





ENERGY STATEMENT

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Document Version

REV	DATE	DESCRIPTION	PREPARED	CHECKED
1	13/07/2023	First Draft V1	D.Barsted	A.Cotterill
2	18/07/2023	Minor Amendments	D.Barsted	A.Cotterill

This report has been prepared for the client only and expressly for the purposes set out in July 2023 and we owe no duty of care to any third parties in respect of its content. Therefore, unless expressly agreed by us in signed writing, we hereby exclude all liability to third parties, including liability for negligence, save only for liabilities that cannot be so excluded by operation of applicable law. The consequences of climate change and the effects of future changes in climatic conditions cannot be accurately predicted. This report has been based solely on the specific design assumptions and criteria stated herein.

Contents

1.Executive Summary	3
1.1 Introduction	3
1.2 Policies and Requirements	3
1.3 Energy Efficiency Measures	4
1.4 Low Carbon Energy Supply	4
1.5 On-site renewable technologies.....	4
1.6 Site Description	5
1.7 Renewable and Low Carbon Energy	6
2. Methodology	7
2.1 Limitations	7
2.2 Energy Hierarchy	7
2.3 Carbon Factors.....	7
3. Be Lean Measures	8
3.1 Thermal insulation	8
3.2 Fabric Air Permeability	8
3.3 Improved Glazing Elements	9
3.4 Thermal/Cold Bridging Details	9
3.5 Summary of Be Lean Measures.....	9
4. Be Clean Measures.....	10
4.1 Low Carbon Energy Supply	10
5. Be Green Measures	11
5.1 Solar Hot Water Panels	11
5.2 Photovoltaic (PV) Cells	12
5.3 Combined Heat and Power (CHP) and Micro-CHP (mCHP).....	12
5.4 Ground Source Heat Pumps (GSHP)	13
5.5 Air Source Heat Pumps (ASHP).....	13
5.6 Wind Turbines.....	14
5.7 Biomass	15
5.8 Summary of Be Green Measures.....	16
6. Conclusion	18
6.1 Summary of energy efficient measures	18
6.2 Summary of renewable or Low Carbon measures.....	18
6.3 Summary of Carbon Emissions reductions	19
6.4 Appendix 1 – SBEM Documents	20

1.Executive Summary

1.1 Introduction

This energy strategy has been prepared on behalf of Brocklehurst Architects Limited, hereafter referred to as the Applicant, in support of an full planning application for the development known as Oxford Road Pharmacy, 266-268 Oxford Road, hereafter referred to as the Development.

1.2 Policies and Requirements

National Policies

Below outlines the national policies this energy statement has been developed in accordance with,

- **National Planning Policy Framework**

The National Planning Policy Framework sets out the Government's planning policies for England and how these should be applied¹. It provides a framework within which locally-prepared plans for housing and other development can be produced.

- **Building Regulations Approved Document Part L**

Part L of Building Regulations covers the conservation of fuel and power, Notional specifications have been designed as a benchmarking tool to assess against. The DER (Dwelling Emission Rate) can therefore be assessed against the notional specification TER (Target Emission Rate).

Local Policies

Below outlines the local policies this energy statement has been developed in accordance with,

CC2: Sustainable Design and Construction

This policy seeks improved sustainability performance of buildings by setting out BREEAM requirements for non-residential developments conversions to residential. It also sets out the general principles of sustainability in new development that applies to both residential and non-residential uses. Requiring the specified BREEAM levels will significantly contribute to achieving Reading's emissions targets, as well as mitigating the effects of climate change.

CC3: Adaptation to Climate Change

This identifies measures including building orientation, shading, heating, ventilation, green or brown roofs and walls, planting and surface water run-off to deal with the effects of climate change. Where these measures are not appropriately incorporated, planners will consider whether or not this is a reason for refusal. This policy will ensure that development within the Borough is resilient in the face of climate change.

CC4: Decentralised Energy

This policy requires developers to consider inclusion of decentralised energy infrastructure, increasing the amount of decentralised energy provision in the Borough. This will help to achieve a shift to sustainable energy consumption and production and covers a wide range of technologies that reduce dependence on a centralised network or grid.

