum standards applicable	N/A

Assessment Criteria	Compliant?	Credits available	Credits achieved
Resilience of structure, fabric, building services and renewables installation	Yes	1	1
Exemplary level - responding to climate change	No	1	0

Total BREEAM credits achieved	1
Total contribution to overall building score	0.60%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

Wst 06 Design for disassembly and adaptability

No. of BREEAM credits available	2	Available contribution to overall score	1.20%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	N/A

Assessment Criteria	Compliant?	Credits available	Credits achieved
Design for disassembly and functional adaptability - recommendations	No	1	0
Disassembly and functional adaptability - implementation	No	1	0

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

LAND USE & ECOLOGY

LE 01 Site Selection

No. of BREEAM credits available	2	Available contribution to overall score	2.00%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Percentage of proposed development's footprint on previously occupied land	100.00%	1	1
Contaminated land	No	1	0

Total BREEAM credits achieved	1
Total contribution to overall building score	1.00%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

LE 02 Ecological risks and opportunities

No. of BREEAM credits available	2	Available contribution to overall score	2.00%
No. of BREEAM exemplary credits available	1	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Assessment route selection	Comprehensive		
Prerequisite - Statutory obligations	Yes		
Survey and Evaluation	Yes	2	2
Determining ecological outcomes	Yes		
Exemplary level - Wider site sustainability	No	1	0

Total BREEAM credits achieved	2
Total contribution to overall building score	2.00%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

LE 03 Managing impacts on ecology

No. of BREEAM credits available	3	Available contribution to overall score	3.00%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Assessment route	Comprehensive		
Prerequisite - Ecological risks and opportunities	Yes		
Planning and measures on-site	Yes	1	1
Managing negative impacts	1	2	1

Total BREEAM credits achieved	2
Total contribution to overall building score	2.00%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

LE 04 Ecological change and enhancement

No. of BREEAM credits available	4	Available contribution to overall score	4.00%
No. of BREEAM exemplary credits available	1	Minimum standards applicable	No

Assessment Criteria	Assessment route	Compliant?	Credits available	Credits achieved
	Prerequisite - Managing negative impacts on ecology	Comprehensive		
		Yes		
	Change and enhancement of ecology (Foundation route only)		0	0
	Ecological enhancement (Comprehensive route only)	Yes	1	1
	Change and enhancement of ecology (Comprehensive route only)	1	3	1
	Exemplary level criteria (Comprehensive route only)	No	1	0

Total BREEAM credits achieved	2
Total contribution to overall building score	2.00%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

LE 05 Long term ecology management and maintenance

No. of BREEAM credits available	2	Available contribution to overall score	2.00%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Assessment route	Compliant?	Credits available	Credits achieved
	Prerequisite - Statutory obligations, planning and site implementation	Comprehensive		
		Yes		
	Management and maintenance throughout the project	Yes	1	1
	Landscape and ecology management plan	Yes	1	1

Total BREEAM credits achieved	2
Total contribution to overall building score	2.00%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

POLLUTION

Pol 01 Impact of refrigerants

No. of BREEAM credits available	3	Available contribution to overall score	2.00%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Note: The data required for this assessment issue is sourced from the separate BREEAM Pol 01 calculator.

Assessment Criteria	Compliant?	Credits available	Credits achieved
Refrigerant containing systems installed in the assessed building?	Yes	2	1
All systems (with electric compressors) comply with BS EN 378:2016 (parts 2 and 3) and (where applicable) Institute of Refrigeration Ammonia Refrigeration Systems code of practice?	Yes		
Total Direct Effect Life Cycle CO ₂ -eq/kW emissions from the system	900	kgCO ₂ eq/kW heating and cooling capacity	
Global Warming Potential of the specified refrigerant(s) 10 or less?	No		

Leak Detection	Are all the systems hermetically sealed?	Yes	1	1
	BREEAM compliant automatic refrigerant leak detection system installed and able to manage the remaining refrigerant charge			

Total BREEAM credits achieved	2
Total contribution to overall building score	1.33%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Pol 02 Local air quality

No. of BREEAM credits available	2	Available contribution to overall score	1.33%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant	Credits available	Credits achieved
Is the project required to connect to a District Heating system, and it supplies all heating and hot water demands to the building?	No		
How many credits have been achieved?	2	2	2

Total BREEAM credits achieved	2
Total contribution to overall building score	1.33%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:



Pol 03 Flood and surface water management

No. of BREEAM credits available	5	Available contribution to overall score	3.33%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Has an appropriate consultant demonstrated and confirmed the development's compliance with all sought credits?	Yes		
Has a site-specific flood risk assessment been conducted?	Yes		
Annual probability of flooding	Low	2	2
Has the pre-requisite for the Surface Water Run-Off credits been achieved?	Yes		
Has the Surface Water Run-Off - Rate credit been achieved?	Yes	1	1
Flooding of property will not occur in the event of local drainage system failure	Yes		
Has the Surface Water Run-Off - Volume credit been achieved?	Yes	1	1
Minimising watercourse pollution	No	1	0

Total BREEAM credits achieved	4
Total contribution to overall building score	2.67%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Pol 04 Reduction of night time light pollution

No. of BREEAM credits available	1	Available contribution to overall score	0.67%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
External lighting has been designed out	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.67%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:



Pol 05 Reduction of noise pollution

No. of BREEAM credits available	1	Available contribution to overall score	0.67%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant	Credits available	Credits achieved
Noise-sensitive areas/buildings within 800m radius of the development	Yes		
Is the site compliant with all relevant criteria?	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.67%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

