SYNTEGRA
CONSULTING

19-5436

Sustainability statement

2-6 Camden High Street, London NW1 0HJ

June 2019

Quality Standards Control

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Revision	*Initial*	*Rev A*	*Rev B*	*Rev C*
Date	10/04/2019	13/06/2019		
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1. Executive Summary

This Energy Statement demonstrates the predicted energy performance and carbon dioxide emissions of the proposed development at **2-6 Camden High Street, London NW1 0HJ,** based on the information provided by the design team. The development will comprise of **a refurbishment and extension of a six-floor commercial building.**

1.1. Policy Requirements

The Council requires new developments to incorporate sustainable design and construction measures. The table below summarises the local policy requirements for the proposed development.

Policies	Requirements	Compliance Check
London Plan 5.2 Policy CC1	An overall 35% reduction of carbon emissions over the Building Regulation Part L 2013. Non-residential development should aim to achieve 15 percent through energy efficiency measures.	The development achieved an overall carbon reduction of 42 % over Part L 2013 baseline via energy efficient measures and ASHP on the site. The proposed strategy also suggests achieving approximately 16% savings through energy efficiency measures
Local Plan Policy CC1	A 20% carbon reduction via on-site renewable technologies	The development achieved an overall carbon reduction of 25% via high efficiency ASHP.
Local Plan Policy CC2	BREEAM NC 2018 'Excellent' for the commercial unit.	Pre-assessment is in Appendix B.

Table 1 Policy Requirements

1.2. Methodology and Strategies

The methodology used to determine the CO_2 emissions is in accordance with the London Plan's three-step Energy Hierarchy (Policy 5.2). The below table shows the Energy Hierarchy and suggested strategies for the proposed development.

Stages	Strategies
BE LEAN Energy efficient design	• U-values better and air permeability better than Building Regulations Part L; • High efficiency gas boiler for heating and hot water. • Low energy (LED) type lighting; • Mechanical Ventilation with Heat Recovery units
BE CLEAN District heat networks or communal heating systems	As there are no current or proposed district heat networks and the size of the development is not suitable for CHP this stage of the hierarchy is not feasible for this scheme. Details can be found in section 8.1.
BE GREEN On-site renewable technologies	• Air Source Heat pump for heating and cooling.

Table 2 Energy Hierarchy and suggested strategies

1.3. Assessment Results

After the application of all strategies based on the Energy Hierarchy, the regulated carbon dioxide emissions have been reduced as follows;

Energy Hierarchy		Regulated Carbon Emissions (Tonnes CO_2/yr)
BASELINE	TER set by Building Regulations 2013 Part L	20
BE LEAN	After energy demand reduction	17
BE CLEAN	After CHP/ Communal Heating	17
BE GREEN	After renewable energy	12

Table 3 Carbon Emissions after each stage of the proposed strategy

This carbon savings from each stage can be calculated based on the results above. The table below summarises the total cumulative savings:

Energy Hierarchy		Regulated Carbon Savings	
		Tonnes CO_2/yr	%
BE LEAN	After energy demand reduction	3	16 %
BE CLEAN	After heat network/ CHP	-	-
BE GREEN	After renewable energy	5	25 %
Total Cumulative Savings		**8**	**42%**
Total Target Savings		6	35 %

Table 4 Carbon dioxide Emissions after each stage of the Energy Hierarchy

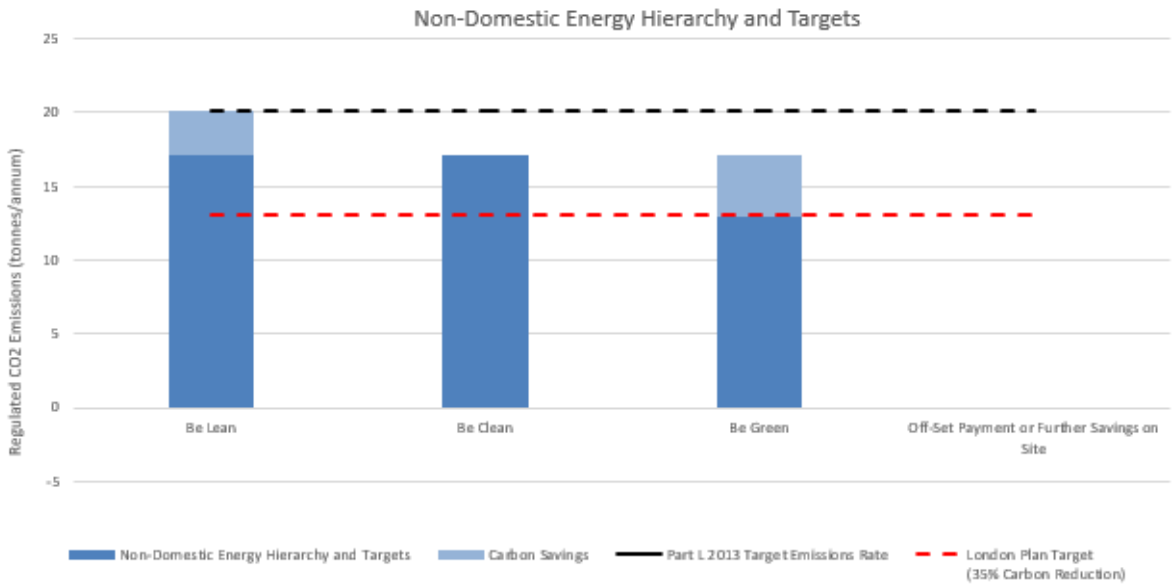

Figure 1 The Energy Hierarchy

2. Introduction

This Energy Statement will be included as part of the planning application that addresses the environmental impact of the development. This report focuses on the energy strategy for the proposed scheme and how energy consumption and carbon emissions will be minimised and to meet the targeted carbon emissions in accordance with the London Plan and Local planning policy.

The development is to be located in the **London Borough of Camden** and it is in close proximity to Mornington Crescent Station (approximately 65 meters to the South) and Harrington Square Gardens (approximately 150 meters to the South). The proposal is **a refurbishment and extension of a six-floor commercial building at 2-6 Camden High Street, London, NW11 0HJ.**

Figure 2 Site Location

3. Planning Policy

3.1. National Planning Policy Framework (July 2018)

The National Planning Policy Framework is a key part of our reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth.

3.2. The London Plan (March 2016)

Policy 5.2, 5.4, 5.5, 5.6, & 5.7

According to Policy 5.2 all major new developments should show carbon emissions reduction through the Mayor's energy hierarchy (Be Lean, Be Clean and Be Green), unless it can be demonstrated that such provision is not feasible. From October 2016 Zero Carbon Standard apply to all new major residential development (10 or more units). This means that at least 35% of carbon reductions against a Building Regulations Part L 2013 must be achieved on-site, with the remaining emissions, up to 100%, to be offset through a contribution to the Council's Carbon Offset Fund. For the non-residential development, must achieve a 35% reduction in CO_2 emissions against a Building Regulations Part L 2013 baseline.

For retrofitting developments, it will be a challenge to meet these targets. However, available reductions in carbon emissions should be demonstrated along with water saving measures as per Policy 5.4.

Furthermore, intent must be shown for connecting to a Decentralised Energy Network and utilizing a Combined Heat & Power according to Policy 5.5 and 5.6. The Mayor and boroughs should in their DPDs adopt a presumption that developments will achieve a reduction in carbon dioxide emissions of 20% from onsite renewable energy generation according to paragraph 5.42 of Policy 5.7

3.3. London Borough of Camden

Core Strategy (Adopted in 2010)

Policy CS13 – Tackling climate change through promoting higher environmental standards

Reducing the effects of and adapting to climate change

The Council will require all development to take measures to minimise the effects of, and adapt to, climate change and encourage all development to meet the highest feasible environmental standards that are financially viable during construction and occupation by:

a) Ensuring patterns of land use that minimize the need to travel by car and hep support local energy networks;
b) Promoting the efficient use of land and buildings;
c) Minimising carbon emissions from the redevelopment, construction and occupation of buildings by implementing, in order, all the elements of the following energy hierarchy:
   - Ensuring developments use less energy,
   - Making use of energy from efficient sources, such as the King's Cross, Gower Street, Bloomsbury and proposed Euston Road decentralised energy networks;
   - Generating renewable energy on-site; and
d) Ensuring buildings and spaces are designed to cope with, and minimize the effects of, climate change.

The Council will have regard to the cost of installing measures to tackle climate change as well as the cumulative future costs of delaying reductions in carbon dioxide emissions.

Local Plan (Adopted July 2017)

Policy CC1 – Climate change mitigation

The Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation.
We will:

a. Promote zero development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;
b. Require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met;
c. Ensure that the location of development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks;
d. Support and encourage sensitive energy efficiency improvements to existing building;
e. Require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and
f. Expect all developments to optimise resource efficiency.

For decentralised energy networks, we will promote decentralised energy by:

g. Working with local organisations and developers to implement decentralised energy networks in the parts of Camden most likely to support them;
h. Protecting existing decentralised energy networks (e.g. at Gower Street, Bloomsbury, King's Cross, Gospel Oak and Somers Town) and safeguarding potential network routes; and
i. Requiring all major developments to assess the feasibility of connecting to an existing decentralised energy network, or where this is not possible establishing a new network.

To ensure that the Council can monitor the effectiveness of renewable and low carbon technologies, major developments will be required to install appropriate monitoring equipment.

The energy hierarchy

The Council's Sustainability Plan 'Green Action for Change' commits the Council to seek low and where possible zero carbon buildings. New developments in Camden will be expected to be designed to minimise energy use and CO2 emissions in operation through the application of the energy hierarchy. It is understood that some sustainable design measures may be challenging for listed buildings and some conservation areas and we would advise developers to engage early with the Council to develop innovative solutions.

The energy hierarchy is a sequence of steps that minimise the energy consumption of a building. Buildings designed in line with the energy hierarchy prioritise lower cost passive design measures, such as improved fabric performance over higher cost active systems such as renewable energy technologies.

All developments involving five or more dwellings and/or more than 500 sqm of (gross internal) any floorspace will be required to submit an energy statement demonstrating how the energy hierarchy has been applied to make the fullest contribution to CO2 reduction. All new residential development will also be required to demonstrate a 19% CO2 reduction below Part L 2013 Building Regulations (in

addition to any requirements for renewable energy). This can be demonstrated through an energy statement or sustainability statement.

Policy CC2 – Adapting to climate change

The Council will require development to be resilient to climate change.

All development should adopt appropriate climate change adaptation.

a. The protection of existing green spaces and promoting new appropriate green infrastructure;
b. Not increasing, and wherever possible reducing, surface water run-off through increasing permeable surfaces and use of Sustainable Drainage Systems;
c. Incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and
d. Measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy.

Any development involving 5 or more residential units or 500 sqm or more of any additional floorspace is required to demonstrate the above in a Sustainable Statement.

Sustainable design and constructions measures

The Council will promote and measure sustainable design and construction by:

e. Ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation;
f. Encourage new build residential development to use the Home Quality Mark and Passivhaus design standards;
g. Encouraging conversions and extensions of 500 sqm of residential floorspace or above or five or more dwellings to achieve “excellent” in BREEAM Domestic refurbishment; and
h. Expecting non-domestic developments of 500 sqm of floorspace or above to achieve “excellent” in BREEAM assessments and encouraging zero carbon in new development from 2019.