Assessment Methodology

As per the above national and local criteria, the below strategy has been adopted for the site

- 35% Reduction in CO₂ emissions has been set at a minimum target, to meet all of the requirements and incorporate adaption to climate change, an operational Net-zero target is set to be achieved
- The energy hierarchy and a fabric first approach will be utilised

1.3 Energy Efficiency Measures

The proposed development incorporates several energy efficiency measure and designs to ensure compliance & CO₂ reduction including:

- Fabric Insulation improvements on Building Regulations Part L minimum standards,
- Air permeability improvements on Building Regulations Part L minimum standards,
- Improved U & G Values for the development,
- Thermal bridging scheme adopted for cold bridging to minimise heat loss.
- Low Energy lighting scheme adopted on site.

1.4 Low Carbon Energy Supply

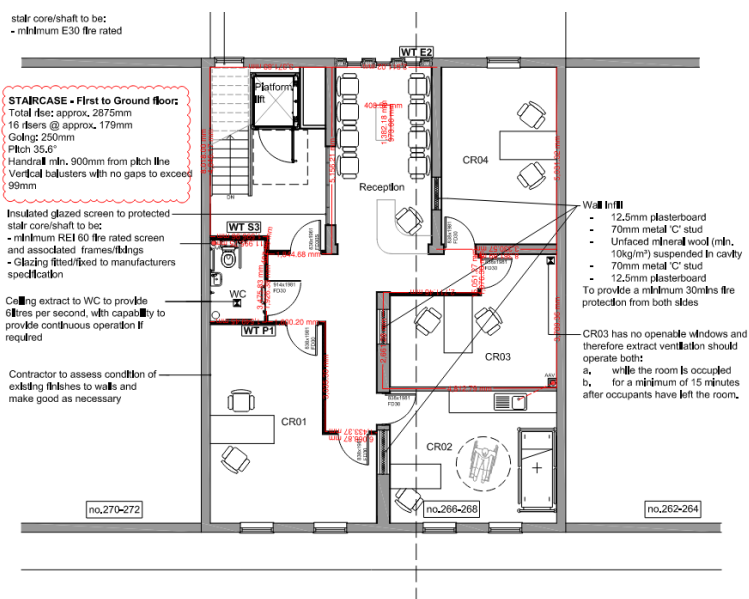
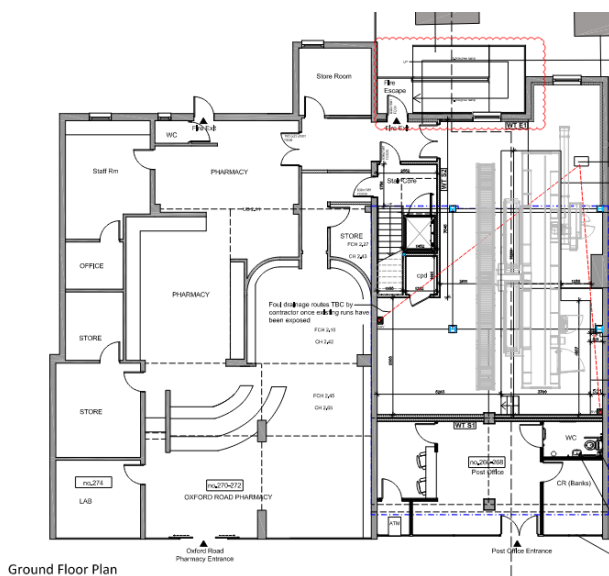
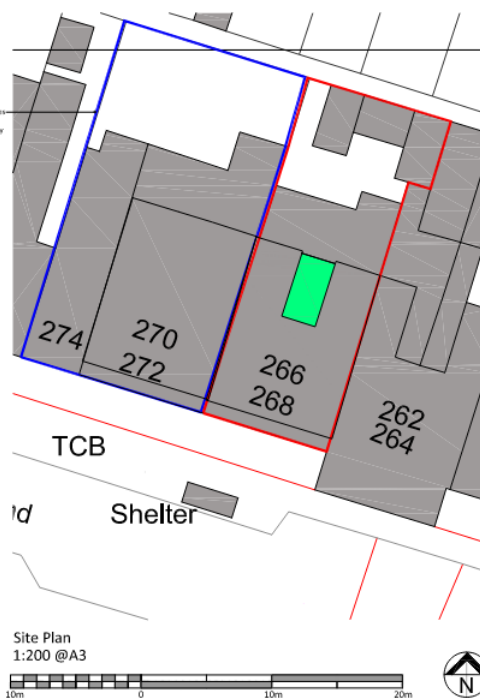
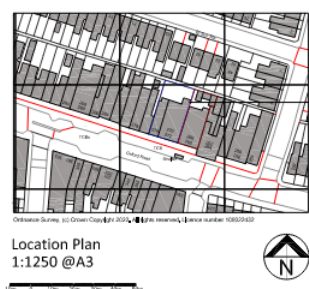
The proposed development does not have a significant thermal demand and is not within an area of which allows for a decentralised energy network to be utilised, therefore this option will not be explored further within this energy statement. It is recommended that the site is development in a manner that will allow to connection to a district heating system in the future is one is to become feasible.

