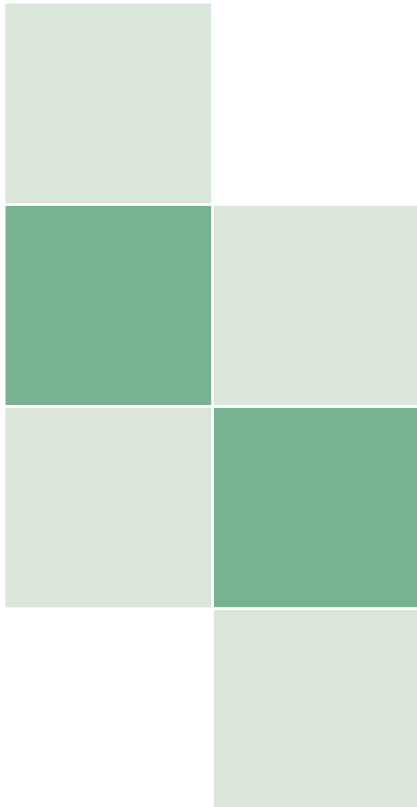




**Brunel Retail Park
Rose Kiln Lane, Reading**

Energy Statement



Ref: 1990 R001 Rev 0 Date: 23/10/2020

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Revision Record

Date	Doc Ref	Revision	Prepared By	Checked By
23.10.2020	1990 R001	0	BG	CW

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1.0 Executive Summary

This Energy Statement has been prepared as part of a planning application for proposed new warehouses at Brunel Retail Park, Rose Kiln Lane, Reading. This energy statement shall demonstrate that the proposed development meets the requirements as per UK Building Regulations and Reading Borough's Local Plan (adopted November 2019):

- compliance with Part L2A of the English Building Regulations 2013;
- measures taken to satisfy Reading Borough Local Plan Policies CC2 – Sustainable Design and Construction, and CC4 – Decentralised Energy

The results of the Part L2A 2013 assessment to show compliance with Criterion 1 of Building Regulations Part L2A 2013 are below, and shows a 37% improvement over that target for Unit 1 and a 29% improvement over that for Unit 2:

	Target CO2 emission rate (kgCO2/m ² .annum)	Building CO2 emission rate (kgCO2/m ² .annum)	Part L2A 2013 Betterment %
Unit 1, Brunel Retail Park	22.6	14.2	37
Unit 2, Brunel Retail Park	12.3	8.7	29

Table 1: Part L2A 2013 assessment results

The fabric u-values and building services system efficiencies selected at this stage show compliance with the requirements of Criterion 2 of Part L2A 2013.

The current design shows compliance with Criterion 3 of Part L2A 2013, in that there are no areas of solar exceedance.

The proposed design utilises improved fabric parameters and high efficiency LED lighting throughout in conjunction with a Variable Refrigerant Flow (VRF) system, which utilises Air Source Heat Pump (ASHP) technology and high efficiency ventilation with heat recovery for the office area, as well as Photovoltaic cells (PV), and currently achieves a BREEAM 'Excellent'

2.0 Background

2.1 Introduction

The Proposed Development, located at Brunel Retail Park, Rose Kiln Lane, Reading, involves site-wide redevelopment to provide two new industrial units with dedicated car parking and servicing arrangements, access and landscaping.

It is envisaged that this will be a phased development with Phase 1 consisting of the erection of Unit 2 (41,140 ft²) and Phase 2 consisting of the erection of Unit 1 (89,000 ft²)

Therefore, the elements contained within the development are to be assessed using Approved Document Part L2A, which is intended for new-build, commercial premises.

The calculations within this report are preliminary and includes high-level assumptions, thus will need to be recalculated at various stages throughout the design of the development to ensure that compliance with all criteria are still achieved.

