

Energy & Sustainability Statement

Duckyls Farm Centre, East Grinstead

Job number: 13118

Date: July 2025

BASE ENERGY LIVERPOOL
Head Office

T: +44 (0)151 933 0328

E: north@baseenergy.co.uk

BASE ENERGY LONDON
London Office

T: +44 (0)203 286 2016

E: south@baseenergy.co.uk

BASE ENERGY SHEFFIELD
Sheffield Office

T: +44 (0)114 303 4986

E: north@baseenergy.co.uk

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1 Executive Summary

This report has been produced in support of the planning application for the erection of 2no. agricultural buildings at the Ducklys Farm Centre on Selsfield Road in East Grinstead falling under the requirements of Mid Sussex District Council. This report sets out the design approach with regards to energy, carbon dioxide emissions, and sustainability in order to ensure the development complies with:

- National Planning Policy
- Mid Sussex District Plan

The design of the development will incorporate energy efficient building fabric and services in addition to renewable technology:

- Thermal specification meeting and exceeding Part L 2021 limiting standards
- Energy efficient building services
- A design which limits air permeability
- Renewable energy in the form of Solar PV and Air Source Heat Pumps

The proposed development shall also incorporate measures such as water-efficient fittings, efficient use of resources and climate change risk mitigation measures to ensure the sustainable design and construction requirements of the Mid Sussex District Plan are met.

2 Proposed Development

The development site is located on Duckyls Farm on Selsfield Road, West Hoathly.

The development proposals are for two new barns positioned at the end of the existing agricultural track that runs from approximately 250m from the centre to an existing polytunnel and horticultural building. The buildings shall add to and extend the facilities for residents, day care users and visitors.

Aspects of the site location, shape, and surroundings (in particular the adjacent buildings), along with any other requirements of planning, use type, and scale will naturally constrain the development proposals in terms of the layout, positioning, and orientation of the proposed development. Subsequently, these constraints will impact on the feasibility of certain renewable technologies (as discussed in Section 4 of this report).



Figure 1: Proposed Site Plan

3 Planning Policy

National Planning Policy Framework 2023

The NPPF was updated in December 2023 to place greater emphasis on beauty, place-making, the environment, and sustainable development. The strengthened environmental objectives aim to protect and enhance the natural, built, and historic environment, and encourage effective land use, greater biodiversity, prudent use of natural resources, minimisation of waste and pollution, and adaptation to climate change alongside a move to a low carbon economy.

Mid Sussex District Plan

The Mid Sussex District Plan, adopted March 2018, is the main planning document used by the council when considering planning applications. It includes the strategy, proposed level of development and a number of planning policies.

Policy DP39: Sustainable Design and Construction

All development proposals must seek to improve the sustainability of development and should where appropriate and feasible according to the type and size of development and location, incorporate the following measures:

- Minimise energy use through the design and layout of the scheme including through the use of natural lighting and ventilation;
- Explore opportunities for efficient energy supply through the use of communal heating networks where viable and feasible;
- Use renewable sources of energy;
- Maximise efficient use of resources, including minimising waste and maximising recycling/re-use of materials through both construction and occupation;
- Limit water use to 110 litres/person/day in accordance with Policy DP42: Water Infrastructure and the Water Environment;
- Demonstrate how the risks associated with future climate change have been planned for as part of the layout of the scheme and design of its buildings to ensure its longer term resilience.

Mid Sussex Design Guide Supplementary Planning Document SPD

The Design Guide is intended to inform and guide the quality of design for all development across Mid Sussex District. It sets out a number of design principles to deliver high quality new development that responds appropriately to its context and is inclusive and sustainable.

Principle DG37: Deliver high quality buildings that minimise their environmental impact

The construction industry makes a significant contribution to CO2 emissions utilising substantial volumes of non-renewable resources and generating pollution and waste. The need for sustainable approaches to building design is therefore fundamental if the challenges associated with climate change, resource depletion and pollution are to be addressed, and will be necessary to achieve the Government's Future Homes Standard.

The Council welcomes innovative and inventive designs that respond to the sustainability agenda by minimising the use of resources and energy both through building construction and after completion.