1.5 On-site renewable technologies

The proposed design of the development incorporates the use of **Solar Photovoltaic** to meet the requirements of the local authority. Further options have been reviewed to provide further carbon reductions; the use of on-site renewable technologies has been reviewed in further details within this statement.

1.6 Site Description

The proposed development is set at Oxford Road Pharmacy, 266-274 Oxford Road. The proposed works to the site is the redevelopment of two existing commercial units to create a new pharmacy across two storeys. The development incorporates a new fill-in extension at the first floor level. The proposed development is to incorporate a high level of thermal performance and incorporate on-site renewable technologies to ensure the new development achieve the local policy requirements.



1.7 Renewable and Low Carbon Energy

Overall, **49.79%** of the predicted energy requirements is to be produced utilising Renewable or Low Carbon technologies as shown below, totalling a reduction of **49.79% site wide**.

	Regulated residential carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	1.72	21.68%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	2.22	28.11%
Cumulative on site savings	3.94	49.79%
Annual savings from off-set payment	3.94	-
	(Tonnes CO ₂)	
Cumulative savings for off-set payment	3.97	-
Cash in-lieu contribution (£)	7146	

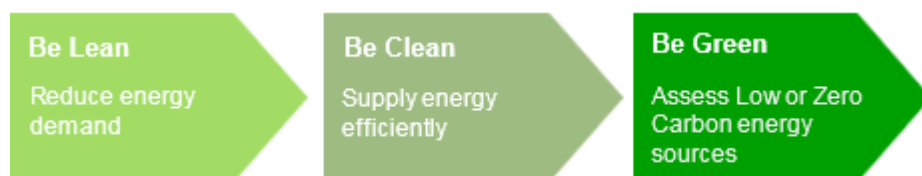
2. Methodology

2.1 Limitations

The calculations and figures utilised within this energy statement are based on Building regulations Part L methodology and should not be understood as a predictive assessment of likely future energy requirements. Other external factors will be present such as occupant system operation patterns and weather patterns.

2.2 Energy Hierarchy

The assessment has been carried out in accordance to the energy hierarchy method in line with GLA policy/s. The energy hierarchy method has been utilised to ensure the design of the development has reduced the demand for energy as far as reasonably practicable prior to the consideration of integrating Low or Zero Carbon technologies.



2.3 Carbon Factors

The below emissions factors were used to convert the energy requirement figures into CO₂ emissions; figures taken from Building Regulations Part L 2013. In Accordance with approved document guidance the below SAP 2012 emission factors have been used within the calculations.

Fuel	Emission Factor (kgCO ₂ /KWh)
Gas	0.210
Electricity	0.513

3. Be Lean Measures

The following sections details the design measures that have been considered/to be implemented at the development.

