Luton Borough Council

SEN School, Kestrel Way, Luton

Energy Statement

714456R(03)

27TH JUNE 2023

RSK GENERAL NOTES

Project No.: 714456R(03)

Title: SEN School, Kestrel Way, Luton - Energy Statement

Client: Luton Borough Council

Date: 27th June 2023

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Appendices

1 INTRODUCTION

RSK Environment Ltd ("RSK") has been appointed by Luton Borough Council to prepare this Energy Statement relating to the proposed development of a SEND School at Kestrel Way, Luton Borough.

This statement has been prepared to address Luton Borough Council's Local Plan 2011-2031 (November 2017) Policy LLP37.

1.1 Report Structure

Chapter 2 of this statement introduces relevant Luton Borough Council's planning policies, whilst **Chapter 3** reports the results of SBEM modelling that has been undertaken for the proposed development. **Chapter 4** describes the electric car charging. **Chapter 5** summarises the energy / CO_2 emissions performance as determined by SBEM modelling and how this accords with local planning policy. SBEM reports for the site are included at **Appendix 1**. A BREEAM Pre-Assessment is included in **Appendix 2**.

2 PLANNING POLICY REQUIREMENTS

2.1 National Planning Policy

2.1.1 National Planning Policy Framework (July 2021)

The Revised National Planning Policy Framework sets out the Government's planning policies for England and how these should be applied. The Framework continues to recognise that a central purpose of the planning system is to help deliver sustainable development.

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

a) an economic objective - to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;

b) a social objective - to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and

c) an environmental objective - to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

These objectives should be delivered through the preparation and implementation of plans and the application of the policies in this Framework; they are not criteria against which every decision can or should be judged. Planning policies and decisions should play an active role in guiding development towards sustainable solutions, but in doing so should take local circumstances into account, to reflect the character, needs and opportunities of each area.

2.2 Luton Borough Council's Local Plan (November 2017)

2.2.1 Policy LLP37 - Climate Change, Carbon and Waste Reduction and Sustainable Energy

The Council will support development proposals that contribute towards mitigation, and adaptation to climate change through energy use reduction, efficiency, and renewable, and decentralised energy.

- All new non-residential developments over 1,000 square metres will be required to achieve the 2013 Building Research Establishment Environmental Assessment Method (BREEAM) 'Good' status.
- Energy Hierarchy:

i. consider reducing energy and water demand;

ii. consider energy generation from low and zeros carbon sources on site;

iii. consider decentralised energy networks and generation; and

iv. consider off-site solutions, retro fitting, and carbon reduction schemes.

2.3 Luton Borough Councils Transport Strategy and Local Transport Policies (April 2021)

2.3.1 Policy 6: Ultra Low Emission and Electric Vehicles

In order to promote and encourage use of Ultra Low Emission and Electric Vehicles we will:

- Increase the provision of electric charging points across the borough
- Set a requirement for developers to provide one chargepoint per residential parking space and one chargepoint for every ten spaces in non-residential building with more than 20 car parking spaces, with passive provision to provide chargepoints at remaining spaces.

2.4 Summary

This Energy Statement sets out the proposals that could be adopted to ensure that the development meets and exceeds the Building Regulations 2021 with regard to CO_2 emissions and to further reduce those emissions by 10% through the use of renewable technology. Measures to include electric car charging have also been included.

3 ENERGY MODELLING

3.1 Introduction

The energy strategy seeks to ensure that the development has an operational CO_2 emissions performance that meets or exceeds the requirements of 2023 Building Regulations Part L. In order to test this performance, the development has been modelled in iSBEM software, the results of which are reported below. SBEM reports are presented in **Appendix 1**.

3.2 Energy Efficiency

Table 2 presents enhanced specifications.

Table 2 Enhanced' Energy Efficiency Specifications

Parameter	Enhanced Value
U values (W/m²K)	
External wall	0.18
Ground floor	0.13
Roof	0.12
Glazing – Window	1.10
Air permeability (m³/m²/hr)	3
Thermal bridging (y value, W/m²K)	Pre-set SBEM values
Low energy lighting	100%
Space heating	80% ASHP Efficiency 4.6 20% GAS Efficiency 0.91
Water heating	From main system
Ventilation	MHVR

3.3 Renewable Energy Technology

A range of renewable and low carbon energy technologies have been considered, some of which have been included within this strategy.