Applicants must demonstrate how this has informed their design and should consider in particular:

- Orientation and design of buildings and roofs to maximise daylight / sunlight penetration and solar gain, whilst also avoiding overheating;
- The use of green roofs or walls to reduce storm water run-off, increase sound-proofing and biodiversity;
- The use of materials with low embodied energy (for example, renewably sourced timber and recycled materials);
- The use of sustainable materials that are locally sourced wherever possible;
- Incorporating high levels of insulation (in combination with air tightness and temperature control systems) including the use of materials with a high thermal mass, such as stone or brick, which store heat and release it slowly;
- Incorporating renewable energy including photovoltaics, solar thermal water heating, ground and air source heat pumps;
- The use of low flow technology in water fittings, rainwater harvesting systems and grey water recycling systems to reduce water consumption to 110 litres/person/day (maximum); and
- Laying out development to support identified opportunities for decentralised renewable or low carbon energy systems.

4 Energy & Carbon Emissions Calculation Methodology

The Simplified Building Energy Model (SBEM) is the UK Government methodology for assessing and calculating the energy performance of non-domestic buildings. SBEM calculations take into account a range of factors that contribute to energy efficiency, including:

- Materials used for the construction and the thermal insulation of the building fabric (u-values¹ and thermal mass)
- Air permeability
- Efficiency, fuel source, and control of heating and cooling systems
- Ventilation system energy use and heat recovery
- Lighting energy
- Low carbon and energy saving or generating technologies

Approved Document Part L Volume 2 of current Building Regulations addresses the conservation of fuel and power in non-domestic buildings.

To comply with Part L, the calculations should demonstrate how the buildings will either meet or achieve a percentage reduction in the Building Emission Rate (BER) under the required Target Emission Rate (TER).

DesignBuilder SBEM calculation software has been used to calculate a baseline of energy demand and carbon dioxide emissions as appropriate from which any reductions or contributions have been measured.

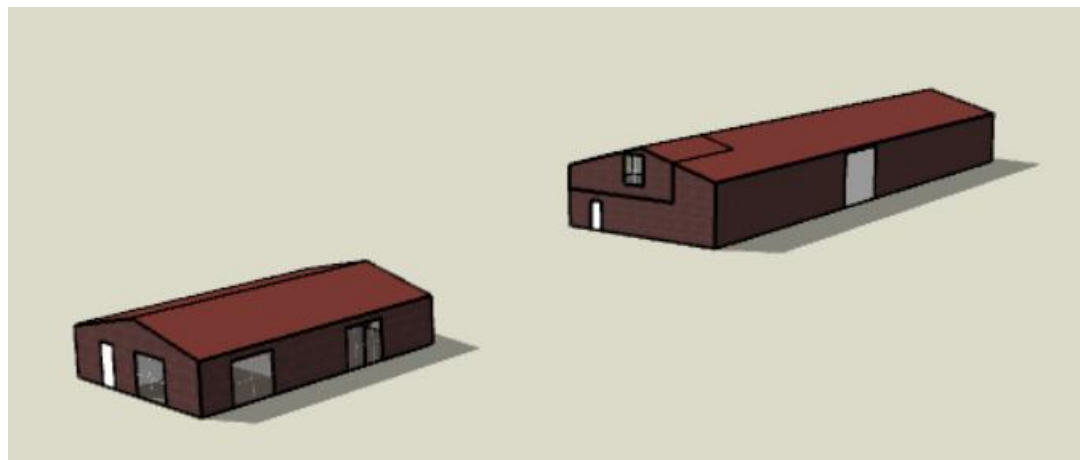


Figure 4.1: Proposed Development Site modelled in DesignBuilder software

¹ U-values (Thermal Transmittance) - the measure of the overall rate of heat transfer by all mechanisms under standard conditions, through a particular section of a construction. Lower u-values mean better thermal insulation

5 Baseline Energy & CO₂ Emissions

SBEM Energy modelling software has been used to calculate a baseline for the development. This forms the basis from which compliance with planning policy has been measured.