3.1 Thermal insulation

In order to reduce the overall heating and cooling requirements for the development it is imperative that the development incorporates an efficient thermal envelope. The below elements have been considered for the development.

- Fabric Insulation improvements on Building Regulations Part L1a minimum standards,
- Air permeability improvements on Building Regulations Part L1a minimum standards,
- Improved U & G Values for the development,
- Accredited thermal bridging scheme adopted for cold bridging to minimise heat loss.
- Low Energy lighting scheme adopted on site.

The table below outlines the u-value targets for the development in comparison to the limiting factor set out in Building regulations Part L.

Element	U-Value (W/m ² K)	
	Part L1 Limiting Factor	Development
Ground Floor	0.18	0.12
External Façade	0.26	0.15
Roof Wall	0.25	0.15
Insulated at Ceiling Roof	0.16	0.1
Sloped Roof	0.16	0.12
Glazing	1.4	1.2
Doors	1.4	1.1
Rooflights	1.4	1.3
Air Permeability	8	4
Low Energy Lighting	7lm/W	120lm/W

3.2 Fabric Air Permeability

Fabric air permeability is a measure of the volume of air that can penetrate through the fabric of a building leading to ventilation heat loss and gain. An improved air permeability rate has been included within the development to reduce the heat loss and gain and therefore reduce the heating and cooling requirements.

3.3 Improved Glazing Elements

Improvement measures have been made to the glazed elements of the development, the u-values for the glazing whole units are to achieve 1.2 W/m²k. Additional attention should be taken to the solar (G) values for the glazing to control solar gains and overheating.

3.4 Thermal/Cold Bridging Details

A combination of Accredited and bespoke details are to be used within the development to minimise the heat loss through the junction details, these details will be determined based on suitability to accredited details and bespoke details calculated where necessary.

3.5 Summary of Be Lean Measures

Element	U-Value (W/m ² K)	
	Part L1 Limiting Factor	Development
Ground Floor	0.25	0.23
External Façade New	0.35	0.17
External Façade Upgraded	0.35	0.29
Flat Roof New	0.25	0.18
Glazing	2.2	1.6
Doors	2.2	1.6
Air Permeability	N/A	15
Low Energy Lighting	75lm/W	120lm/W

4. Be Clean Measures

4.1 Low Carbon Energy Supply

The proposed development does not have a significant thermal demand and is not within an area of which allows for a decentralised energy network to be utilised, therefore this option will not be explored further within this energy statement. However the development does sit within a Heat Network Priority Areas, As the development is a single unit and a change of use, this justification has not been progressed and the feasibility of connection to a heat network has been deemed unviable due to financial and thermal demand.

5. Be Green Measures

The following sections discuss the renewable energy generation measures that have been considered, and those which will be implemented at the Development.

Renewable technologies harness energy from the environment and convert this to a useful form. Many renewable technologies are available. However, not all these are commercially viable, suitable for city-centre locations or appropriate for the Development.

Technologies considered for the Development include:

- Solar Hot Water Panels (Solar Thermal)
- Photovoltaic (PV) Cells
- Combined Heat and Power (CHP) and Micro-CHP (mCHP)
- Ground Source Heat Pumps (GSHP)
- Air Source Heat Pumps (ASHP)
- Wind Turbines

5.1 Solar Hot Water Panels

Solar Hot Water Panels or, Solar Panels as they are commonly known, are used to supplement the energy required for the domestic hot water requirement. The system will collect and absorb solar radiation and transfer the heat directly to the storage tank. The circulation may then be either 'passive' thus relying on the natural convection or 'active' using a pump which increases a system's efficiency but has additional costs for the controls and energy requirement.

There are two main types of solar panel collector available to the UK market. The first is Flat Plate Collectors which consist of a dark absorber sheet with pipes built into the sheet encased in a weatherproof box. This will pump the collected solar radiation to the storage device to heat the water for use. The second main system is Evacuated Tube Collectors. These devices are more efficient and are effective under a "...wider range of conditions..." (TM38:2006) due to the energy being drawn from "...light rather than outside temperature..." This therefore allows this type of system to adapt to cooler climes.