2.2 Site Location

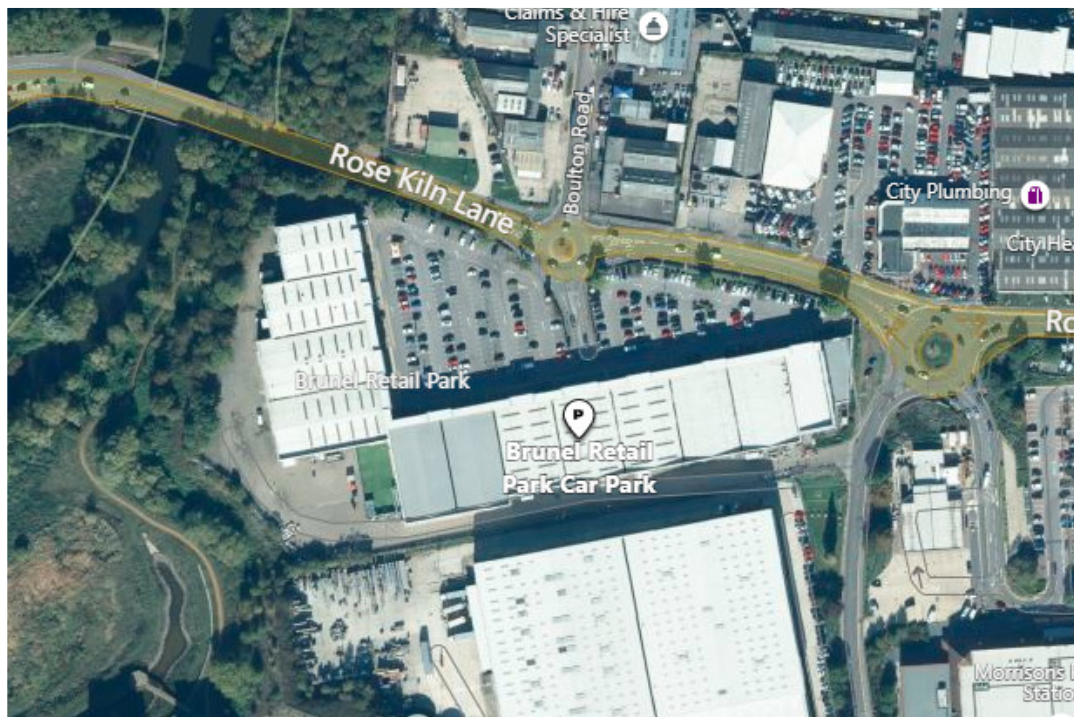


Figure 1: Site location

2.3 Modelling Disclaimer

The building has been modelled with accredited software package IESve Version 7.0.12, which is dynamic simulation software approved for the purpose of

demonstrating compliance with the energy efficiency and carbon emission requirements of the building regulations.

It should be noted that the data generated by this work is obtained using computer simulations. These simulations are the best means of predicting the performance of the building at this stage. Full certainty can only be achieved by measuring the performance of the building and associated systems after a period of use.

Whilst the simulations have been undertaken in good faith using reasonable skill and care, Crookes Walker Consulting Limited (CWC) can take no responsibility for differences between the computer simulations and the actual performance of the completed building due to the inherent complexity and variability of the physics in a building and its environment.

3.0 Energy Targets

3.1 Building Regulations Part L2A 2013

The English Building Regulations Part L2A 2013 are made up of five criteria which all need to be achieved in order to attain overall compliance. The three which are the focus of this assessment are:

- Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target;
- Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards and energy efficiency;
- Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains.

Criterion 1

Carbon dioxide emissions (kgCO₂/m²/year) are noted as the Emission Rating; the Building Emission Rating (BER) must be lower than or equal to the Target Emission Rating (TER).