Policy CC3 – Water and flooding

The Council will seek to ensure that development does not increase flood risk and reduces the risk of flooding where possible.

We will require development to:

a. Incorporate water efficiency measures;
b. Avoid harm to the water environment and improve water quality;
c. Consider the impact of development in areas at risk of flooding (including drainage);
d. Incorporate flood resilient measures in areas prone to flooding;
e. Utilize Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible; and
f. Not locate vulnerable development in flood-prone areas.

Where an assessment of flood risk is required, developments should consider surface water flooding in detail and groundwater flooding where applicable.

The Council will protect the borough’s existing drinking water and foul water infrastructure, including the reservoirs at Barrow Hill, Hampstead Heath, Highgate and Kidderpore.

4. Sustainability Statement

4.1. Materials

The development will utilise **low embodied materials** - at least three of the key elements of the building envelope are to achieve a rating of A+ to D in the BRE's The Green Guide of specification. At least 50% of timber and timber products will be sourced from accredited Forest Stewardship Council (FSC) or Programme for the Endorsement of forestry certification (PEFC) where feasible. All material used will be durable to cater for their level of use and exposure and will not release toxins into the internal and external environment where feasible. The project aim is to have a minimum, 10% of the total value of materials used should derive from recycled and reused content in the products and materials selected. This is in line with SPG Sustainable Design and Construction 2.7 and London Plan policy 5.3, 5.20, 7.6, and 7.14 as specified below table. Details can be found in the BREEAM Pre-assessment in Appendix B.

Materials – Design phase	
Mayor's Priority	**London Plan Policy**
The design of development should prioritise materials that: ○ have a low embodied energy, including those that can be re-used intact or recycled; ○ at least three of the key elements of the building envelope (external walls, windows roof, upper floor slabs, internal walls, floor finishes / coverings) are to achieve a rating of A+ to D in the BRE's *The Green Guide* of specification; ○ can be sustainably sourced; ○ at least 50% of timber and timber products should be sourced from accredited Forest Stewardship Council (FSC) or Programme for the Endorsement of forestry Certification (PEFC) source; ○ are durable to cater for their level of use and exposure; and will not release toxins into the internal and external environment, including those that deplete stratospheric ozone	5.3, 5.20, 7.6, 7.14
Mayor's Priority	**London Plan Policy**
The design of developments should maximise the potential to use pre-fabrication elements.	5.3, 7.6

Table 5 Summary of the Mayor's priorities set by SPG

4.2. Water Efficiency

In accordance with London Plan SPG Sustainable Design and Construction 2.6, London Plan policy 5.3/ 5.4/ 5.13/ 5.15 (see below summary table), the development will be based upon the specification of water efficient fittings including low volume dual flush WCs, and low flow taps/ showers/ bath. **For the development at least 2 credits will be achieved under BREEAM** Water 01. Details can be found in the BREEAM Pre-assessment in Appendix B.

4.3. Nature conservation and biodiversity

Due to the lack of available external space, the site is surrounded by buildings and there are limited opportunities to enhance the biodiversity. However, there are some trees shown on the site plan at the southwest of the development which will enhance the biodiversity of the site. And, the development will make a contribution to biodiversity on the site in the course of design development. The suitably qualified ecologist should be appointed at detail design stage to understand other means to enhance the biodiversity. This is related with SPG Sustainable Design and Construction 2.8 / 3.3 and London Plan policy 5.3, 5.10, and 7.19. Details can be found in the BREEAM Pre-assessment in Appendix B.

Nature conservation and biodiversity	
Mayor's Priority	**London Plan Policy**
There is no net loss in the quality and quantity of biodiversity.	5.3, 7.19
Mayor's Priority	**London Plan Policy**
Developers make a contribution to biodiversity on their development site.	5.3, 7.19

Table 6 Summary of the Mayor's priorities set by SPG

4.4. Waste

The construction waste will be considered **to minimise, recycle and reuse** on site where possible, this will reduce the overall construction cost and at the same time minimise the amount of waste diverting to landfill. **Site Waste Management Plan (SWMP)** will be formalised before the construction works start and updated as the works continue on the site.

The proposed development will adopt the best waste management procedures to reduce the amount of waste going to landfill. This will be established by creating provisions for recycling and also waste segregation from general to recyclable waste. This development has **separated bin storages on the ground floor**, and the storages include refuse and recycling, with enough sizes in accordance with borough requirements. This is in line with SPG Sustainable Design and Construction 2.7 and London Plan policy 5.3 and 5.17 as below table. Details can be found in the BREEAM Pre-assessment in Appendix B.

Waste	
Construction phase	
Mayor's Priority	**London Plan Policy**
Developers should maximise the use of existing resources and materials and minimise waste generated during the demolition and construction process through the implementation of the waste hierarchy.	5.3, 5.20
Occupation phase	
Mayor's Priority	**London Plan Policy**
Developers should provide sufficient internal space for the storage of recyclable and compostable materials and waste in their schemes.	5.3, 5.17
Mayor's Priority	**London Plan Policy**
The design of development should meet borough requirements for the size and location of recycling, composting and refuse storage and its removal.	5.3, 5.17

Table 7 Summary of the Mayor's priorities set by SPG

- **Light**

Lighting scheme will be designed to minimise light pollution where feasible. Guidance Notes for the Reduction of Obtrusive Light (2005) will be utilised to reduce obtrusive light in accordance with SPG Sustainable Design and Construction 4.5 and London Plan policy 5.2, 5.3, and 6.7. Details can be found in the BREEAM Pre-assessment in Appendix B.

Light pollution	
Mayor's Priority	**London Plan Policy**
Developments and lighting schemes should be designed to minimise light pollution.	5.2, 5.3, 6.7

Table 8 Summary of the Mayor's priorities set by SPG

4.5. Flooding

The flood map for planning shows that the site is located **within Zone 1 of the flood risk** (see below image). Therefore, the detailed flood risk assessment has not been carried out for the site. In order to protect the site for future climate change impacts the Sustainable drainage strategy (SUDS) would be developed to incorporate attenuation for surface water runoff as well as habitat, water quality and amenity benefits in accordance with SPG Sustainable Design and Construction 3.4 and London Plan policy 5.3, 5.13, and 5.14. Therefore, there would be a net decrease in both the volume and rate of run-off leaving the site. As part of this, **permeable paving materials** will be used on the ground floor to avoid, reduce and delay the discharge of rainfall to public sewers and watercourses. And also, rainwater collection and recycling systems would be considered at detailed design stage where feasible.

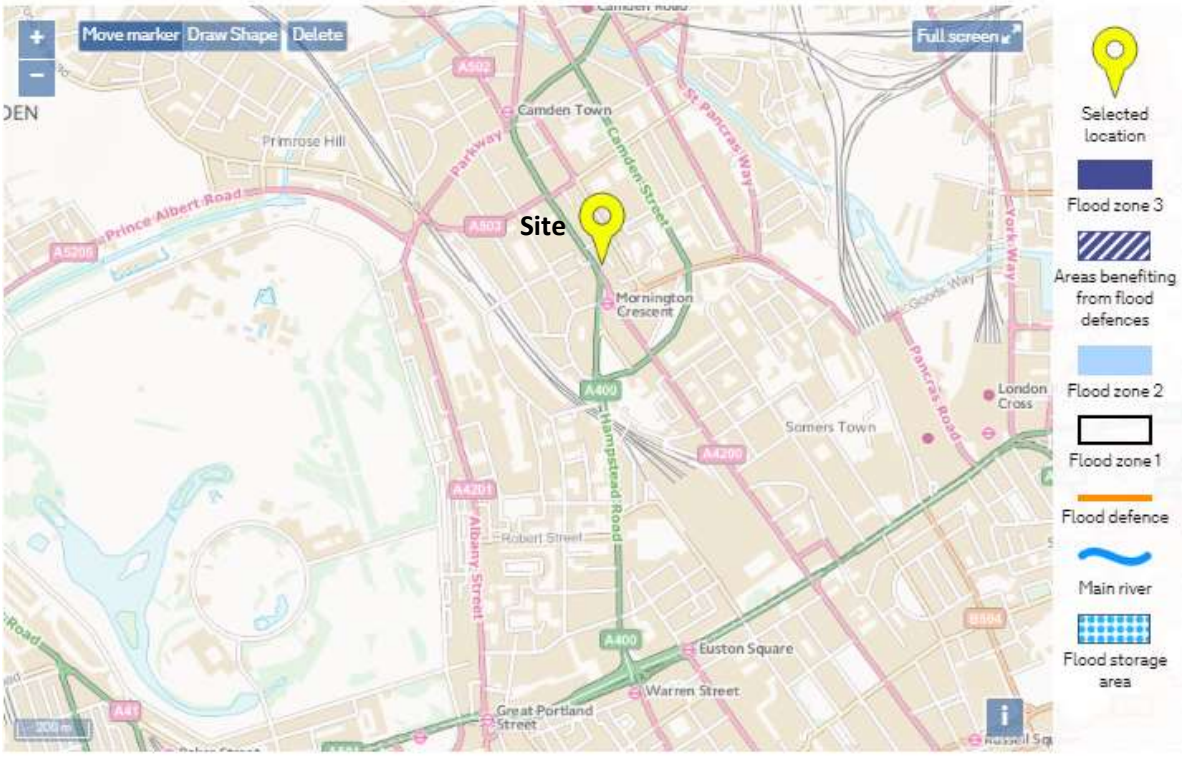

Figure 3 Flood map for planning

4.6. Pollution

- **Air**

The proposed scheme has been designed to minimise the generation of air pollution and mitigate against increased exposure to poor air quality. This will include **low/No NOx heating systems (air source heat pump) and non-toxic building materials** where feasible. Contractor will follow the guidance set out in the emerging Minimising dust and emissions from construction and demolition SPG when constructing their development.

Air quality	
Mayor's Priority	**London Plan Policy**
Developers are to design their schemes so that they are at least 'air quality neutral'.	7.14
Mayor's Priority	**London Plan Policy**
Developments should be designed to minimise the generation of air pollution.	5.3, 7.14
Mayor's Priority	**London Plan Policy**
Developments should be designed to minimise and mitigate against increased exposure to poor air quality.	3.2, 5.3, 7.14
Mayor's Priority	**London Plan Policy**
Developers should select plant that meets the standards for emissions from combined heat and power and biomass plants set out in Appendix 7.	7.14
Mayor's Priority	**London Plan Policy**
Developers and contractors should follow the guidance set out in the emerging *The Control of Dust and Emissions during Construction and Demolition SPG* when constructing their development.	5.3, 7.14

Table 9 Summary of the Mayor's priorities set by SPG

- **Noise**

The mitigation measures will be incorporated to the proposed building at construction stage to reduce sources of noise – insulate and soundproofing doors, walls, windows, floors and ceilings, and seal air gaps around windows etc. Details can be found in the BREEAM Pre-assessment in Appendix B.

Noise	
Mayor's Priority	**London Plan Policy**
Areas identified as having positive sound features or as being tranquil should be protected from noise.	3.2, 7.15
Mayor's Priority	**London Plan Policy**
Noise should be reduced at source, and then designed out of a scheme to reduce the need for mitigation measures.	3.2, 5.3, 7.6,.7 .15

Table 10 Summary of the Mayor's priorities set by SPG

5. Assessment Methodology

5.1. Mayor's Energy Hierarchy

The energy hierarchy is a classification of different methods to improve energy performance in a parallel sequence. This includes primarily a focus on reducing energy use by avoiding unnecessary use, to then improving the efficiency of energy systems to minimise loss, this is followed by exploiting renewable energy sources and then low carbon energy solutions for energy needs and finally, any remaining demand can be catered for by conventional fuel sources.