Solar Hot Water Panels have not been deemed viable for this development due to the available roof space and DHW demand, An alternative technology has been selected to further reduce the carbon emissions on site and to meet the financial and on-site feasibility.

5.2 Photovoltaic (PV) Cells

Solar panel electricity systems, also known as solar Photovoltaics' (PV), capture the sun's energy using photovoltaic cells. These cells do not need direct sunlight to work - they can still generate some electricity on a cloudy day. The cells convert the sunlight into electricity, which can be used to run household appliances and lighting.

PV cells are made from layers of semi-conducting material, usually silicon. When light shines on the cell it creates an electric field across the layers. The stronger the sunshine, the more electricity is produced. Groups of cells are mounted together in panels or modules that can be mounted on your roof.

The power of a PV cell is measured in kilowatts peak (kWp). That is the rate at which it generates energy at peak performance in full direct sunlight during the summer. PV cells come in a variety of shapes and sizes. Most PV systems are made up of panels that fit on top of an existing roof, but you can also fit solar tiles.

Photovoltaic (PV) Cells have been considered and have been deemed viable for this site, the available roof space would accommodate the required level of PV array to meet the on-site reductions, therefore this technology has been adopted on site.

5.3 Combined Heat and Power (CHP) and Micro-CHP (mCHP)

Micro-CHP' stands for micro combined heat and power. This technology generates heat and electricity simultaneously, from the same energy source, in individual homes or buildings. The main output of a micro-CHP system is heat, with some electricity generation, at a typical ratio of about 6:1 for domestic appliances.

A typical domestic system will generate up to 1kW of electricity once warmed up: the amount of electricity generated over a year depends on how long the system is able to run. Any electricity you generate and don't use can be sold back to the grid.

Domestic micro-CHP systems are currently powered by mains gas or LPG; in the future there may be models powered by oil or bio-liquids. Although gas and LPG are fossil fuels rather than renewable energy sources, the technology is still considered to be a 'low carbon technology' because it can be more efficient than just burning a fossil fuel for heat and getting electricity from the national grid. Micro-CHP systems are similar in size and shape to ordinary, domestic boilers and like them can be wall hung or floor standing. The only difference to a standard boiler is that they are able to generate electricity while they are heating water.

For the householder, there is little difference between a micro-CHP installation and a standard boiler. If the dwelling already has a conventional boiler then a micro-CHP unit should be able to replace it as it's roughly the same size. However, the installer must be approved under the Micro generation Certification Scheme. Servicing costs and maintenance are estimated to be similar to a standard boiler – although a specialist will be required.

CHP and mCHP have been considered for the project, in order to house the system, an external additional plant area would be required and therefore the feasibility of the CHP has not been deemed acceptable or viable due to planning restrictions. Additionally the carbon reductions for the mCHP system does not meet the Local Authority requirements due to the low heat demand.

5.4 Ground Source Heat Pumps (GSHP)

Ground source heat pumps use pipes which are buried in the garden to extract heat from the ground. This heat can then be used to heat radiators, underfloor or warm air heating systems and hot water in the home.

A ground source heat pump circulates a mixture of water and antifreeze around a loop of pipe - called a ground loop - which is buried in the garden. Heat from the ground is absorbed into the fluid and then passes through a heat exchanger into the heat pump. The ground stays at a constant temperature under the surface, so the heat pump can be used throughout the year - even in the middle of winter.

The length of the ground loop depends on the size of the home and the amount of heat needed. Longer loops can draw more heat from the ground, but need more space to be buried in. If space is limited, a vertical borehole can be drilled instead. Running costs will depend on several factors - including the size of the dwelling and how well insulated it is.

Ground Source Heat Pump has been considered for this project and has not been deemed viable due to the available external space. A more suitable technology has been selected to reduce the carbon emissions as well as financial and on-site feasibility.

5.5 Air Source Heat Pumps (ASHP)

Air source heat pumps absorb heat from the outside air. This heat can then be used to heat radiators, underfloor heating systems, or warm air convectors and hot water in dwellings.