Table 5.1: Baseline CO₂ Emissions

	CO ₂ Emission Rate (kg CO ₂ /m ² /year)	Floor Area (m ²)	Total Baseline Emissions (kg CO ₂ /year)
Baseline	2.73	741.6	2,025

The **Total Baseline CO₂ Emissions** for the development are shown to be 2,025 kg/year.

Table 5.1: Baseline Primary Energy

	Energy (kWh/m ² /year)	Floor Area (m ²)	Total Energy (kWh/year)
Baseline	28.87	741.6	21,410

The **Total Baseline Primary Energy** for the development is shown to be 21,410 kWh/year.

6 Low Carbon Design – Fabric First – Be Lean

Before considering low carbon energy generating technology the development has been designed to reduce energy demand through the first step of the energy hierarchy by considering a 'fabric first' approach. The specified building envelope is designed to meet and exceed the minimum requirements of Approved Document Part L and will help to reduce the energy demand associated with space heating for the units.

Table 6.0: Building Fabric Standards (including u-values W/m²K)

	Part L 2021	Proposed Development
External walls	0.26	0.18
Roof	0.16	0.16
Floor	0.18	0.16
Windows / Rooflights	1.6	1.4
Personnel / Vehicle Access Doors	1.6	1.2
Air tightness	8.0	5.0

Building Services

After addressing heat retention, the next step is to ensure energy consuming building services are efficient. The following building services have been proposed for the buildings:

- Space heating: Air Source Heat Pumps with minimum seasonal efficiency (SCOP) of 2.5
- Electric water heaters for domestic hot water
- Light fittings with a minimum efficacy of 120 lumens per circuit-watt
- Lighting controls: Occupancy sensors and daylight dimming controls to applicable areas
- Mechanical extract fans with a specific fan power (SFP) of 0.3 W/l/s or less

7 Low Carbon Technology Review & Recommendations

Having set out an energy efficient design, the next step is to incorporate low carbon technology for energy generation. A number of technologies exist and should be specified where they:

- Comply with planning policy
- Are feasible for the site
- Are cost efficient
- Are appropriate for proposed development form and function
- Protect against fuel poverty
- Promote fuel security
- Reduce reliance on fossil fuels
- Reduce carbon emissions
- Reduce resource depletion
- Reduce pollution

Site location and development form and function will influence the suitability of different technologies through:

- Orientation
- Space (inside and outside of the buildings)
- Surrounding topography, structures, and natural features
- Wind speed
- Overshading
- Geology and ground conditions
- Building form, function, and density

In determining the most feasible renewable technologies for the dwelling, the following have been reviewed:

- Wind turbines
- Ground Source Heat Pumps
- Air Source Heat Pumps
- Biomass
- Combined Heat and Power
- Photovoltaic Panels
- District Heating

WIND TURBINES

Wind turbines are used to produce electricity. They can be either pole mounted (in a suitably exposed position) or building mounted; building mounted systems need a sufficient wind speed at the structural height and both a structural survey and planning permission.

- Wind speed can be too low on low rise buildings
- Taller systems need sufficient space
- Wind resources very variable and unpredictable
- May need planning permission

Wind turbines technology is **not recommended** for this development

GROUND SOURCE HEAT PUMP (GSHP)

GSHPs use naturally occurring underground low-level heat in areas with appropriate geological features. Heat is transferred from the ground by either extracting and discharging (re-charging) water from/to the ground directly (open loop) or circulating water through pipes buried within the ground, (closed loop). The water is passed through a heat pump to transfer the heat from this water into a higher temperature water circuit to provide heating. The loop can be fitted horizontally (laid in a shallow trench) or vertically (in a borehole).

- Feasibility analysis is costly
- Suitable ground conditions required
- More capital intensive than air source heat pumps
- Can be more efficient and lower running costs than ASHPs
- Well suited to highly insulated buildings

Ground source heat pump technology is **not recommended** for this development

AIR SOURCE HEAT PUMP (ASHP)

ASHP systems absorb heat from outside air at a low temperature into a fluid which is then passed through an electrically driven compressor where its temperature is increased. There are two main types of ASHP systems: Air to Water systems distribute heat through wet central heating; Air to air produce warm air which is circulated by fans. For an ASHP system to be installed, there needs to be ample outdoor space for the external condensing unit; these units can also be noisy and blow out colder air to the neighbouring environment.