The Mayor's Energy Strategy adopts a set of principles to guide design development and decisions regarding energy, balanced with the need to optimise environmental and economic benefits. These guiding principles have been reordered since the publication of the Mayor's Energy Strategy in Feb 2004 and the adopted replacement London Plan 2011 with further alterations in 2015 stating that the following hierarchy should be used to assess applications:

- **BE LEAN** – By using less energy and taking into account the further energy efficiency measure in comparison to the baseline building.

- **BE CLEAN** – By supplying energy efficiently. The clean building looks at further carbon dioxide emission savings over the lean building by taking into consideration the use of decentralise energy via CHP.

- **BE GREEN** – By integrating renewable energy into the scheme which can further reduce the carbon dioxide emission rate.

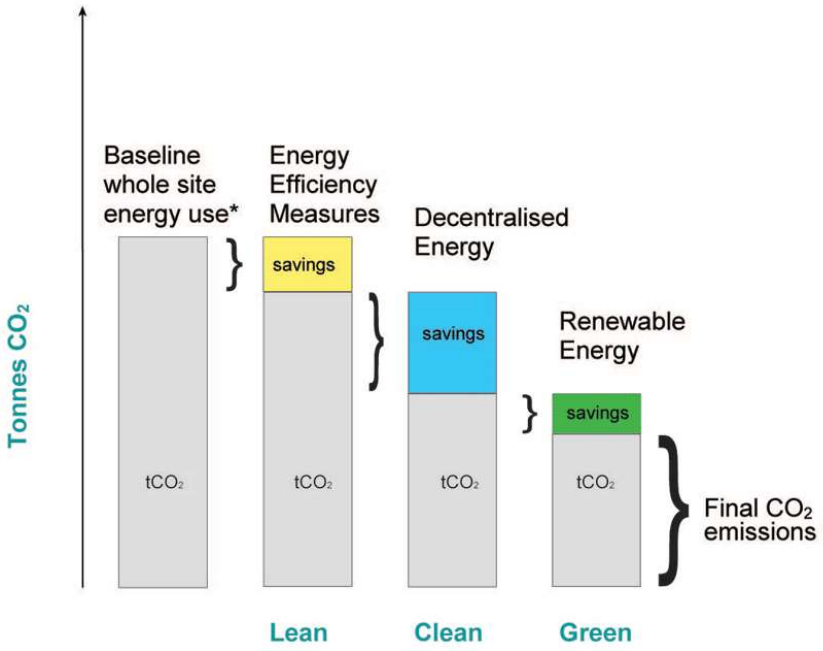

Figure 4 The Energy Hierarchy

5.1. Software and Input data

The Government approved software, i.e. **IES VE 2018**, have been utilised to carry out **Simplified Building Energy Model (SBEM)** calculations. The below Image shows the IES SBEM model for commercial units.

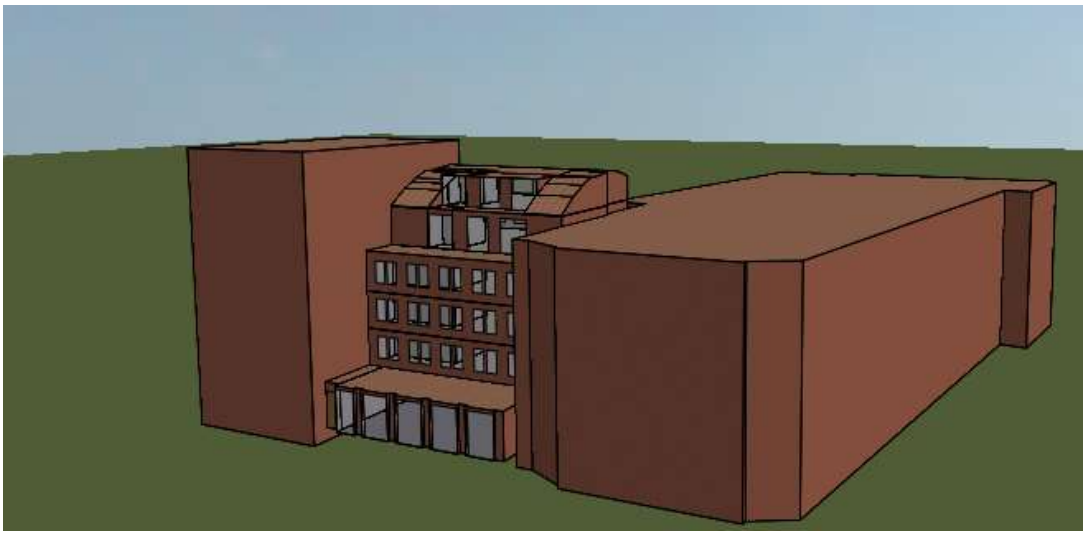

Image 1 IES model for commercial units

Syntegra received the architectural drawings and relevant documents, and they were used to undertake the energy assessments. The document references are listed in the table below.

No.	Document Name	Format	Received Date
1	540 PROPOSED PLANNING D 12 2019	dwg	08-04-2019
2	Camden High Street D&A Report Revision D	pdf	06-03-2019

Table 11 The document list

6. Baseline – Target Emission Rate

The baseline (known as Target Emission Rate), as calculated in line with the Building Regulation 2013, is the maximum amount of carbon dioxide a dwelling or non-residential unit is allowed to emit. The Target Emission Rate (TER) includes carbon dioxide emissions which are covered by Part L of the Building Regulations, known as regulated emissions (space and water heating, ventilation, lighting, pumps, fans & controls). The baseline energy uses and resulting CO_2 emissions rates of the development have been assessed using the Government approved software.

The baseline regulated CO_2 emissions for the development (as a whole) is presented in the table below:

BASELINE

BASELINE: TER	Regulated CO_2 Emissions (Tonnes CO_2/yr)
2-6 Camden High Street	20

Table 12 Regulated Carboon Emission at Baseline

7. BE LEAN – Energy Efficient Design

This section outlines the energy efficient measures taken in order to minimise the building's energy demand and therefore reduce energy use and CO_2 emissions further than the Baseline requirements (Building Regulations 2013 Part L compliance).

7.1. Passive Design Measures

- **Enhanced Building Elements**

At the 'BE LEAN' stage of the energy hierarchy, energy efficient building elements have been incorporated into the build. The heat loss of different building element is dependent upon their U-value, air tightness, and thermal bridging y-values. Therefore, better U-values and air permeability than the minimum values set in the Part L 2013 have been suggested in this development. Please see the table below more specifically:

		Part L2A min. required values	Proposed building values
U-value (W/m^2 K)	Wall	0.35	0.16
	Window unit (glass + frame)	2.20	1.2
	Floor	0.25	0.2
	Roof	0.25	0.13
	Door	1.5 -2.2	1.0
Air Permeability ($m^3/h.m^2$ at 50 Pa)		10	3.5

Table 13 Proposed Building Elements

- **Orientation & Natural Daylighting**

Passive solar gain reduces the amount of energy required for space heating during the winter months. The building is typically positioned to have west aspects, so they align with the roads and also maximise the passive solar gains into the building throughout the day. Moreover, the internal layout of the development has been designed to improve daylighting in all habitable spaces, as a way of improving the health and wellbeing of occupants.

- **Cooling and Overheating Hierarchy**

Based on the GLA guidance on preparing energy assessment (March 2016), various strategies have been considered for this development to reduce the cooling demand and the overheating risks. This follows below cooling hierarchy set by London Plan Policy 5.9.

- ✓ Firstly, **internal heat generation will be minimised through energy efficient design** in the course of design development. It will include minimizing pipe lengths (particularly lateral pipework in corridors of flats) and adopting pipe configurations which minimise heat loss, e.g. twin pipes.

- ✓ Moreover, **the amount of heat entering building in summer will be reduced through use of shading measures** including balconies, internal blinds or curtains.

- ✓ Next, the internal layout provides the dwellings the **passive ventilation via openable windows and dual aspect units**.

- ✓ Lastly, this natural ventilation will be adopted with **extract fans in wet rooms** (toilets, bathroom, and kitchen) to remove the hot humid air. The specific fan power (SFP) of 0.3W/l/s has been suggested at this early design stage.

Given the all strategies above, the cooling demand and overheating risks have been reduced, and therefore higher energy consumption and CO_2 emissions due to active cooling systems can be avoided. Further details can be found in the Climate Change Adaption - Overheating Assessment report.

- **Solar Shading**

The commercial area will incorporate internal blinds with transmission factor 0.4, which will provide solar shadings, and thus can reduce cooling energy for summer.

7.2. Active Design Measures

- **Heating, Cooling and Hot Water System**

At the 'BE LEAN' stage, combi boiler (91% efficiency) has been examined for space heating and hot water demand. Cooling will be supplied by electrical cooling systems. All suggested specifications below are provisional and have to be reviewed with mechanical engineers and contractors at detailed design stage.

Systems	Systems	Controls
Heating	Gas Boiler (efficiency of 91%)	Centre Time, optimum start/stop , Local Time and Temperature Control.
Hot water	Same as space heating	-
Cooling	Electric cooling (EER 3.6, SFP 1.2 W/(l.s))	-

Table 14 Heating, cooling and Hot water systems

Please note that the above system has been used only for carbon emission calculation at BE LEAN stage as per GLA Guidance on energy assessment. Suggested system will be mentioned at BE GREEN stage as Air Source Heat Pimp (ASHP) – Section 8.

- **High Efficiency Lighting**

The proposed light fittings will be low energy efficient fittings. **Lighting efficiency of 145 Lumens/ Circuit Watt with output ratio 1 (50lm/W for display lighting)** was considered at this early design stage. The suggested specifications should be reviewed at detailed design stage with electric engineers.

- **Heat Recovery Ventilation**

Mechanical ventilation (SFP 0.3 W/(l.s)) with heat recovery (MVHR with 0.85 HR efficiency) is used to improve its efficiency and reduce any heat loss from the building. The MVHR is proposed for the development to ensure adequate air quality and noise insulation.

The following table demonstrate the reduction in CO_2 emissions from the energy efficiency measures mentioned above. It can be seen that the overall CO_2 reduction at Be Lean stage is ***16%*** for the total emissions.

BE LEAN STAGE

Regulated CO_2 Emissions (Tonnes CO_2/yr)	**BASELINE**	**BE LEAN**	**CARBON REDUCTION (%)**
2-6 Camden High Street	20	17	16

Table 15 Regulated Carbon Emissions at Be Lean Stage

8. BE CLEAN – CHP & Decentralised Energy Networks

The Energy Hierarchy encourages the use of a CHP system and the connection to District Heating system to reduce CO_2 emissions further.

8.1. Decentralised Energy Network

The Mayor's Energy Strategy favours community heating systems because they offer:

- Potential economies of scale in respect of efficiency and therefore reduced carbon emissions; and
- Greater potential for future replacement with Low or Zero Carbon (LZC) technologies.

The feasibility of connecting into an existing heating network or providing the building with its own combined heat and power plant has been assessed alongside the **London Heat Map Study for the London Borough of Camden** as part of this assessment. The study identifies that the site is located near the existing district heating networks. This is demonstrated clearly from the London Heat Map (http://www.londonheatmap.org.uk) snapshot below.