An air source heat pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside. It can get heat from the air even when the temperature is as low as -15° C. Heat pumps have some impact on the environment as they need electricity to run, but the heat they extract from the ground, air, or water is constantly being renewed naturally.

Running costs will vary depending on several factors - including the size of the home, and how well insulated it is, and what room temperatures are achieved.

Air Source Heat Pump has been considered for the project and deemed a viable option for the project, the carbon reductions of the installation of a ASHP exceed the council requirements in carbon emissions, however a more financial feasible option has been adopted on the site.

5.6 Wind Turbines

Wind turbines harness the power of the wind and use it to generate electricity. Forty percent of all the wind energy in Europe blows over the UK, making it an ideal country for domestic turbines (known as 'microwind' or 'small-wind' turbines). A typical system in an exposed site could easily generate more power than a dwelling's lights and electrical appliances use.

Wind turbines use large blades to catch the wind. When the wind blows, the blades are forced round, driving a turbine which generates electricity. The stronger the wind, the more electricity produced. There are two types of domestic-sized wind turbine:

Pole mounted: these are free standing and are erected in a suitably exposed position, often around 5kW to 6Kw

Building mounted: these are smaller than mast mounted systems and can be installed on the roof of a home where there is a suitable wind resource. Often these are around 1kW to 2kW in size. Wind turbines are eligible for the UK government's Feed-in-Tariffs which means money can be earned from the electricity generated by the turbine. Payments for the electricity not use and export to the local grid are available as well. To be eligible, the installer and wind turbine product must be certified under the Microgeneration Certification Scheme (MCS). If the turbine is not connected to the local electricity grid (known as off grid), unused electricity can be stored in a battery for use when there is no wind. Please note that the Feed-in Tariffs scheme is not available in Northern Ireland.

Wind Turbines have been considered for this project, Pole mounted wind turbine has been excluded due to nature of the development and building mounted would not achieve the required reductions on site to meet the local requirements, therefore this has not been explored further.

5.7 Biomass

Energy from Biomass is produced by burning organic matter. Biomass fuel sources include trees, crops or animal dung are "...harvested and processed to create energy in the form of Electricity, Heat and Steam." (TM38:2006) Biomass is carbon based and when used as a fuel, produces carbon emissions. However, the carbon emitted during the combustion process is "...equivalent to the amount absorbed during growth..." (TM38:2006) The only carbon emissions associated with this energy source is treatment and transportation costs of the fuel to the end user.

Carbon savings that can be attributed to this technology type are significant. Biomass boiler installation can "...deliver all of the heating requirements for a building...using an almost carbon neutral fuel source." (TM38:2005) Biomass can be cost effective when directly compared to convention as oil and electricity heating sources. The benefit can be increased when the biomass source, for example wood chips, is diverted from the waste stream. However, maintenance requirements of a biomass system are higher and should be taken into account when installing one. Additionally, the UK introduced the Clean Air Act (1993) (www.uksmokecontrolareas.co.uk) to control the smoke pollution in areas caused by burning of smoky fuels.

Biomass been considered for the project, in order to house the system, an external additional plant area would be required and therefore the feasibility of the CHP has not been deemed acceptable or viable due to planning restrictions. If planning restrictions are limited on Biomass it is recommended to review the financial feasibility as the Biomass option exceeds the planning requirements.

5.8 Summary of Be Green Measures

Technology	Deemed Viable	Adopted on site
Solar Hot Water Panels (Solar Thermal)	✓	✗
Photovoltaic (PV) Cells	✓	✓
Combined Heat and Power (CHP) and Micro-CHP (mCHP)	✗	✗
Ground Source Heat Pumps (GSHP)	✗	✗
Air Source Heat Pumps (ASHP)	✓	✗
Wind Turbines	✗	✗
Biomass	✗	✗

	Regulated residential carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	1.72	21.68%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	2.22	28.11%
Cumulative on site savings	3.94	49.79%
Annual savings from off-set payment	3.94	-
	(Tonnes CO₂)	
Cumulative savings for off-set payment	3.97	-
Cash in-lieu contribution (£)	7146	

6. Conclusion

After reviewing the above renewable technologies, Solar PV have been identified as the most viable options to achieve the criteria set out by the local authority. The development has been deemed viable for additional measures and therefore it is recommended to explore the financial feasibility of these options to maximise the reduction in carbon emissions on site. The target of 35% has been exceeded to ensure compliance to Building regulations Part L.