3.3.1 Solar Photovoltaics (PV)

Solar photovoltaic (PV) panels generate clean electricity through photon-to-electron energy transfer. PV's can generate electricity even on overcast days, requiring daylight, rather than direct sunlight. This makes them viable even in the UK. They are relatively easy to integrate into new developments, have minimal planning and maintenance implications and are widely accepted by UK households as a proven and reliable technology.

Feasibility Summary – Photovoltaic Panels
Based on available plans showing orientation and available roof space, the provision of supplementary electricity through installation of PV panels is considered to be **feasible.** Solar PV has been incorporated to form part of the energy strategy.

3.3.2 Solar Thermal

Solar thermal panels are typically used in order to provide supplementary heat for the purposes of space heating or domestic hot water (DHW). These systems consist of solar collectors, a pump, a control unit, hot water tank together with a conventional heat source (gas/ oil fired boiler). The collectors are usually roof mounted and heat a fluid, in the pipes, that is circulated between the panels and the water storage tank. Installing solar thermal panels could reduce energy consumption and carbon impacts through reductions in gas/ oil supply.

Typically, solar collectors would produce approximately 5-600 kWh/m^2 of hot water. Evacuated tube systems are about 30% more efficient but have a corresponding increase in capital outlay. A collector area of 4 – 5 m^2 could save approximately 230kg of CO^2 emissions per year.

They have additional maintenance requirements over solar PV, due to the need to maintain antifreeze within the pipework to prevent damage from freezing up in winter.

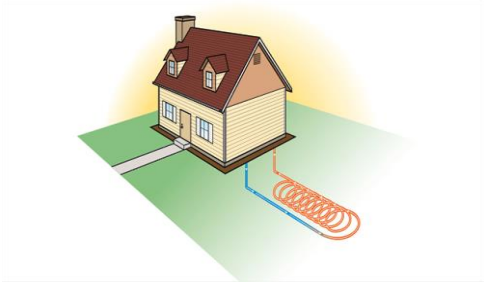
Feasibility Summary – Solar Thermal Panels
Due to the complexity of the system and the ongoing maintenance requirements, the provision of supplementary DHW by installation of Solar Thermal is considered to be **not feasible.** Due to an effective fabric first and energy saving approach, Solar Thermal has not been considered as part of the energy strategy.

3.3.3 Wind Energy

Wind turbines generate clean electricity from the wind, with onshore wind being the most cost-effective renewable energy technology in the UK. At this scale, to be commercially viable, turbines would need to be situated where they will benefit from adequate supplies of wind and be free from turbulence and obstruction. Turbines do not necessarily need high wind speeds to operate, but to be efficient they do need to be located where there will be a relatively constant wind. Turbines have a cut-in (around 3 metres per second) and shut down (around 25 metres per second which equals approximately 56 miles per hour) wind speed, between which the turbine is able to generate power. The optimum output is at around 12–15 metres per second (approximately 26 mph).

Feasibility Summary – Wind Energy
Due to the adverse environmental impacts, the provision and installation of wind turbines is considered to be **not feasible.** Also, due to an effective fabric first and energy saving approach, Wind Energy has not been considered as part of the energy strategy.

3.3.4 Ground Source Heat Pumps



Ground Source Heat Pumps (GSHP's) operate by the removal of residual heat from the ground by using various loops containing a water and glycol fluid mix. Heat from the ground is absorbed by the fluid and is pumped through a heat exchanger in the heat pump. Heat passes through a compressor and is concentrated into a higher temperature gas capable of heating water for DHW and central heating systems.

The heat yielded from GSHP's is relatively small, therefore the efficiency of the heat exchanger is vital in ensuring greater heat transfer. The performance of a GSHP system is also dependent on the ground conditions (depth of soil cover, type of soil or rock, ground temperature and thermal conductivity) which would need to be established by a ground survey.

Feasibility Summary – Ground Source Heat Pumps
Due to the complexity of the system and the ongoing maintenance requirements, the provision of GSHP's is considered to be **not feasible.** Also, due to an effective fabric first and energy saving approach, GSHP's have not been considered as part of the energy strategy.

3.3.5 Air Source Heat Pumps

Air Source Heat Pumps (ASHP's) absorb heat from ambient air in order to provide heat for the purposes of space heating and domestic hot water. ASHP's work on a similar principle to a fridge, which extracts heat from its inside. An evaporator coil mounted outside absorbs the heat, a compressor then pumps the refrigerant through the heat pump and compresses it to the right level to suit the heat distribution system.

Finally, a heat exchanger transfers the heat from the refrigerant for use, depending on which of the two main types of system is installed:

- Air to air system – produces warm air which is circulated by fans to heat a home.
- Air to water system – uses heat to warm water. Heat pumps heat water to a lower temperature than a standard boiler system, therefore, these systems are more suitable for underfloor heating systems than radiators.