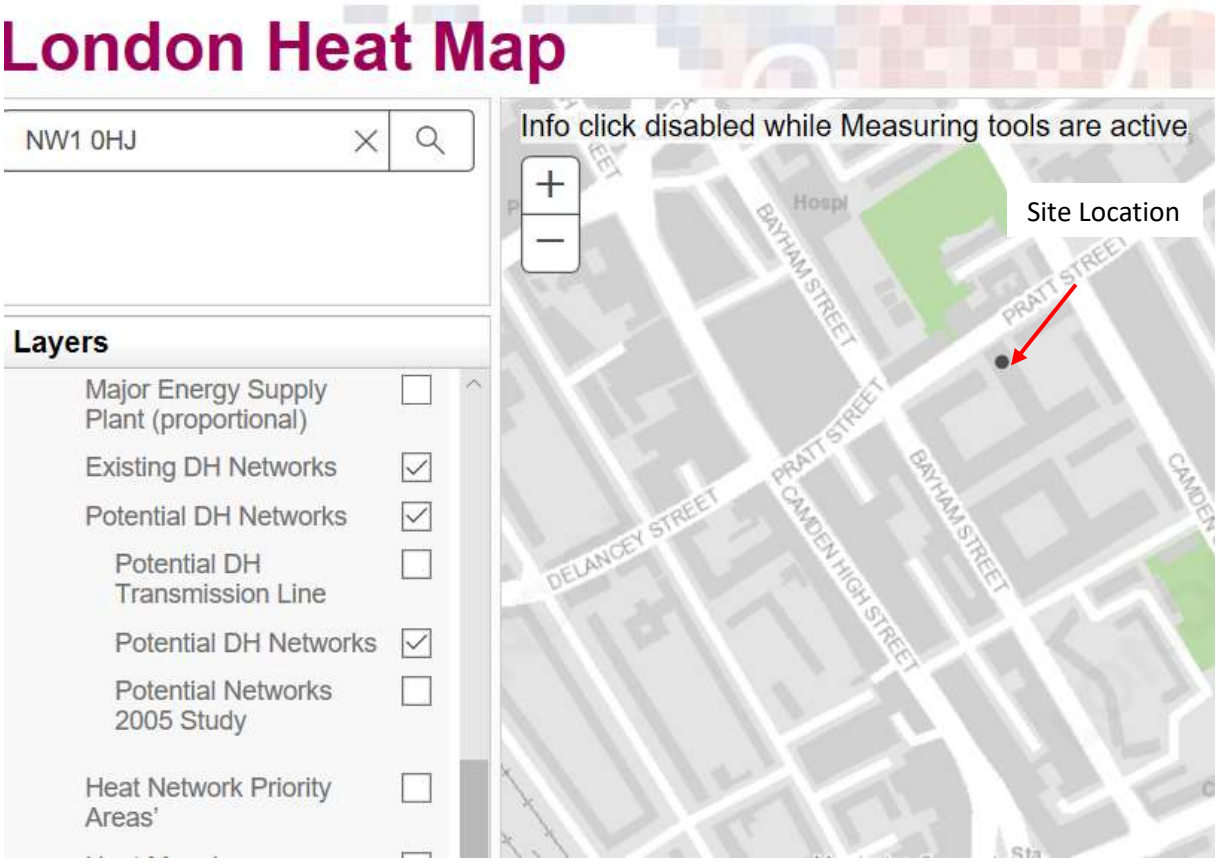

Figure 5 London Heat Map near the site

Moreover, the London heat map below identifies existing and potential DH networks in more broaden area, and it could not find any existing (in yellow) and potential (in red) DH networks within 500m radius from the property. The costs involved in extending the DH networks would outweigh the advantages in this development. **Therefore, utilisation of the DH network has not been a feasible option for this development.**

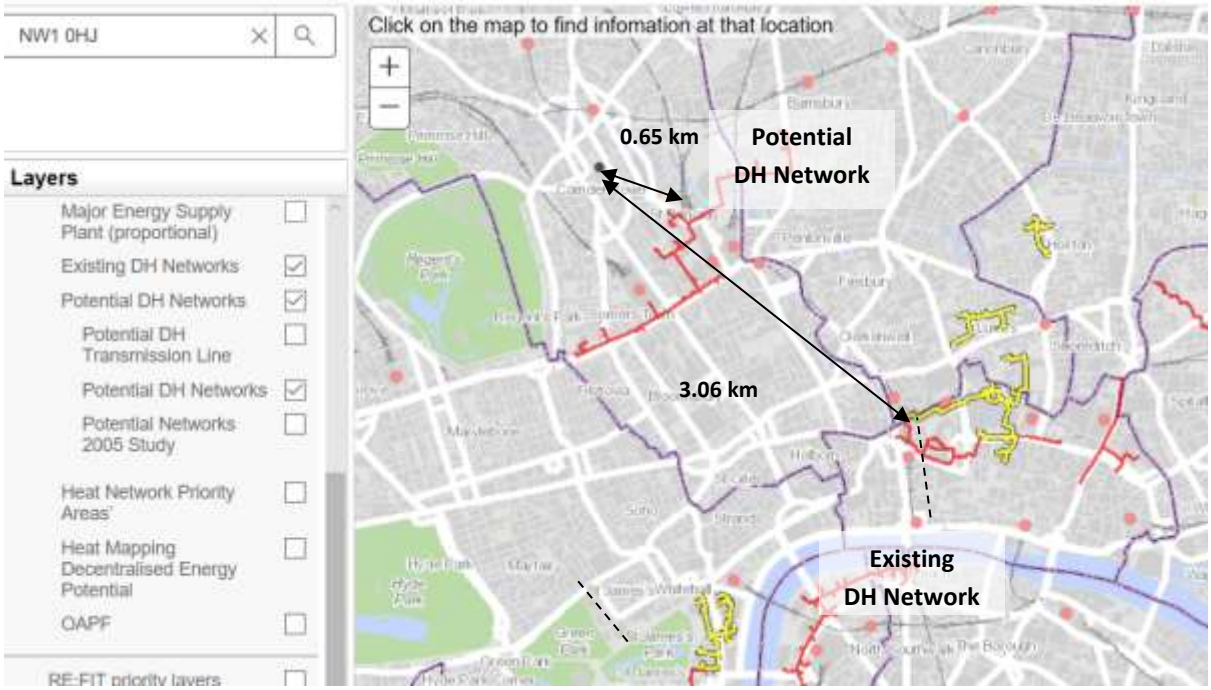

Figure 6 Existing and Potential DH Network near the site

8.2. CHP

The Energy Hierarchy identifies the combined heat and power (CHP) as a method of producing heat and electricity with much lower emissions than separate heat and power. Also, it encourages the creation of district heating systems supplied by CHP. The implementation of a CHP strategy should be decided according to good practice design. Key factors for the efficient implementation of the CHP system are:

- Development with high heating load for the majority of the year.
- CHP operation based on maximum heat load for minimum 10 hours per day.
- CHP operation at maximum capacity of 90% of its operating period.

To ensure that CHP is financially viable it is essential that the unit is selected to meet the base heat load and that this load is maintained over a large proportion of the day (a figure of 14 – 17 hours per day is often quoted subject to the load profiles and gas and electricity prices) to ensure that the additional costs (maintenance) associated with running a CHP unit can be recovered. This need to run the CHP plant, as far as possible continuously makes the building load profile of prime importance when reviewing the viability of such solutions and in particular the summer time heat load profile. To enable the CHP plant to run continuously when it is operating, a thermal store is often used so that excess CHP capacity can be used to generate hot water for use at a later time.

The feasibility of installing CHP has been assessed for this development. **Since this development has only commercial office units that would not require high hot water loads, installing the CHP system would not be beneficial given the cost. Hence the CHP system has not been considered for this small development at Be Clean stage.**

BE CLEAN stage

Regulated CO_2 Emissions (Tonnes CO_2/yr)	**BE LEAN**	**BE CLEAN**	**CARBON REDUCTION (%)**
2-6 Camden High Street	17	17	0

Table 16 Regulated Carbon Emissions at Be Clean Stage

Company name	Postcode	Contact
Wolseley UK Ltd	NW1 0BY	www.plumbcenter.co.uk FFP.Camden@wolseley.co.uk
Travis Perkins Trading Co. Ltd	NW1 0PT	www.travisperkins.co.uk sean.mahon@travisperkins.co.uk
Wolseley UK Ltd	N1C 4PD	www.pipecenter.co.uk k94.kingscross@wolseley.co.uk
Travis Perkins Trading Co. Ltd	N19 5UN	www.travisperkins.co.uk toby.duncan@travisperkins.co.uk
Wolseley UK Ltd	N5 2PW	www.plumbcenter.co.uk YM.Highbury@wolseley.co.uk
Travis Perkins Trading Co. Ltd	W2 6NA	www.travisperkins.co.uk liam.clancy@travisperkins.co.uk
Travis Perkins Trading Co. Ltd	EC1Y 0TY	www.travisperkins.co.uk keith.gittins@travisperkins.co.uk
Travis Perkins Trading Co. Ltd	EC1Y 0TY	www.travisperkins.co.uk kenneth.walker@travisperkins.co.uk
Travis Perkins Trading Co. Ltd	NW6 1SD	www.travisperkins.co.uk johnny.farmer@travisperkins.co.uk
Travis Perkins Trading Co. Ltd	E8 4DL	www.travisperkins.co.uk daniel.marsden@travisperkins.co.uk

- **Wind Power**

Wind turbines need extensive planning requirements and they are only feasible at consistent wind speed. Moreover, since the development is located in an urban area, the site does not have sufficient wind speed to operate wind turbine at the height of 10meters as shown below (http://www.renew-reuse-recycle.com/noabl.pl?n=503). Hence this option has been discounted.

Estimated average windspeeds around NW1 0..

Wind speed at 10m above ground level (m/s)		
4.9	4.8	4.9
4.8	**4.8**	4.9
4.9	4.8	4.8

Wind speed at 25m above ground level (m/s)		
5.6	5.6	5.7
5.6	**5.6**	5.6
5.7	5.6	5.6

Wind speed at 45m above ground level (m/s)		
6.1	6.1	6.2
6.1	**6.1**	6.1
6.2	6.1	6.1

Squares surrounding the central square correspond to wind speeds for surrounding grid squares. Power generated is related to windspeed by a cubic ratio. This means that if you halve the windspeed, the power goes down by a factor of 8 (which is 2 x 2 x 2). A quarter of the windspeed gives you a 64th of the power (4 x 4 x 4). As a rough guide, if your turbine is rated at producing 1KW at 12m/s, it will produce 125W at 6m/s and 15W at 3m/s.

Please note that the NOABL windspeed dataset used here is a model of windspeeds across the country, assuming completely flat terrain. It is not a database of measured windspeeds. Other factors such as hills, houses, trees and other obstructions in the vicinity need to be considered as well as they can have a significant effect. If you are thinking about installing a wind turbine, you should perform your own windspeed measurements using an anemometer to determine what the actual figures are.

9. BE GREEN – Renewable Energy

In this section the viable renewable energy technologies that could reduce the development's CO_2 emissions are examined. In determining the appropriate renewable technology for the site, the following factors were considered;

- Renewable energy resource or fuel availability of the LZC technology on the site.
- Space limitations due to building design and urban location of the site.
- Capital, operating and maintenance cost.
- Planning Permission
- Implementation with regards the overall M&E design strategy for building type
- Available Grants

The table below summarises the various low zero carbon technologies considered for the projects, and we have identified that **Air Source Heat Pumps (ASHP)** would be the most appropriate option in this development.