The results of the Part L2A 2013 assessment to show compliance with Criterion 1 of Building Regulations Part L2A 2013 are below, and shows a 37% improvement over that target for Unit 1 and a 29% improvement over that for Unit 2:

	Target CO2 emission rate (kgCO ₂ /m ² .annum)	Building CO2 emission rate (kgCO ₂ /m ² .annum)	Part L2A 2013 Betterment %
Unit 1, Brunel Retail Park	22.6	14.2	37
Unit 2, Brunel Retail Park	12.3	8.7	29

Table 1: Part L2A 2013 assessment results

Criterion 2

Ensure that minimum standards are achieved throughout the design, in terms of fabric, systems and lighting. This is calculated on an individual element basis; thus, all elements must exceed those outlined in the Building Regulations and Non-Domestic Building Service Compliance Guide.

Criterion 3

The amount of solar gains allowed to enter the occupied spaces should not exceed those outlined in the notional building. This is to reduce the energy demand of heating and cooling systems within the development. Both Unit 1 and Unit 2, Brunel Retail Park design stage BRUKLs demonstrates compliance with Criterion 1, Criterion 2 and Criterion 3 of the Building Regulations Part L2A 2013.

3.2 Reading Borough Local Plan

Further to achieving Part L compliance, the proposed development, must also adhere to Reading Borough Local Plan (adopted November 2019). The policies which this assessment will focus on is Policies CC2 – Sustainable Design and Construction, and CC4 – Decentralised Energy

CC2: SUSTAINABLE DESIGN AND CONSTRUCTION

Proposals for new development, including the construction of new buildings and the redevelopment and refurbishment of existing building stock, will be acceptable where the design of buildings and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.

To meet these requirements:

- *All major non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Excellent' standards, where possible;*
- *All minor non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Very Good' standard as a minimum;*
- *All non-residential development or conversions to residential should incorporate water conservation measures so that predicted per capita consumption does not exceed the appropriate levels set out in the applicable BREEAM standard. Both residential and non-residential development should include recycling greywater and rainwater harvesting where systems are energy and cost effective.*

Figure 2: Reading Borough Local Plan Policy CC2

CC4: DECENTRALISED ENERGY

In meeting the sustainability requirements of this plan, developments of the sizes set out below shall demonstrate how consideration has been given to securing energy for the development from a decentralised energy source.

Any development of more than 20 dwellings and/ or non-residential development of over 1,000 sq m shall consider the inclusion of decentralised energy provision, within the site, unless it can be demonstrated that the scheme is not suitable, feasible or viable for this form of energy provision.

Where there is existing decentralised energy provision present within the vicinity of an application site, further developments of 10 dwellings or more or non-residential development of 1,000 sq m or more will be expected to link into the existing decentralised energy network or demonstrate why this is not feasible.

Figure 3: Reading Borough Local Plan Policy CC4

3.2.1 Demand Reduction

The first step is to reduce the building's energy demand through passive measures, such as improved fabric and being more air tight. Below is a table with the parameters used in comparison to the minimums required by Building Regulations:

Building Element	Minimum Building Regs Fabric (U-value, W/m²K)	Unit 1 & 2 Fabric (U-value, W/m²K)
<i>External Walls</i>	0.35	0.18
<i>Floor</i>	0.25	0.18
<i>Roof</i>	0.25	0.18
<i>Windows</i>	2.20	1.40
<i>Personnel Doors</i>	2.20	1.50
<i>Vehicle Access & Similar Large Doors</i>	1.50	1.50
<i>Air Permeability</i>	10 m ³ /hr/m ² @ 50 Pa	5 m ³ /hr/m ² @ 50 Pa

Table 2: Unit 1 & 2's fabric improvements and air permeability in comparison to Building Regulations.