- Requires space for external plant and internal hot water tank for wet systems supplying DHW
- Can generate noise though quieter systems have been developed
- Least efficient when most needed
- Longer life than fossil fuel boilers
- High capital costs vs gas systems but lower than GSHPs
- Well suited to highly insulated buildings

Air source heat pump technology **is recommended** for this development

BIOMASS

Biomass systems burn wood pellets, chips, or logs to provide heat in a single room, or to power central heating and hot water boilers. There needs to be ample space available for both the boiler and the storage of fuel. There will also be regular deliveries of fuel and therefore adequate site access is required.

- Carbon emissions are cyclical unlike fossil fuel
- Requires fuel storage space and bulk delivery
- Carbon 'neutral' fuel in isolation but supply side emissions are still present so not neutral overall
- Harmful particulate emissions impact air quality and health

Biomass technology **is not recommended** for this development

COMBINED HEAT AND POWER (CHP)

CHP is effectively an on-site small power plant providing both electrical power and thermal heat energy. It is an energy efficiency and low carbon measure rather than a renewable energy technology. A CHP system operates by burning a primary fuel (normally natural gas) by use of either a reciprocating engine or turbine, which in turn drives an alternator to generate electrical power. The heat emitted by the engine and exhaust gases is recovered and used to heat the building or to provide hot water.

- Reduces consumption of and reliance on grid electricity
- Works best with high and consistent heat and hot water demand
- Recovers waste energy
- Can export to the grid
- Uses fossil fuel
- Emissions on site rather than upstream
- Efficiency is sensitive to sizing

CHP **is not recommended** for this development

DISTRICT HEATING

District Heating systems provide multiple buildings or dwellings with heat and hot water from a central boiler house, or 'energy centre'. The system can provide heating or cooling which is transferred from the energy centre through a network of highly insulated pipes carrying the heated water to each dwelling.

- Economies of scale
- Frees up space in habitable areas of development
- Variety of systems
- Can make use of waste heat from industry
- Can be fossil fuel based and dependent

With reference to the Local Heat Map it has been determined that there are no existing or proposed heat networks or energy centres within a suitable radius from the development and there are no existing networks local to the site (See adjacent image)

District heating **is not recommended** for this development as there are no heat networks in vicinity of the site

SOLAR PHOTOVOLTAIC (PV)

Solar PV cells (which are mounted together in panels or tiles on the roof) convert sunlight into electricity. The cells are made from layers of semi-conducting material; when the light shines on the cell, an electric field is created across the layers. Although PV cells are most effective in bright sunlight, they can still generate electricity on a cloudy day. The power of a PV cell is measured in kilowatts peak (kWp). Each PV panel produces 250 Watts to 420 Watts depending on the manufacturer.

- Passive technology, requires no energy input from grid
- Does not require sunny days to generate power
- Capital costs can be high although payback is effective
- Needs sufficient roof space and orientation
- Zero site or upstream emissions
- Can export to the grid

Solar PV technology **is recommended** for this development due to the unshaded roof space of the proposed development and high electricity consumption which is anticipated.

SOLAR HOT WATER

Solar hot water systems absorb energy from the sun and transfer this energy using heat exchangers to heat water which can then be stored. Systems should be roof mounted and oriented to face between a south-east and south-west direction.

- Mostly passive technology but requires pump energy
- Not suitable for combi boilers and developments without roof space
- Lower CO2 reductions than other technologies

Solar hot water technology **is not recommended** for this development due to low anticipated hot water demand.

Low and Zero Carbon Technology Summary

The low carbon technology review indicates that ASHP and PV would be potentially feasible.

The following low carbon technologies are recommended:

- Air Source Heat Pumps (ASHP) to provide space heating to the buildings
- Solar Photovoltaic Panels (PV) providing renewable electricity is recommended for the site. It is proposed to provide 8kW PV for Building 1 and 4 kWp for Building 2.