Technology	Local Planning Requirements	Carbon Payback	Grants/ Funding	Feasibility
Air Source Heat Pumps (ASHP)	Noise Issues from External units	High	Renewable Heat Incentive (RHI)	**HIGH**
Photovoltaic (PV)	Spatial and Shadowing	Medium	-	**MEDIUM**
Solar Thermal	Spatial and Shadowing	Low	Renewable Heat Incentive (RHI)	**MEDIUM**
Ground Source Heat Pumps (GSHP)	Spatial issues for Bore Holes and noise	Medium	Renewable Heat Incentive (RHI)	**MEDIUM**
Biomass	Spatial requirement for fuel storage and biomass odour	High	Renewable Heat Incentive (RHI)	**LOW**
Wind Power	Extensive planning requirements for noise and local biodiversity	Low	-	**LOW**
Hydro Power	Extensive planning requirements for noise and water quality	None	-	**ZERO**

Table 17 Feasibility Study of LZC Technologies

9.1. Non-feasible Technology

- **Ground Source Heat Pumps (GSHP)**

Ground source heat pump would be a feasible option to meet the space heating requirements, however, it requires ground space for bore holes to extract the ground heat to be utilised for space heating requirements. In this case there is no available ground space for a borehole or trench system, the ground source loop would have to be incorporated within the foundation piles of the structure, which would result in additional cost. Hence, this option is not suitable for this development.

- **Solar Thermal**

The use of solar thermal for this development would be limited to domestic hot water only. The use of solar thermal for space heating would not be practical as it is not required when solar thermal is at its most effective during the summer months. Therefore, this system would require additional plumbing and space for hot water storage, incurring additional financial cost. Moreover, the amount of carbon offset from the system is generally lower than other technologies. Therefore, this technology is deemed to be unsuitable for this development.

- **Hydro power**

There is no river or lake within the development site boundaries. Therefore, small scale hydro-electric will not be studied any further because of the location and the spatial limitations of the development.

- **Biomass**

A biomass system designed for this development would be fueled by wood pellets which have a high energy content. However, a biomass system would not be an appropriate technology for the site for the following reasons:

i. The burning of wood pellets releases substantially more NOx emissions when compared to similar gas boilers. As the development is situated within an urban area, the installation of a biomass boiler would further impact on the air quality in this area.
ii. the lack of spaces for pellet boiler and storage on the site.
iii. Pellets would need to be transported from local pellet suppliers, which causes carbon emissions to the air.

However, if the biomass system is considered at detailed design stage, local suppliers can be found near the site as shown in the map below (http://biomass-suppliers-list.service.gov.uk).

9.2. Proposed Technology

- **Air Source Heat Pumps (ASHP)**

ASHP can meet the space heating demands on site efficiently in comparison with gas boilers. Although this low carbon technology consumes electricity to operate, due to higher efficiency the heat output is much greater. Therefore, it has been suggested for the space heating, cooling and hot water demand. The design stage specifications used for energy calculations are in the table below. However, the mechanical engineer should be reviewed the specification during the design development.

Systems	General Specification	Control
Heating and Cooling	ASHP (Heating efficiency 4.61, cooling EER 4.48)	Centre Time, optimum start/stop , Local Time and Temperature Control.
Hot water	Dedicated gas boiler (efficiency 92%)	-

Table 18 Proposed Space HVAC and hot water System

Tariffs that apply for non-domestic Renewable Heat Incentive (RHI) are as shown in the table below based on the following link. https://www.ofgem.gov.uk/environmental-programmes/non-domestic-renewable-heat-incentive-rhi/tariffs-apply-non-domestic-rhi-great-britain.

Tariff name	Eligible technology	Eligible sizes	RHI
Air Source Heat Pumps (commissioned on or after 4 December 2013)	Air source heat pumps	All capacities	2.75 in pence per kWth

Table 19 Tariffs that apply for installations with an accreditation date on or after 1 April 2019

Given the proposed LZC technologies on the site (**ASHPs**), the overall CO2 reduction at BE GREEN stage can be calculated as shown below. And, it can be seen that the overall CO_2 reduction via on-site renewables is ***25%*** for the total emissions.

BE GREEN stage

Regulated CO_2 Emissions (Tonnes CO_2/yr)	**BE LEAN**	**BE CLEAN**	**CARBON REDUCTION (%)**
2-6 Camden High Street	17	12	25

Table 20 Regulated Carbon Reduction at Be Green Stage

10. Conclusion

This report assesses the predicted energy performance and carbon dioxide emissions of the proposed development at **2-6 Camden High Street, London, NW11 0HJ,** based on the information provided by the design team.

In line with the London Plan's three step energy hierarchy the regulated CO2 emissions for this development have been reduced by **41%** over Building Regulation 2013, once all measures in the table below are taken into account.

Stages	Strategies
BE LEAN Energy efficient design	• U-values better and air permeability better than Building Regulations Part L; • High efficiency gas boiler for heating and hot water. • Low energy (LED) type lighting; • Mechanical Ventilation with Heat Recovery units
BE CLEAN District heat networks or communal heating systems	As there are no current or proposed district heat networks and the size of the development is not suitable for CHP this stage of the hierarchy is not feasible for this scheme. Details can be found in section 8.1.
BE GREEN On-site renewable technologies	• Air Source Heat pump for heating and cooling.

Table 21 Energy Hierarchy and suggested strategies

This carbon savings from each stage can be calculated based on the results above. The chart below summarises the total cumulative savings:

Energy Hierarchy		Regulated Carbon Savings	
		Tonnes CO_2/yr	%
BE LEAN	After energy demand reduction	3	16 %
BE CLEAN	After heat network/ CHP	-	-
BE GREEN	After renewable energy	5	25 %
Total Cumulative Savings		**8**	**42%**
Total Target Savings		6	35 %

Table 22 Carbon dioxide Emissions after each stage of the Energy Hierarchy

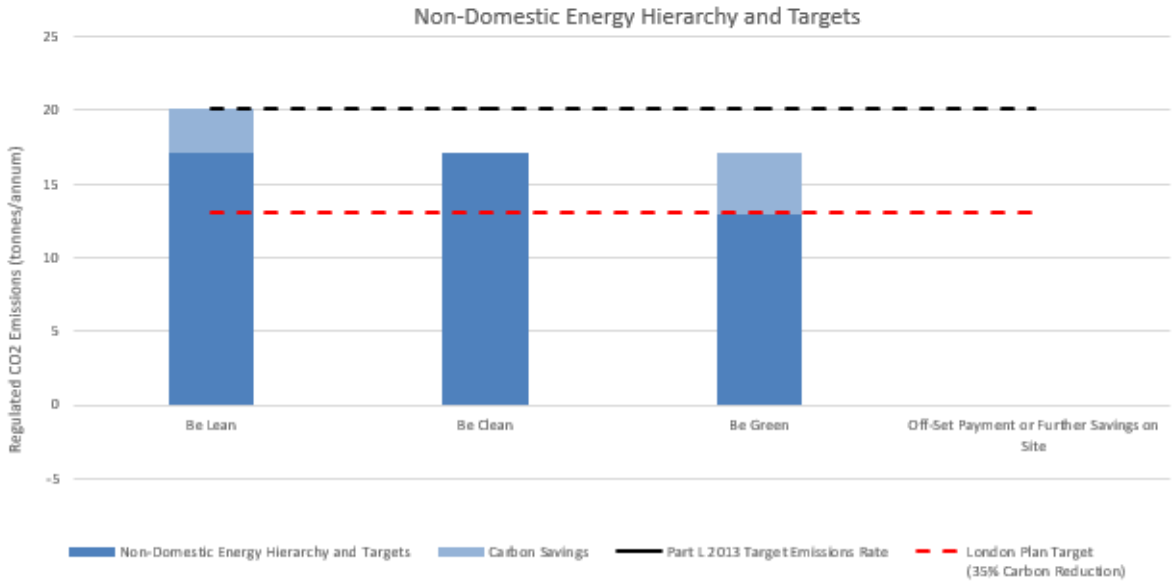

Figure 9 The Energy Hierarchy

11. Appendix A – SBEM Reports

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

2-6 Camden High Street - Be Lean

As designed

Date: Tue Apr 09 10:03:20 2019

Administrative information

Building Details

Address: London, NW1 0HJ

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.4.b.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.10

BRUKL compliance check version: v5.4.b.0

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	23.6
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	23.6
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	19.7
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

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

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

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.16	0.16	G0000001_W1
Floor	0.25	0.2	0.2	G0000000_F
Roof	0.25	0.13	0.13	G0000001_C
Windows***, roof windows, and rooflights	2.2	1.2	1.2	G0000001_W1_O0
Personnel doors	2.2	1.01	1.01	G0000002_W3_O0
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

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

* 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	3.5

Building services

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

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

1- Gas boiler + electric cooling

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	3.6	-	1.2	0.85
Standard value	0.91*	N/A	N/A	1.6^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* 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- SYST0001-DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	-
Standard value	N/A	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
G 0.03 LIFT LOBBY	-	-	-	-	-	-	-	0.3	-	-	N/A
G 0.02 RECEPTION	-	-	-	-	-	-	-	0.3	-	-	N/A
G 0.00 ENTRANCE HALL	-	-	-	-	-	-	-	0.3	-	-	N/A
G0.09 BIN STORE	-	-	-	-	-	-	-	0.3	-	-	N/A
G 0.08 CYCLE STORAGE	-	-	-	-	-	-	-	0.3	-	-	N/A
G0.10 FIRE ESCAPE	-	-	-	-	-	-	-	0.3	-	-	N/A
G 0.07 PRET A MANGER	-	-	-	-	-	-	-	0.3	-	-	N/A
G 0.04 LIFT	-	-	-	-	-	-	-	0.3	-	-	N/A
G 0.05 STAIRS	-	-	-	-	-	-	-	0.3	-	-	N/A
G 0.06 CORRIDOR	-	-	-	-	-	-	-	0.3	-	-	N/A
G0.11 Staircase	-	-	-	-	-	-	-	0.3	-	-	N/A
1F 1.03 OFFICE AREA	-	-	-	-	-	-	-	0.3	-	-	N/A
1F 1.04 LIFT	-	-	-	-	-	-	-	0.3	-	-	N/A