3.2.2 Energy efficiency and low/zero carbon technologies and networks

Step 2 is to utilise high efficiency and low/zero carbon building services for the development. The following were considered:

Low or Zero Carbon Technology	Likelihood of Being Feasible	Main Reason for Dismissal	Feasible to Export Energy?	Cost For Carbon Emission Reduction
HYDRO-POWER	Unlikely	Whilst there is a running watercourse nearby the flow of water is not enough to provide a meaningful supply of energy.	Yes (if technology was feasible for development)	High
COMBINED HEAT & POWER	Unlikely	Absence of a continuous heat demand renders CHP technically inapplicable	Yes (if technology was feasible for development)	High
SOLAR PHOTOVOLTAICS	Likely	Photovoltaics could be implemented to contribute to the Electricity demands of the warehouses and offices	Yes – can be easily linked to the grid supplied electricity	Medium
SOLAR THERMAL	Unlikely	There is a small domestic hot water demand for this development making this technology not feasible	No – there is no existing network that could incorporate this technology	Medium
HIGH EFFICIENCY CHILLERS	Unlikely	This technology is not required for the VRF solution adopted.	No – there is no existing network	Medium
AIR SOURCE HEAT PUMPS	Likely	This technology is likely to be applicable to the offices	No - there is no existing network	Medium

GROUND / WATER SOURCE HEAT PUMPS	Unlikely	Limited footprint of the site, constrained by heavy vehicular access routes	No	Low
WIND POWER	Unlikely	The strobing effect and noise issues from this technology are not acceptable in this location.	Yes (if technology was feasible for development)	High
BIOMASS	Unlikely	Site location and logistics preclude this from viability.	No – there is no existing network that could incorporate this technology	High

The following has been utilised for the proposed new Units 1 & 2:

- High efficiency LED lighting with PIR control and daylight sensing
- High efficiency mechanical ventilation with heat recovery and low specific fan power
- Variable Refrigerant Flow (VRF) system, which utilises Air Source Heat Pump technology (low/zero carbon technology)
- Photovoltaic power supply contribution (low/zero carbon technology), 200m² for Unit 1 and 100m² for Unit 2

Unit 1's Annual Energy Demand is 851,862kWh and Unit 2's Annual Energy Demand is 285,134kWh

The payback period for the PVs is ~13.5 years for Unit 1 (assuming £50k capital cost and 13p per kWh for electricity) and ~17.5 years for Unit 2 (assuming £32.5k capital cost and 13p per kWh for electricity)

Energy storage is not feasible for this scheme with the intended building usage.

3.2.3 BREEAM Standard

By utilising the fabric and air permeability betterments outlined in 3.2.1 and the LZC technologies and systems described in 3.2.2, including 200m² PV for Unit 1 and 100m² PV for Unit 2, both Unit 1 & Unit 2 achieve a BREEAM 'Excellent'.

3.2.4 Decentralised Energy

The site is not in the vicinity of a district heat network and CHP units are not feasible for this scheme. We are implementing Air Source Heat Pumps to do the heating and cooling in the offices and Photovoltaics to contribute to the building's power demand

4.0 Summary

This Energy Statement was prepared as part of a planning application and to demonstrate that the proposed new Unit 1 and Unit 2 warehouses located at Brunel Retail Park, Rose Kiln Lane, Reading, complies with UK Building Regulations Part L2A 2013 and Reading Borough's Local Plan.

The proposed new Unit 1 and Unit 2 complies with Criterion 1, Criterion 2 and Criterion 3 of the UK Building Regulations Part L2A 2013 at this design stage.

Reading Borough's Local Plan has been addressed in the following ways:

- Improvements over the building fabric and building services systems over and above the Building Regulations minimum standards means reduced energy demand.
- Variable Refrigerant Flow (VRF) system, which utilises Air Source Heat Pump (ASHP) technology and the Photovoltaics proposed are classed as low/zero carbon technologies. There are further contributions to reduce CO2 high efficiency ventilation systems, high efficiency LED lighting with PIR and daylight saving controls.
- By utilising 200m² of PV on Unit 1 and 100m² of PV for Unit 2 the scheme may achieve a BREEAM 'Excellent'
- District heating and CHP have been considered and discounted due to the location and site constraints, but ASHP technology has been implemented on the scheme.