INNOVATION

Inn 01 Innovation

No. of BREEAM innovation credits available	10	Available contribution to overall score	10.00%
		Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Man 01 BREEAM AP - Simple Buildings only	N/A	N/A	N/A
Man 03 Responsible construction practices	No	1	0
Hea 01 Visual Comfort	No	2	0
Hea 02 Indoor Air Quality	No	1	0
Hea 06 Security	No	1	0
Ene 01 Reduction of energy use and carbon emissions	No	5	0
Wat 01 Water Consumption	No	1	0
Mat 01 Environmental impacts from construction products - Building LCA	No	3	0
Mat 03 Responsible Sourcing of Materials	No	1	0
Wst 01 Construction Waste Management	No	1	0
Wst 01 Construction Waste Management - Simple Buildings only	N/A	N/A	N/A
Wst02 Recycled Aggregates	No	1	0
Wst 05 Adaptation to climate change	No	1	0
LE 02 Identifying and understanding the risks and opportunities for the site	No	1	0
LE 04 Change and enhancement of ecological value (Route 2 only)	No	1	0
Pol 03 Flood and surface water management - Simple Buildings only	N/A	N/A	N/A

Number of 'approved' innovation credits achieved?	
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Total BREEAM innovation credits achieved	0
Total contribution to overall building score	0.00%
Minimum standard(s) level	N/A

Assessor comments/notes:

Building name:

Yew Tree Care Home

Identifier	Assessment Evidence Reference	Assessment issue	Issue criteria No. and/or compliance note	Assessor's supporting notes/information
1	e.g. Project A, First floor plan, rev05, 1/10/10. Supplied by F Fitzgerald (23/3/11)	Wat 02	e.g. 1	e.g. Plan indicates location of water meter in plant room located in south-west corner of the building.
2	e.g. See identifier 1	Mat05	e.g. 1 and 2c	e.g. Plan indicates vehicle parking within 1m of north façade and the provision of barriers to protect façade.
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BREEAM UK New Construction 2018 Assessment Report: Version Control

Version	Release Date	Description of changes/additions made to the BREEAM Assessment Scoring and Reporting Tool
Current Version		
3.4	05/03/2021	Ene 01 - Net zero requirement not applicable to shell only Assessment Details - Question for Hea 06 & Hea 07 filtering for prisons without publicly accessible building/areas or car parking areas added Man 05 - Minimum standard applicability for speculative developments
Previous Version		
3.3	10/07/2020	Assessment details - cell J81 drop down removed Ene 01 - alternative method guidance added Hea 07 - safe access credit applicable if no external areas LE 05 - Prerequisite fixed
3.2	25/10/2019	Assessment details - Education - Primary school building type added and filtering Ene 01 - Question added for Energy Prediction and Occupation Stage Assessment min std
3.1	06/09/2019	Added Issue 3.0 to the 'BREEAM UK 2018 technical manual issue number' dropdown Ene 01 - calculation corrected when primary energy consumption actual/notional <0 Ene 01 - exemplary credits for beyond zero net regulated carbon can only be awarded when $EPR_{NC} \geq 0.9$ Ene 07 - removed the building type restriction in line with KBCN1340 LE 04 and LE 05 revised prerequisites
3.0	02/08/2019	Mat 03 - percentage input format corrected LE - wording in the whole category has been amended according to technical manual reissue 3.0
2.6	21/06/2019	Man 05 - speculative development credit applicability Mat 03 - minimum scope level added to appropriately award credits
2.5	16/05/2019	Man 05 - shell only minimum standard Ene 01 - Calculation updated in line with Guidance note 39 Ene 01 - Excellent minimum standard updated in line with Guidance Note 32 Ene 01 - Simple building exemplary/standard credits awarding corrected Ene 02 - shell only minimum standard Wst 01 - Demolition KPI filtered out when no demolition occurring Assessment references - assesment issue list updated
2.4	28/01/2019	Ene 07 total credits achieved repaired Ene 05 and Pol 05 comments boxes fixed Wst 01 - Simple building no demolition credit applicability
2.3	17/12/2018	Repair minimum standard error Wst 01 - Simple Buildings no demolition occurring fix
2.2	03/12/2018	Re-issue version included Circular references fix Wst 06 - percentage total contribution fixed Hea 07 - percentage total contribution fixed Ene 01 - calculation refined Pol 03 - Simple Building prerequisite requirement (KBCN1067) Tra 02 - prerequisite functionality updated in line with KBCN1205 Pol 02 - District heating question added Wat 03 - credit applicability for residential buildings Assessment building types - sub-building types match 2018 manual Wat 01 & Wat 02 minimum standard applicability
2.1	28/09/2018	Minimum standard applicability to shell only repaired Ene 01 - calculation corrected
2.0	16/08/2018	Re-issue version included LE 03 - pre-requisite filtering amended to match reissue of manual LE 04 - Route 2 exemplary credit added LE 05 - pre-requisite filtering amended to match reissue of manual Ene 01 - shell only calculation repaired
1.2	13/07/2018	Pol 05 - credit applicability Mat 03 - percentage drop down removed - enter figures Man 05 - minimum standard applicability Tra 02 - heading corrected Wst 01 - units corrected and diversion of landfill LE 04 & 05 - headings corrected Man 04 - Shell only credit applicability Issue score rounding aligned with BREEAM Projects rounding
1.1	13/06/2018	Ene 07 - filtering corrected Wat 03 - "Shell only" credit available
1.0	31/05/2018	New Release New Construction 2018