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
1F 1.05 STAIRS	-	-	-	-	-	-	-	0.3	-	-	N/A
1F 1.06 CORRIDOR	-	-	-	-	-	-	-	0.3	-	-	N/A
1F1.11 Staircase	-	-	-	-	-	-	-	0.3	-	-	N/A
1F 1.12 TOILET	0.3	-	-	-	-	-	-	0.3	-	-	N/A
2F 2.03 OFFICE AREA	-	-	-	-	-	-	-	0.3	-	-	N/A
2F 2.04 LIFT	-	-	-	-	-	-	-	0.3	-	-	N/A
2F 2.05 STAIRS	-	-	-	-	-	-	-	0.3	-	-	N/A
2F 2.06 CORRIDOR	-	-	-	-	-	-	-	0.3	-	-	N/A
2F2.11 Staircase	-	-	-	-	-	-	-	0.3	-	-	N/A
2F 2.12 TOILET	0.3	-	-	-	-	-	-	0.3	-	-	N/A
3F 3.03 OFFICE AREA	-	-	-	-	-	-	-	0.3	-	-	N/A
3F 3.04 LIFT	-	-	-	-	-	-	-	0.3	-	-	N/A
3F 3.05 STAIRS	-	-	-	-	-	-	-	0.3	-	-	N/A
3F 3.06 CORRIDOR	-	-	-	-	-	-	-	0.3	-	-	N/A
3F3.11 Staircase	-	-	-	-	-	-	-	0.3	-	-	N/A
3F 3.12 TOILET	0.3	-	-	-	-	-	-	0.3	-	-	N/A
3F3.12 PLANT ENCLOSURE	-	-	-	-	-	-	-	0.3	-	-	N/A
4F 4.03 OFFICE AREA	-	-	-	-	-	-	-	0.3	-	-	N/A
4F 4.04 LIFT	-	-	-	-	-	-	-	0.3	-	-	N/A
4F 4.05 STAIRS	-	-	-	-	-	-	-	0.3	-	-	N/A
4F 4.06 CORRIDOR	-	-	-	-	-	-	-	0.3	-	-	N/A
4F4.11 Staircase	-	-	-	-	-	-	-	0.3	-	-	N/A
5F 5.05 STAIRS	-	-	-	-	-	-	-	0.3	-	-	N/A
5F 5.05 STAIRS	-	-	-	-	-	-	-	0.3	-	-	N/A
5F 5.04 LIFT	-	-	-	-	-	-	-	0.3	-	-	N/A
5F 5.06 CORRIDOR	-	-	-	-	-	-	-	0.3	-	-	N/A
5F 5.03 OFFICE AREA	-	-	-	-	-	-	-	0.3	-	-	N/A
5F 5.11 STAIRS	-	-	-	-	-	-	-	0.3	-	-	N/A
5F 5.03 OFFICE AREA	-	-	-	-	-	-	-	0.3	-	-	N/A

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
G 0.03 LIFT LOBBY	-	145	-	49
G 0.02 RECEPTION	-	145	50	240
G 0.00 ENTRANCE HALL	-	145	-	179
G0.09 BIN STORE	145	-	-	76
G 0.08 CYCLE STORAGE	145	-	-	184
G0.10 FIRE ESCAPE	-	145	-	113
G 0.07 PRET A MANGER	-	145	-	744
G 0.04 LIFT	-	145	-	43
G 0.05 STAIRS	-	145	-	71
G 0.06 CORRIDOR	-	145	-	39

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
G0.11 Staircase	-	145	-	86
1F 1.03 OFFICE AREA	145	-	-	920
1F 1.04 LIFT	-	145	-	37
1F 1.05 STAIRS	-	145	-	61
1F 1.06 CORRIDOR	-	145	-	33
1F1.11 Staircase	-	145	-	64
1F 1.12 TOILET	-	145	-	76
2F 2.03 OFFICE AREA	145	-	-	920
2F 2.04 LIFT	-	145	-	37
2F 2.05 STAIRS	-	145	-	61
2F 2.06 CORRIDOR	-	145	-	33
2F2.11 Staircase	-	145	-	63
2F 2.12 TOILET	-	145	-	76
3F 3.03 OFFICE AREA	145	-	-	674
3F 3.04 LIFT	-	145	-	39
3F 3.05 STAIRS	-	145	-	64
3F 3.06 CORRIDOR	-	145	-	35
3F3.11 Staircase	-	145	-	66
3F 3.12 TOILET	-	145	-	79
3F3.12 PLANT ENCLOSURE	145	-	-	101
4F 4.03 OFFICE AREA	145	-	-	550
4F 4.04 LIFT	-	145	-	39
4F 4.05 STAIRS	-	145	-	63
4F 4.06 CORRIDOR	-	145	-	35
4F4.11 Staircase	-	145	-	66
5F 5.05 STAIRS	-	145	-	36
5F 5.05 STAIRS	-	145	-	56
5F 5.04 LIFT	-	145	-	29
5F 5.06 CORRIDOR	-	145	-	32
5F 5.03 OFFICE AREA	145	-	-	90
5F 5.11 STAIRS	-	145	-	59
5F 5.03 OFFICE AREA	145	-	-	358

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?
G 0.03 LIFT LOBBY	N/A	N/A
G 0.02 RECEPTION	NO (-78.9%)	YES
G 0.00 ENTRANCE HALL	N/A	N/A
G0.09 BIN STORE	NO (-58.8%)	YES
G 0.08 CYCLE STORAGE	N/A	N/A
G0.10 FIRE ESCAPE	NO (-24.2%)	YES
G 0.07 PRET A MANGER	NO (-42.1%)	YES
G 0.04 LIFT	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
G 0.05 STAIRS	N/A	N/A
G 0.06 CORRIDOR	N/A	N/A
G0.11 Staircase	N/A	N/A
1F 1.03 OFFICE AREA	NO (-75.6%)	YES
1F 1.04 LIFT	N/A	N/A
1F 1.05 STAIRS	N/A	N/A
1F 1.06 CORRIDOR	N/A	N/A
1F1.11 Staircase	N/A	N/A
1F 1.12 TOILET	N/A	N/A
2F 2.03 OFFICE AREA	NO (-75.6%)	YES
2F 2.04 LIFT	N/A	N/A
2F 2.05 STAIRS	N/A	N/A
2F 2.06 CORRIDOR	N/A	N/A
2F2.11 Staircase	N/A	N/A
2F 2.12 TOILET	N/A	N/A
3F 3.03 OFFICE AREA	NO (-70.6%)	YES
3F 3.04 LIFT	N/A	N/A
3F 3.05 STAIRS	N/A	N/A
3F 3.06 CORRIDOR	N/A	N/A
3F3.11 Staircase	N/A	N/A
3F 3.12 TOILET	N/A	N/A
3F3.12 PLANT ENCLOSURE	N/A	N/A
4F 4.03 OFFICE AREA	NO (-69.5%)	YES
4F 4.04 LIFT	N/A	N/A
4F 4.05 STAIRS	N/A	N/A
4F 4.06 CORRIDOR	NO (-20.2%)	YES
4F4.11 Staircase	NO (-71.8%)	YES
5F 5.05 STAIRS	N/A	N/A
5F 5.05 STAIRS	N/A	N/A
5F 5.04 LIFT	N/A	N/A
5F 5.06 CORRIDOR	NO (-42.6%)	YES
5F 5.03 OFFICE AREA	N/A	N/A
5F 5.11 STAIRS	NO (-83.9%)	YES
5F 5.03 OFFICE AREA	NO (-63.8%)	YES

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?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m^2]	1563.1	1563.1
External area [m^2]	1461.2	1461.2
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	4	3
Average conductance [W/K]	460.03	685.24
Average U-value [W/m^2K]	0.31	0.47
Alpha value* [%]	29.09	17.69

* 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
100	**B1 Offices and Workshop businesses**
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger terminals
	Others: Emergency services
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others: Stand alone utility block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	5	5.65
Cooling	7.21	8.61
Auxiliary	15.02	12.67
Lighting	9.21	18.51
Hot water	10.6	10.6
Equipment*	37.5	37.5
TOTAL**	**47.04**	**56.04**

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

Energy Production by Technology [kWh/m^2]

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

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	103.12	128.24
Primary energy* [kWh/m^2]	115.55	138.92
Total emissions [kg/m^2]	19.7	23.6

* 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] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	13.6	89.5	5	7.2	15	0.76	3.45	0.91	4.5
Notional	16.6	111.6	5.6	8.6	12.7	0.82	3.6	----	----

Key to terms

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

Key Features

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

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.16	G0000001_W1
Floor	0.2	0.2	G0000000_F
Roof	0.15	0.13	G0000001_C
Windows, roof windows, and rooflights	1.5	1.2	G0000001_W1_O0
Personnel doors	1.5	1.01	G0000002_W3_O0
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = 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	3.5

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

2-6 Camden High Street - Be Green

As designed

Date: Wed Apr 10 13:25:32 2019

Administrative information

Building Details

Address: London, NW1 0HJ

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.4.b.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.10

BRUKL compliance check version: v5.4.b.0

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	18.4
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	18.4
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	13.9
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	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.16	0.16	G0000001_W1
Floor	0.25	0.2	0.2	G0000000_F
Roof	0.25	0.13	0.13	G0000001_C
Windows***, roof windows, and rooflights	2.2	1.2	1.2	G0000001_W1_O0
Personnel doors	2.2	1.01	1.01	G0000002_W3_O0
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

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

* 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	3.5

Building services

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

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

1- ASHP

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	4.61	4.48	-	-	-
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					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

1- SYST0001-DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	0.91	-
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**
G 0.03 LIFT LOBBY	-	-	-	1.2	-	-	-	-	-	0.85	0.5
G 0.02 RECEPTION	-	-	-	1.2	-	-	-	-	-	0.85	0.5
G 0.00 ENTRANCE HALL	-	-	-	1.2	-	-	-	-	-	0.85	0.5
G0.09 BIN STORE	-	-	-	1.2	-	-	-	-	-	0.85	0.5
G 0.08 CYCLE STORAGE	-	-	-	1.2	-	-	-	-	-	0.85	0.5
G0.10 FIRE ESCAPE	-	-	-	1.2	-	-	-	-	-	0.85	0.5
G 0.07 PRET A MANGER	-	-	-	1.2	-	-	-	-	-	0.85	0.5
G 0.04 LIFT	-	-	-	1.2	-	-	-	-	-	0.85	0.5
G 0.05 STAIRS	-	-	-	1.2	-	-	-	-	-	0.85	0.5
G 0.06 CORRIDOR	-	-	-	1.2	-	-	-	-	-	0.85	0.5
G0.11 Staircase	-	-	-	1.2	-	-	-	-	-	0.85	0.5
1F 1.03 OFFICE AREA	-	-	-	1.2	-	-	-	-	-	0.85	0.5
1F 1.04 LIFT	-	-	-	1.2	-	-	-	-	-	0.85	0.5
1F 1.05 STAIRS	-	-	-	1.2	-	-	-	-	-	0.85	0.5
1F 1.06 CORRIDOR	-	-	-	1.2	-	-	-	-	-	0.85	0.5