The efficiency of ASHP's is measured by a coefficient of performance (CoP) i.e the amount of heat produced compared to the amount of electricity needed for them to operate. This methodology is also used with GSHP's although the use of air as a heat source instead of the earth results in ASHP's having a lower CoP than GSHP's with subsequently less carbon savings for a similar sized pump. ASHP's have a relatively low heat yield when compared to traditional boilers, therefore buildings must be well insulated and draught proofed to ensure that the heating system is effective.

ASHP's are often a more popular (and technically/ financially viable) alternative to GSHP's due to the lack of requirement for extensive excavation, requiring less space and ease of installation.

Feasibility Summary – Air Source Heat Pumps
Due to the current move away from traditional gas boilers and the availability of green energy the installation of ASHP's for this scheme is considered to be **feasible.** ASHP's have been incorporated as part of the energy strategy.

3.3.6 Combined Heat & Power (CHP)

Combined heat & power (CHP) or “co generation” engines combine the generation of electricity for general consumption with the recovery of exhausted heat energy which can be used to provide heat for domestic and industrial purposes. A CHP plant (typically 75% - 80% efficient) is more efficient than a typical oil/gas fired power station (35% - 45% efficient), even when used in combination with fossil fuels such as gas and diesel. Therefore, it is more efficient than obtaining energy from the National Grid.

They can be highly cost-effective to operate but do need to operate continually and are therefore best suited to meeting substantial base heating loads, for example from a large block of flats or leisure centre.

Feasibility Summary – Combined Heat & Power (CHP)
The relatively low density that is proposed means CHP is unlikely to be commercially viable and has therefore considered to be **not feasible.** Also, due to an effective fabric first and energy saving approach, CHP has not been considered as part of the energy strategy.

3.3.7 Biomass Heating

Biomass boilers replace conventionally powered boilers with an almost carbon neutral fuel (such as wood pellets). The technology is better suited to non-continual operation than CHP for example in a school where heating start ups / shut downs are required several times over the school terms and although many biomass burners will meet Clean Air Act requirements, combustion of wood biomass releases higher quantities of Nox compared to a comparable system fuelled by natural gas. As a consequence, many Local Authorities, particularly in urban areas have concerns about the potential impact on air quality. The technology also requires significant space and servicing to regularly receive and store fuel deliveries and significant management and maintenance to ensure the system remains operational. For these reasons, biomass heating is discounted as a suitable energy technology.

Feasibility Summary – Biomass Heating
Due to the ongoing maintenance and storage requirements, the provision of Biomass Heating is considered to be **not feasible**. Also, due to an effective fabric first and energy saving approach, Biomass has not been considered as part of the energy strategy.

3.3.8 Considered & Inclusion

Table 3 Considered LZC Technology and inclusion at this development.

LZC Technology	Feasible	Included in this Strategy
Solar Photo-Voltaic	Yes	Yes
Solar Thermal	No	No
Wind Energy	No	No
Ground Source Heat Pumps	No	No
Air Source Heat Pumps	Yes	Yes
Combined Heat & Power	No	No
Biomass	No	No

3.4 SBEM Results

Table 4 presents total annual regulated CO_2 emissions from the development as determined by SBEM modelling. This shows that with energy efficiency measures the development exceeds the requirements of criterion 1 of the Building Regulations.

Table 4 Development CO_2 Emissions

Scenario	Annual Emissions (tCO_2)	% Improvement	PER (kWh/m^2)
Maximum Emissions -Building Regulations 2021	12.08	--	30.80
Proposed Building including ASHP	13.69	-13.3%	37.81
Plus PV 15.0 kWp	13.69	0%	32.62
Plus PV 26.5 kWp	10.84	23.6%	28.16

3.5 Photovoltaic Requirements

As can be seen in Table 4, the development exceeds Building Regulations Part L1, using Table 2 parameters only. The use of 15.0 kWp PV will ensure that the building meets Part L1 in terms of CO_2 emissions, it fails to meet Part L1 in terms of Primary Energy Rate (PER). For this development an addition of 26.5 kWp PV will provide CO_2 emissions reduction by 10.3% meeting the requirements of Part L1 and Luton Borough's Policy LLP37, this equates to approx. 199 sqm of PV (30^o pitch orientated South).