8 Low and Zero Carbon Technology – Renewable Energy Generation

The selected Low Carbon Technology has been incorporated into the calculation and the results are set out below.

Table 8.1: Energy Hierarchy Carbon Emissions CO₂ Emissions

	CO ₂ Emission Rate (kg CO ₂ /m ² /year)	Floor Area (m ²)	Total Emissions (kg CO ₂ /year)	Reduction in CO ₂
Baseline	2.73	741.6	2,025	N/A
Be Green	2.57	741.6	1,906	5.9%

The **CO₂ Emissions reduction** is shown to 119 kg/year against the 'Baseline' scenario.

Table 6.2: Energy Hierarchy Primary Energy

	Energy Consumption Rate (kWh/m ² /year)	Floor Area (m ²)	Total Primary Energy (kWh/year)	Reduction in Primary Energy
Baseline	28.87	741.6	21,410	N/A
Be Green	26.51	741.6	19,660	8.2%

The **Primary Energy reduction** is shown to be 1,750 kWh/year against the 'Baseline' scenario.

9 Proposed Development Response to Sustainability Policy

Policy DP39: Sustainable Design and Construction	
Issue	Compliance
Minimising energy use	Energy demand has been reduced through the layout and orientation of the scheme. Building 1 benefits from east and south facing glazing while Building 2 incorporates north-east and south-facing glazing, allowing for good levels of natural daylight and minimise lighting energy demand. A natural ventilation strategy is proposed utilising openable windows, reducing the need for mechanical ventilation and active cooling.
Communal heating networks	Communal heating networks is not appropriate for the development as there are no existing/proposed heat networks in the vicinity of the site and there is no continuous heating demand to justify a communal heating system. Each building shall be provided with its own heating system to serve the occupied spaces.
Use renewable sources of energy	A Low and Zero Carbon Technology Feasibility Study has been carried out which has identified that Air Source Heat Pumps and Solar PV are the most appropriate technologies for the site. It is proposed that Air Source Heat Pumps shall provide heating while Solar PV is installed to both buildings to provide a renewable source of electricity.
Efficient use of resources	Opportunities for the efficient use of resources through both construction and occupation may include: - The use of prefabricated or modular components, such as composite cladding panels. - The specification of materials with high recycled content - The use of a Site Waste Management Plan to monitor and reduce waste - Dedicated internal and external refuse areas for the separation and segregation of recyclable/organic waste - Designing the building with resilience measures such as durable materials and protection measures to avoid damaging and the need for replacing materials in operation.

Limit water use	Components should be installed so to not exceed the following consumption performance levels to ensure an equivalent of BREEAM 'Good' Standard is achieved in accordance with Policy DP42: - WC: 4.5 litre effective flush volume - Wash hand basin taps: 6 litre/min - Showers: 10 litres/min - Kitchen tap: 8 litres/min - Domestic sized dish washers: 13 litres/cycle <i>Note these are assumed components based on a typical development, for a full list of minimum consumption performance levels, see the BREEAM UKNC technical manual.</i>
Mitigating future climate change risks	The following measures have been incorporated into the design to reduce the risks associated with future climate change and ensure longer term resilience: - Natural ventilation strategy with openable windows and cross-flow ventilation where possible - High performance glazing with solar gain control to reduce the risk of overheating - External landscaping including deciduous trees to the south-west to provide shading to the buildings - Building fabric designed to minimise heating energy demand in colder winters - On-site renewable energy in the form of ASHPs and Solar PV to reduce dependence on mains grid energy - Water-efficient components to reduce potable water consumption - Site located in Flood Zone 1 with a low probability of flooding from rivers or the sea

10 Conclusion

The proposals are for two new barns located at Duckyls Farm Centre on Selsfield Road in West Hoathly. The new buildings shall add to and extend the facilities for residents, day care users and visitors.

The proposed development has been designed to respond to all national, regional and local energy & sustainability policies.

The buildings shall be constructed using thermally efficient building fabric and building services to limit energy demand.