6.1 Summary of energy efficient measures

Element	U-Value (W/m2K)	
	Part L1 Limiting Factor	Development
Ground Floor	0.25	0.23
External Façade New	0.35	0.17
External Façade Upgraded	0.35	0.29
Flat Roof New	0.25	0.18
Glazing	2.2	1.6
Doors	2.2	1.6
Air Permeability	N/A	15
Low Energy Lighting	75lm/W	120lm/W

6.2 Summary of renewable or Low Carbon measures

Element	
Main Heating System	Gas Boiler 93% efficiency assumed
Hot Water System	Provided via Main Heating System 300L Cylinder
Renewable Technologies	5.85 kWp solar PV array faced south

6.3 Summary of Carbon Emissions reductions

	Regulated residential carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	1.72	21.68%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	2.22	28.11%
Cumulative on site savings	3.94	49.79%
Annual savings from off-set payment	3.94	-
	(Tonnes CO ₂)	
Cumulative savings for off-set payment	3.97	-
Cash in-lieu contribution (£)	7146	

6.4 Appendix 1 – SBEM Documents

SBEM documentation has been included in a separate folder and is to be used in conjunction with this document to validate figures and reductions.

Project name

Oxford Road Pharmacy

As designed

Date: Fri Jul 21 14:16:21 2023

Administrative information

Building Details

Address: Address 1, Address 2, City, Postcode

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.20

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

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	24.9
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	24.9
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	19.5
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

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

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

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.28	0.29	"GF000009_W2"
Floor	0.25	0.23	0.24	"GF00000A_F"
Roof	0.25	0.18	0.18	"GF000009_C"
Windows***, roof windows, and rooflights	2.2	1.93	2.6	"GF00000A_W1_O0"
Personnel doors	2.2	1.6	1.6	"GF000009_W2_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 -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)] * There might be more than one surface where the maximum U-value occurs. ** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows. *** Display windows and similar glazing are excluded from the U-value check. N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	15*
* Buildings with less than 500 m ² total useful floor area may avoid the need for a pressure test provided that the air permeability is taken as 15 m ³ /(h.m ²) at 50 Pa.		

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- Main system

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.93	-	-	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					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.					

1- SYST0000-DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0.01
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	
GF:WC	0.3	-	-	-	-	-	-	-	-	-	N/A	
FF: WC	0.3	-	-	-	-	-	-	-	-	-	N/A	

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
Standard value	60	60	22	
GF: Circ	-	120	-	50
GF: Store	-	120	-	10
GF: Pharmacy2	-	120	85	795
GF: PO Office	120	-	-	57
GF: PO ATM	-	120	-	8
GF: PO	-	120	85	222
GF:WC	-	120	-	20
GF:PO CR Banks	120	-	-	73
FF: CR04	120	-	-	98

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
FF: CR03		120	-	-	93
FF: CR02		120	-	-	100
FF: Reception		120	-	-	83
FF: Circulation		-	120	-	24
FF: Circ/Lift		-	120	-	24
FF: WC		-	120	-	18
FF: CR01		120	-	-	120

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?
GF: Pharmacy2	NO (-91%)	NO
GF: PO Office	N/A	N/A
GF: PO	NO (-2%)	NO
GF:PO CR Banks	NO (-16.1%)	NO
FF: CR04	NO (-87.2%)	NO
FF: CR03	N/A	N/A
FF: CR02	NO (-70.7%)	NO
FF: Reception	NO (-46.8%)	NO
FF: CR01	NO (-70.3%)	NO