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
1F1.11 Staircase	-	-	-	1.2	-	-	-	-	-	0.85	0.5
1F 1.12 TOILET	0.3	-	-	1.2	-	-	-	-	-	0.85	0.5
2F 2.03 OFFICE AREA	-	-	-	1.2	-	-	-	-	-	0.85	0.5
2F 2.04 LIFT	-	-	-	1.2	-	-	-	-	-	0.85	0.5
2F 2.05 STAIRS	-	-	-	1.2	-	-	-	-	-	0.85	0.5
2F 2.06 CORRIDOR	-	-	-	1.2	-	-	-	-	-	0.85	0.5
2F2.11 Staircase	-	-	-	1.2	-	-	-	-	-	0.85	0.5
2F 2.12 TOILET	0.3	-	-	1.2	-	-	-	-	-	0.85	0.5
3F 3.03 OFFICE AREA	-	-	-	1.2	-	-	-	-	-	0.85	0.5
3F 3.04 LIFT	-	-	-	1.2	-	-	-	-	-	0.85	0.5
3F 3.05 STAIRS	-	-	-	1.2	-	-	-	-	-	0.85	0.5
3F 3.06 CORRIDOR	-	-	-	1.2	-	-	-	-	-	0.85	0.5
3F3.11 Staircase	-	-	-	1.2	-	-	-	-	-	0.85	0.5
3F 3.12 TOILET	0.3	-	-	1.2	-	-	-	-	-	0.85	0.5
3F3.12 PLANT ENCLOSURE	-	-	-	1.2	-	-	-	-	-	0.85	0.5
4F 4.03 OFFICE AREA	-	-	-	1.2	-	-	-	-	-	0.85	0.5
4F 4.04 LIFT	-	-	-	1.2	-	-	-	-	-	0.85	0.5
4F 4.05 STAIRS	-	-	-	1.2	-	-	-	-	-	0.85	0.5
4F 4.06 CORRIDOR	-	-	-	1.2	-	-	-	-	-	0.85	0.5
4F4.11 Staircase	-	-	-	1.2	-	-	-	-	-	0.85	0.5
5F 5.05 STAIRS	-	-	-	1.2	-	-	-	-	-	0.85	0.5
5F 5.05 STAIRS	-	-	-	1.2	-	-	-	-	-	0.85	0.5
5F 5.04 LIFT	-	-	-	1.2	-	-	-	-	-	0.85	0.5
5F 5.06 CORRIDOR	-	-	-	1.2	-	-	-	-	-	0.85	0.5
5F 5.03 OFFICE AREA	-	-	-	1.2	-	-	-	-	-	0.85	0.5
5F 5.11 STAIRS	-	-	-	1.2	-	-	-	-	-	0.85	0.5
5F 5.03 OFFICE AREA	-	-	-	1.2	-	-	-	-	-	0.85	0.5

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
G 0.03 LIFT LOBBY	-	145	-	49
G 0.02 RECEPTION	-	145	50	240
G 0.00 ENTRANCE HALL	-	145	-	179
G0.09 BIN STORE	145	-	-	76
G 0.08 CYCLE STORAGE	145	-	-	184
G0.10 FIRE ESCAPE	-	145	-	113
G 0.07 PRET A MANGER	-	145	-	744
G 0.04 LIFT	-	145	-	43
G 0.05 STAIRS	-	145	-	71
G 0.06 CORRIDOR	-	145	-	39
G0.11 Staircase	-	145	-	86
1F 1.03 OFFICE AREA	145	-	-	920

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
1F 1.04 LIFT	-	145	-	37
1F 1.05 STAIRS	-	145	-	61
1F 1.06 CORRIDOR	-	145	-	33
1F1.11 Staircase	-	145	-	64
1F 1.12 TOILET	-	145	-	76
2F 2.03 OFFICE AREA	145	-	-	920
2F 2.04 LIFT	-	145	-	37
2F 2.05 STAIRS	-	145	-	61
2F 2.06 CORRIDOR	-	145	-	33
2F2.11 Staircase	-	145	-	63
2F 2.12 TOILET	-	145	-	76
3F 3.03 OFFICE AREA	145	-	-	674
3F 3.04 LIFT	-	145	-	39
3F 3.05 STAIRS	-	145	-	64
3F 3.06 CORRIDOR	-	145	-	35
3F3.11 Staircase	-	145	-	66
3F 3.12 TOILET	-	145	-	79
3F3.12 PLANT ENCLOSURE	145	-	-	101
4F 4.03 OFFICE AREA	145	-	-	550
4F 4.04 LIFT	-	145	-	39
4F 4.05 STAIRS	-	145	-	63
4F 4.06 CORRIDOR	-	145	-	35
4F4.11 Staircase	-	145	-	66
5F 5.05 STAIRS	-	145	-	36
5F 5.05 STAIRS	-	145	-	56
5F 5.04 LIFT	-	145	-	29
5F 5.06 CORRIDOR	-	145	-	32
5F 5.03 OFFICE AREA	145	-	-	90
5F 5.11 STAIRS	-	145	-	59
5F 5.03 OFFICE AREA	145	-	-	358

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?
G 0.03 LIFT LOBBY	N/A	N/A
G 0.02 RECEPTION	NO (-78.9%)	YES
G 0.00 ENTRANCE HALL	N/A	N/A
G0.09 BIN STORE	NO (-58.8%)	YES
G 0.08 CYCLE STORAGE	N/A	N/A
G0.10 FIRE ESCAPE	NO (-24.2%)	YES
G 0.07 PRET A MANGER	NO (-42.1%)	YES
G 0.04 LIFT	N/A	N/A
G 0.05 STAIRS	N/A	N/A
G 0.06 CORRIDOR	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
G0.11 Staircase	N/A	N/A
1F 1.03 OFFICE AREA	NO (-75.6%)	YES
1F 1.04 LIFT	N/A	N/A
1F 1.05 STAIRS	N/A	N/A
1F 1.06 CORRIDOR	N/A	N/A
1F1.11 Staircase	N/A	N/A
1F 1.12 TOILET	N/A	N/A
2F 2.03 OFFICE AREA	NO (-75.6%)	YES
2F 2.04 LIFT	N/A	N/A
2F 2.05 STAIRS	N/A	N/A
2F 2.06 CORRIDOR	N/A	N/A
2F2.11 Staircase	N/A	N/A
2F 2.12 TOILET	N/A	N/A
3F 3.03 OFFICE AREA	NO (-70.6%)	YES
3F 3.04 LIFT	N/A	N/A
3F 3.05 STAIRS	N/A	N/A
3F 3.06 CORRIDOR	N/A	N/A
3F3.11 Staircase	N/A	N/A
3F 3.12 TOILET	N/A	N/A
3F3.12 PLANT ENCLOSURE	N/A	N/A
4F 4.03 OFFICE AREA	NO (-69.5%)	YES
4F 4.04 LIFT	N/A	N/A
4F 4.05 STAIRS	N/A	N/A
4F 4.06 CORRIDOR	NO (-20.2%)	YES
4F4.11 Staircase	NO (-71.8%)	YES
5F 5.05 STAIRS	N/A	N/A
5F 5.05 STAIRS	N/A	N/A
5F 5.04 LIFT	N/A	N/A
5F 5.06 CORRIDOR	NO (-42.6%)	YES
5F 5.03 OFFICE AREA	N/A	N/A
5F 5.11 STAIRS	NO (-83.9%)	YES
5F 5.03 OFFICE AREA	NO (-63.8%)	YES

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?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m^2]	1563.1	1563.1
External area [m^2]	1461.2	1461.2
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	4	3
Average conductance [W/K]	460.03	685.24
Average U-value [W/m^2K]	0.31	0.47
Alpha value* [%]	29.09	17.69

* 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
100	**B1 Offices and Workshop businesses**
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger terminals
	Others: Emergency services
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others: Stand alone utility block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	0.88	1.9
Cooling	7.78	8.61
Auxiliary	4.73	2.73
Lighting	9.21	18.51
Hot water	10.07	10.6
Equipment*	37.5	37.5
TOTAL**	**32.67**	**42.34**

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

Energy Production by Technology [kWh/m^2]

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

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	103.12	128.24
Primary energy* [kWh/m^2]	81.68	107.95
Total emissions [kg/m^2]	13.9	18.4

* 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] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	13.6	89.5	0.9	7.8	4.7	4.3	3.2	4.61	4.5
	Notional	16.6	111.6	1.9	8.6	2.7	2.43	3.6	----	----

Key to terms

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

Key Features

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

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.16	G0000001_W1
Floor	0.2	0.2	G0000000_F
Roof	0.15	0.13	G0000001_C
Windows, roof windows, and rooflights	1.5	1.2	G0000001_W1_O0
Personnel doors	1.5	1.01	G0000002_W3_O0
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = 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	3.5

12. Appendix B – BREEAM Pre-Assessment

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VAT Registration No. 980016044
Registered Company Number. 06408056

BREEAM UK New Construction 2018 Assessment Report

BREEAM® UK delivered by bre

General information

BRE Assessment reference no.	BREEAM-19-5436
Client name	JCL Planning
Building end user/occupier	TBC
Assessor name	Umer Uzair
Assessors role	BREEAM Assessor
Assessor organisation	Syntegra Group Ltd.

Building details

Building name	Camden High Street
Building address	2-6 Camden High Street
County	UK
Post code	NW1 0HJ
Country	England
BREEAM scheme	New Construction
BREEAM version	2018 (SD5078)
BREEAM UK 2018 technical manual issue number	SD5078 Issue 1.2
Project scope	Fully fitted
Building type (main description)	Office
Building type (sub-group)	Office - General office building
Does this healthcare building have inpatient areas?	
Does this industrial building have an office area, or other occuped spaces?	
Assessment stage	Design (interim)
Building floor area (GIA) m^2	1563.1
Building floor area (NIFA) m^2	1563.1
Is the building designed to be untreated?	Yes
Building services - heating system type	None
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 escaltors or moving walks present?	No
Are laboratories present?	No
What percentage of total building area do laboratories represent?	No laboratory
Are there fume cupboard(s) and/or other containment devices present?	No
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?	No
Are the post-occupancy stage credits targeted in Ene 01?	No

Project team details

Developer	TBC
Principal contractor	TBC
Architect	TBC
Project management	TBC
Building services	TBC
BREEAM Accredited Professional	TBC
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, Umer Uzair, a qualified BREEAM assessor working on behalf of Syntegra Group Ltd. 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:	UU	Date	21/12/2018

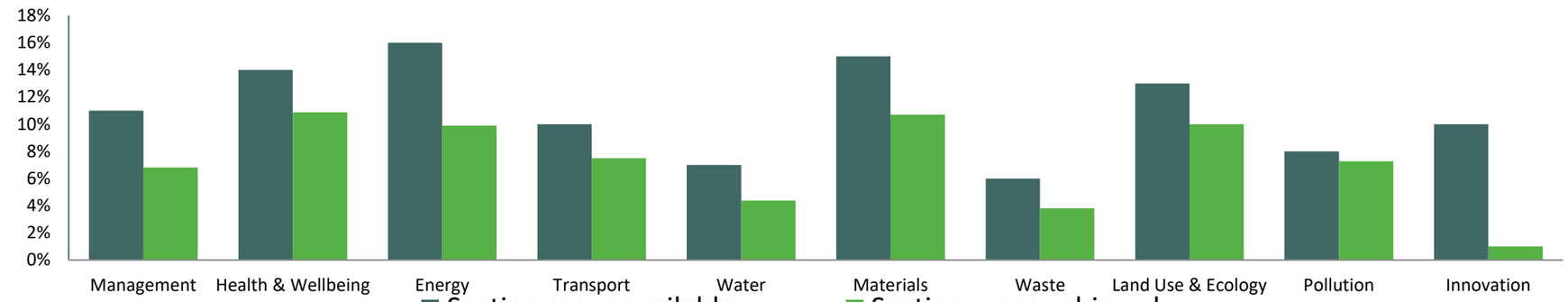
BREEAM UK New Construction 2018 Assessment Report: Rating & Key Performance Indicators

BREEAM® UK delivered by bre

Overall Building Performance

Building name	Camden High Street
BREEAM rating	Excellent
Total Score	72.20%
Min. standards level achieved	Excellent level

Building Performance by Environment Section



Environmental Section	No. credits available	No. credits Achieved	% credits achieved	Section Weighting	Section Score
Management	21	13	61.90%	11.00%	6.80%
Health & Wellbeing	18	14	77.78%	14.00%	10.88%
Energy	21	13	61.90%	16.00%	9.90%
Transport	12	9	75.00%	10.00%	7.50%
Water	8	5	62.50%	7.00%	4.37%
Materials	14	10	71.43%	15.00%	10.71%
Waste	11	7	63.64%	6.00%	3.81%
Land Use & Ecology	13	10	76.92%	13.00%	10.00%
Pollution	11	10	90.91%	8.00%	7.27%
Innovation	10	1	10.00%	10.00%	1.00%