A renewable energy pre-feasibility study has been carried out and found that Solar PV and Air Source Heat Pumps are the most appropriate renewable energy technology for the site. It is proposed to provide Building 1 with 8kW PV and Building 2 with 4 kW PV. Air Source Heat Pumps are proposed to provide heating to the buildings.

Following the principles of the energy hierarchy, the proposed development is achieving a 5.9% reduction in CO2 emissions when compared with a Approved Document Part L 2021 baseline.

By implementing the principles of sustainable design and construction, this report shows how the site shall successfully respond to the requirements of Policy DP39 of the Mid Sussex District Plan.

10 Appendix 1 BRUKL (Site Wide)

Project name

Ducky's Farm East Grinstead

As designed

Date: Thu Jul 17 12:57:21 2025

Administrative information

Building Details

Address: New Agricultural Buildings, Ducky's Farm Centre,
East Grinstead,

Certifier details

Name:

Telephone number:

Address: , ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.3.1

BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 126.95The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	2.73
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	2.57
Target primary energy rate (TPER), kWh _{PE} /m ² annum	28.87
Building primary energy rate (BPER), kWh _{PE} /m ² annum	26.51
Do the building's emission and primary energy rates exceed the targets?	BER ≤ TER BPER ≤ TPER

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

Fabric element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.18	0.18	mezz - office_W_5
Floors	0.18	0.16	0.16	mezz - office_F_4
Pitched roofs	0.16	0.16	0.16	mezz - office_R_11
Flat roofs	0.18	-	-	No heat loss flat roofs
Windows** and roof windows	1.6	1.4	1.4	mezz - office_G_8
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.2	1.2	Building 1 - Circulation_D_4
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

U_{a-Limit} = Limiting area-weighted average U-values [W/(m²K)]U_{i-Calc} = Calculated maximum individual element U-values [W/(m²K)]U_{a-Calc} = Calculated area-weighted average U-values [W/(m²K)]

* 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.

*** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m²K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	5

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

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- Project HVAC

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

1- Project DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.001
Standard value	1	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
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 balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		Zone	Standard
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
Building 1 - WC	0.3	-	-	-	-	-	-	-	-	-	-	N/A
Block 1 - WCs	0.3	-	-	-	-	-	-	-	-	-	-	N/A
Block 1 - Kitchen	-	-	-	-	-	-	-	-	1	-	-	N/A

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value		95	80	0.3
Building 1 - Barn		120	-	-
mezz - office		120	-	-
Building 1 - WC		120	-	-
Building 1 - Circulation		120	-	-
Building 1 - Classroom		120	-	-
Block 1 - WCs		120	-	-
Block 1 - Circulation		120	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
Block 1 - Diner		120	-	-
Block 1 - Kitchen		120	-	-
Block 1 - Wood workshop		120	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Building 1 - Barn	N/A	N/A
mezz - office	NO (-77.7%)	NO
Building 1 - Classroom	N/A	N/A
Block 1 - Diner	NO (-64.6%)	NO
Block 1 - Wood workshop	NO (-16.8%)	NO

Regulation 25A: Consideration of high efficiency 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
Floor area [m ²]	741.6	741.6
External area [m ²]	2116.9	2116.9
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	4
Average conductance [W/K]	448.14	770.82
Average U-value [W/m ² K]	0.21	0.36
Alpha value* [%]	19.37	36.07

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
66	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
30	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
4	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	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	3.63	3.3
Cooling	0	0
Auxiliary	2.9	1.91
Lighting	7.73	6.51
Hot water	14.92	14.43
Equipment*	30.37	30.37
TOTAL **	29.18	26.15

* 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	12.21	6.74
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>12.21</i>	<i>6.74</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	129.71	273.62
Primary energy [kWh _{PE} /m ²]	26.51	28.87
Total emissions [kg/m ²]	2.57	2.73

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] No Heating or Cooling										
	Actual	109.2	22	0	0	0	0	0	0	0
	Notional	265.3	72.3	0	0	0	0	----	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	85.1	41.6	10.6	0	8.5	2.23	0	2.5	0
	Notional	91.7	59.1	9.6	0	5.6	2.64	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