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

Separate submission

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

Separate submission

EPBD (Recast): Consideration of alternative energy systems

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

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	317.7	317.7
External area [m ²]	393.6	393.6
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	15	3
Average conductance [W/K]	140.95	123.35
Average U-value [W/m ² K]	0.36	0.31
Alpha value* [%]	18.1	14.14

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

Building Use

% Area	Building Type
100	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger terminals
	Others: Emergency services
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	30.68	13.8
Cooling	0	0
Auxiliary	2.56	1.24
Lighting	19.62	40.86
Hot water	6.17	2.62
Equipment*	26.45	26.45
TOTAL **	59.03	58.52

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

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

Energy Production by Technology [kWh/m²]

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

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	202.94	227.77
Primary energy* [kWh/m ²]	113.06	146.06
Total emissions [kg/m ²]	19.5	24.9

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

HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	91.7	111.3	30.7	0	2.6	0.83	0	0.93	0
	Notional	40.7	187.1	13.8	0	1.2	0.82	0	----	----

Key to terms

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

Key Features

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

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.17	"FF000003_W1"
Floor	0.2	0.22	"GF000009_F"
Roof	0.15	0.18	"GF000009_C"
Windows, roof windows, and rooflights	1.5	1.09	"FF000003_C_O0"
Personnel doors	1.5	1.6	"GF000009_W2_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-Typ} = Typical individual element U-values [W/(m²K)]		U _{i-Min} = Minimum individual element U-values [W/(m²K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	15

Project name

Oxford Road Pharmacy

As designed

Date: Fri Jul 21 14:12:03 2023

Administrative information

Building Details

Address: Address 1, Address 2, City, Postcode

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.20

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

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	24.9
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	24.9
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	12.5
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

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

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

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.28	0.29	"GF000009_W2"
Floor	0.25	0.23	0.24	"GF00000A_F"
Roof	0.25	0.18	0.18	"GF000009_C"
Windows***, roof windows, and rooflights	2.2	1.93	2.6	"GF00000A_W1_O0"
Personnel doors	2.2	1.6	1.6	"GF000009_W2_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 -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)] * There might be more than one surface where the maximum U-value occurs. ** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows. *** Display windows and similar glazing are excluded from the U-value check. N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	15*
* Buildings with less than 500 m ² total useful floor area may avoid the need for a pressure test provided that the air permeability is taken as 15 m ³ /(h.m ²) at 50 Pa.		

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- Main system

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.93	-	-	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					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.					

1- SYST0000-DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0.01
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	
GF:WC	0.3	-	-	-	-	-	-	-	-	-	N/A	
FF: WC	0.3	-	-	-	-	-	-	-	-	-	N/A	

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
Standard value	60	60	22	
GF: Circ	-	120	-	50
GF: Store	-	120	-	10
GF: Pharmacy2	-	120	85	795
GF: PO Office	120	-	-	57
GF: PO ATM	-	120	-	8
GF: PO	-	120	85	222
GF:WC	-	120	-	20
GF:PO CR Banks	120	-	-	73
FF: CR04	120	-	-	98

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
FF: CR03		120	-	-	93
FF: CR02		120	-	-	100
FF: Reception		120	-	-	83
FF: Circulation		-	120	-	24
FF: Circ/Lift		-	120	-	24
FF: WC		-	120	-	18
FF: CR01		120	-	-	120

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?
GF: Pharmacy2	NO (-91%)	NO
GF: PO Office	N/A	N/A
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Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

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

Separate submission

EPBD (Recast): Consideration of alternative energy systems

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

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
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Average conductance [W/K]	140.95	123.35
Average U-value [W/m ² K]	0.36	0.31
Alpha value* [%]	18.1	14.14

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

Building Use

% Area Building Type

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	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
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TOTAL **	59.03	58.52

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

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	13.48	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

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Primary energy* [kWh/m ²]	113.06	146.06
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[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	91.7	111.3	30.7	0	2.6	0.83	0	0.93	0
	Notional	40.7	187.1	13.8	0	1.2	0.82	0	----	----

Key to terms

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* 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	15