BREEAM UK New Construction 2018 Assessment Report: Assessment Issue Scoring

BREEAM® UK delivered by bre

Building name	Camden High Street
Building score (%)	72.20%
Building rating	Excellent
Minimum standards level achieved	Excellent level

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)	Yes	1	1
Prerequisite: Have the client and the contractor formally agreed performance targets?	Yes		
BREEAM Advisory Professional (Concept Design)	No	1	0
BREEAM Advisory Professional (Developed Design)	No	1	0

Total BREEAM credits achieved	2
Total contribution to overall building score	1.05%
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	No	1	0
Capital cost of the project		£/m^2	

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:

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)	Yes	1	1	
Responsible construction management	2	2	2	
Monitoring of construction site impacts	Yes			
Utility consumption	Yes	1	0	Note: The KPI data
Transport of construction materials and waste	Yes	1	1	Note: The KPI data
Exemplary level criteria - Responsible construction management	No	1	0	

Key Performance Indicators: Construction site energy use

Energy consumption (total) - site processes		kWh
Energy consumption (intensity) - site processes		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		$KgCO_2$-eq
Carbon dioxide emissions (intensity) - site processes		$KgCO_2$-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?	No

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	No		

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	3.89%
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)	1	2	1
View out	Yes	1	1
Internal and external lighting levels, zoning and controls	Yes	1	1
Exemplary level daylighting		1	0
Exemplary level criteria - Internal and external lighting levels, zoning and control		1	0

Total BREEAM credits achieved	4
Total contribution to overall building score	3.11%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

Hea 02 Indoor Air Quality

No. of BREEAM credits available	4	Available contribution to overall score	3.11%
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	2	2	2
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	3
Total contribution to overall building score	2.33%
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	2.33%
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)		

Total BREEAM credits achieved	2
Total contribution to overall building score	1.56%
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	3	Available contribution to overall score	2.33%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Criteria performance requirements or SQA bespoke requirements?	Criteria performance requirements

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

Total BREEAM credits achieved	3
Total contribution to overall building score	2.33%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Hea 06 Security

No. of BREEAM credits available	1	Available contribution to overall score	0.78%
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	0.78%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	N/A

Hea 07 Safe & Healthy Surroundings

No. of BREEAM credits available	2	Available contribution to overall score	0.78%
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	0.78%
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	9.90%
No. of BREEAM exemplary credits available	5	Minimum standards applicable	Yes

Country of the UK where the building is located	England	
Actual building energy demand	103.120	MJ/m^2 yr
Notional building energy demand	128.240	MJ/m^2 yr
Actual building primary energy consumption	70.850	kWh/m^2yr
Notional building primary energy consumption	107.950	kWh/m^2yr
Actual building CO_2-eq emissions (BER)	12.100	$KgCO_2$-eq $/m^2$ yr
Notional building CO_2-eq emissions (TER)	19.700	$KgCO_2$-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 Actual building energy demand		MJ/m^2 yr

SAP Notional building energy demand		MJ/m^2 yr
SAP Actual building primary energy consumption		kWh/m^2yr
SAP Notional building primary energy consumption		kWh/m^2yr
SAP Actual building CO_2-eq emissions (BER)		KgCO_2-eq /m^2 yr
SAP Notional building CO_2-eq emissions (TER)		KgCO_2-eq /m^2 yr

Building Score

Total BREEAM credits achieved	6
Heating and cooling demand energy performance ratio (EPRdem)	0.147
Primary consumption energy performance ratio (EPRpc)	0.269
CO_2-eq energy performance ratio (EPRCO_2-eq)	0.234
Overall building energy performance ratio (EPRnc)	0.651
% improvement over building regulations (CO2-eq)	38.58%

Assessment criteria (exemplary credits)	Compliant?	Credits available	Credits achieved	
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 carried out?		4	0
Predicted energy consumption targets by end use, design assumptions and input data reported?			
Risk assessment to highlight any significant design, technical, and process risks?			

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?	No		
The energy model is submitted to BRE and retained by the building owner?	No		

Total BREEAM credits achieved	6
Total contribution to overall building score	4.57%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	Excellent level

Assessor comments/notes:

Ene 02 Energy monitoring

No. of BREEAM credits available	2	Available contribution to overall score	1.52%
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	Yes	1	1

Total BREEAM credits achieved	2
Total contribution to overall building score	1.52%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Ene 03 External lighting

No. of BREEAM credits available	1	Available contribution to overall score	0.76%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment criteria	Compliant?	Credits available	Credits achieved
External lighting has been designed out	No		
Is external lighting specified in accordance with the relevant criteria?	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.76%
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	2.29%
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?	Yes		
Passive design analysis	Yes	1	1
Free cooling	No	1	0
Low and zero carbon technologies	Yes	1	1

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

Total on-site and/or near-site LZC energy generation	16443.81	kWh/yr

Expected energy demand and CO_2-eq emissions reduction resulting from passive design measures as a percentage	Energy: 10.52	KWh/m^2yr
	CO2 emissions:	$KgCO_2$-eq/m^2 yr
Expected energy demand and CO_2-eq emissions reduction resulting from passive design measures as a percentage	Energy:	%
	CO2 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	2
Total contribution to overall building score	1.52%
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

Assessment criteria	Compliant?	Credits available	Credits achieved
Refrigeration energy consumption		N/A	N/A
Indirect greenhouse gas emissions		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	1.52%
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	1.52%
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	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 08 Energy 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

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

	Compliant	Credits available	Credits achieved
Significant majority contributors BREEAM compliant		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:

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 - Issue Tra 01 'Transport assessment and travel plan' credits achieved	Yes		
Location type (based on existing AI)	25 ≤ AI > 40 (urban centres)		
Number of points achieved overall	5	10	7

Total BREEAM credits achieved	7
Total contribution to overall building score	5.83%
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 Criteria	Compliant?	Credits available	Credits achieved
Please select the calculation procedure used	Standard approach		
Credits awarded	3	5	3
Exemplary performance		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	3
Total contribution to overall building score	2.63%
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	No	1	0
Flow control devices	Yes	1	1

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

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

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

Assessment Criteria	Compliant?	Credits available	Credits achieved
Total Mat 01 credits achieved - taken from the Mat 01/02 Results Submission Tool	5	7	5
Total Exemplary credits achieved - taken from the Mat 01/02 Results Submission Tool	0	3	0

Total BREEAM credits achieved	5
Total contribution to overall building score	5.36%
Total BREEAM exemplary credits achieved	0
Minimum standard(s) level	N/A

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.	1	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 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

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
Percentage of available for percentage of RSM points achieved	10.00%	3	1
Exemplary level performance		1	0

Total BREEAM credits achieved	2
Total contribution to overall building score	2.14%
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	2.73%
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	2
Have waste materials been sorted into separate key waste groups?	Yes	1	1
Exemplary level criteria			
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	5.00	tonnes/100m2
Total non-hazardous construction waste generated	90.00	tonnes
Non-hazardous non-demolition construction waste diverted from landfill - fill in to award diversion from landfill credit	90.00	%
Total non-hazardous non-demolition construction waste diverted from landfill	80.00	tonnes
Non-hazardous demolition waste diverted from landfill - fill in to award diversion of landfill credit	100.00	%
Total non-hazardous demolition waste generated	0.00	tonnes
Total non-hazardous demolition waste to disposal	0.00	tonnes
Non-hazardous excavation waste diverted from landfill - fill in to award credit	100.00	%
Material for reuse	80.00	tonnes
Material for recycling	20.00	tonnes
Material for energy recovery	0.00	tonnes
Hazardous waste to disposal	0.00	tonnes

Total BREEAM credits achieved	4
Total contribution to overall building score	2.18%

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	0.55%
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	100	1	1
Exemplary performance credit	Achieved	1	1

Key Performance Indicators

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

Total BREEAM credits achieved	1
Total contribution to overall building score	0.55%
Total BREEAM exemplary credits achieved	1
Minimum standard(s) level	N/A

Assessor comments/notes:

Wst 03 Operational Waste

No. of BREEAM credits available	1	Available contribution to overall score	0.55%
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)	Yes		
Vessel(s) for composting suitable organic waste and water outlet	Yes		

Total BREEAM credits achieved	1
Total contribution to overall building score	0.55%
Total BREEAM exemplary credits achieved	N/A
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Wst 04 Speculative finishes (Offices only)

No. of BREEAM credits available	1	Available contribution to overall score	0.55%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Installed in a show area only	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.55%
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	0.55%
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	No	1	0
Exemplary level - responding to climate change	No	1	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

Assessor comments/notes:

Wst 06 Design for disassembly and adaptability

No. of BREEAM credits available	2	Available contribution to overall score	0.55%
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:	yes	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 Identifying and understanding the risks and opportunities for the site

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
Prerequisite - Assessment route selection	Route 2		
Prerequisite - The client or contractor confirms monitoring of compliance with all relevant UK and EU or international legislation	Yes		
Survey and Evaluation	Yes	2	2
Determining the ecological outcomes of the site	Yes		
Exemplary level - Determining the ecological outcomes of the site	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 negative 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
Which assessment route is being followed?	Route 2		
Prerequisite - Identification and understanding the risks and opportunities for the site	Yes		
Planning, liaison and implementation	Yes	1	1
Managing negative impacts of the project	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 Change and enhancement of ecological value

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	Compliant?	Credits available	Credits achieved
Prerequisite - Assessment route selection	Route 2		
Prerequisite - Identification and understanding the risks and opportunities for the site	Yes		
Change and enhancement of ecology (Route 1 only)		0	0
Liaison, implementation and data collation (Route 2 only)	Yes	1	1
Change and enhancement of ecology (Route 2 only)	2	3	2
Exemplary level criteria (Route 2 only)	No	1	0

Total BREEAM credits achieved	3
Total contribution to overall building score	3.00%
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	Compliant?	Credits available	Credits achieved
Prerequisite - Assessment route selection	Route 2		
Prerequisite - Roles and responsibilities, implementation, statutory obligations	Yes		
Liaison, monitoring implementation, evolving management and maintenance solutions	Yes	1	1
Landscape and ecology management plan development	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	2.18%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Refrigerant containing systems installed in the assessed building?	Yes	2	2
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		kgCO2eq/kW heating and cooling capac	
Global Warming Potential of the specified refrigerant(s) 10 or less?	Yes		

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	3
Total contribution to overall building score	2.18%
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	1.45%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria		Credits available	Credits achieved
How many credits have been achieved?	1	2	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:

Pol 03 Flood and surface water management

No. of BREEAM credits available	5	Available contribution to overall score	3.64%
No. of BREEAM exemplary credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
	Yes		
Has a site-specific flood risk assessment been conducted?			
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	Yes	1	1

Total BREEAM credits achieved	5
Total contribution to overall building score	3.64%
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	0.73%
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:

Pol 05 Reduction of noise pollution

No. of BREEAM credits available	N/A	Available contribution to overall score	
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	No	N/A	N/A

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

Assessor comments/notes:

N/A

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 - Simply 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	Yes	1	1
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 - Simply Buildings only	N/A	N/A	N/A

Number of 'approved' innovation credits achieved?	

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

Assessor comments/notes:

N/A