3.6 Overheating Requirements

Following an overheating analysis of the proposed building, it may be necessary to include mechanical cooling measures. Due to the varying and specific requirements of the building users (Kestrel Way School will be a Special Educational Needs School), it is necessary to have a regulated and controllable environment. Natural ventilation alone

may not be sufficient to meet the requirements of the building users. Therefore a more detailed overheating analysis will be undertaken at the detailed design stage, once a contractor is appointed, so that Part L of the building regulations will be met, as well as the needs of the building users.

4 ELECTRIC VEHICLE CHARGING

The Government has set out a UK strategy (The Road to Zero, July 2018) to ensure that by 2040 all new cars and vans are to be effectively zero emission vehicles. To achieve this the document sets out policies aiming to see at least 50%, and as many as 70%, of new car sales and up to 40% of new van sales being ultra-low emission by 2030. Electric Vehicle (EV) charging points are just one element of rolling out this strategy and Local Authorities are encouraging developers to provide suitable, sustainable methods to identify the growing demand for electric vehicles set out by the government.

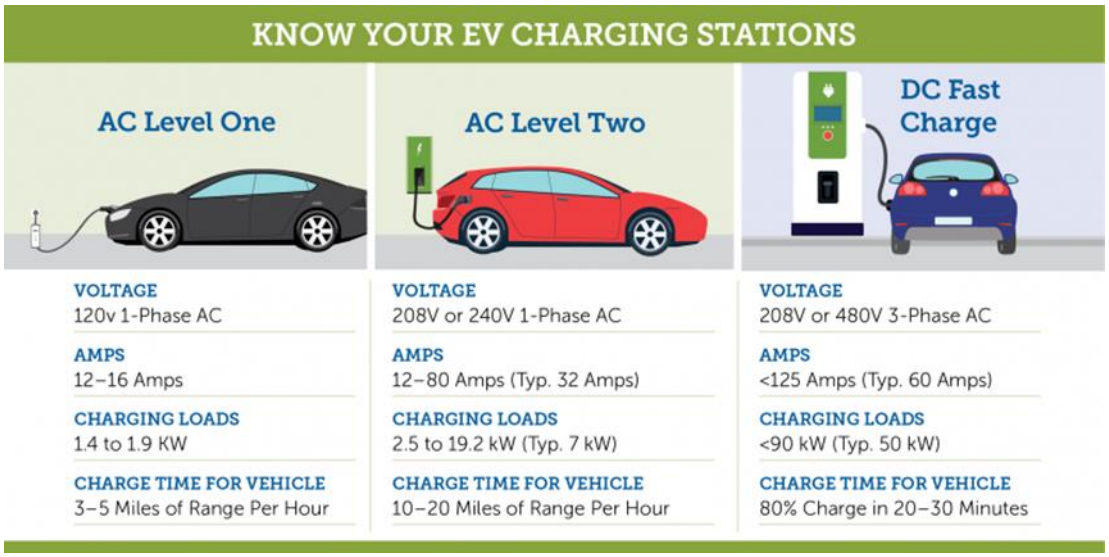
The National Planning Policy Framework states (section 110a) that 'appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location'. Policy 6 in Luton Borough Council's Transport Strategy and Local Policies (April 2021) also aims to promote infrastructure provision of car charging points.

4.1.1 Pin Socket Connections

Electric Vehicles can employ a variety of charging point connectors. To meet Building Regulations 2021 and Luton Borough Council's Transport Strategy, it is proposed that a universal socket (known as an untethered electric vehicle charge point) will be provided to meet 10% of car parking provision and passive provision to provide chargepoints will be implemented for remaining spaces.

There are 3 types of charging speeds: slow, fast and rapid. The proposed development will provide, at a minimum, 7kW measured or calculated at a nominal supply voltage of 230VAC, meaning the development will be offering a fast charge (Level 2) option.

Figure 1 AC Level Two Charging is proposed.



5 BREEAM

Policy LLP37 in Luton Borough Council's Local Plan (November 2017) requires "All new non-residential developments over 1,000 square metres" to "achieve the 2013 Building Research Establishment Environmental Assessment Method (BREEAM) 'Good' status." Therefore, a BREEAM Pre-Assessment has been prepared demonstrating the potential pathway to be followed for the Kestrel Way SEN School to achieve a BREEAM 'Good' rating. This Pre-Assessment can be found in **Appendix 2**.

BREEAM is the world's leading science-based suite of validation and certification systems for sustainable built environment. It is a way to measure the environmental impact of an asset in the built environment. BREEAM strives to challenge the market to provide innovative solutions to sustainability issues and aims to stimulate demand for sustainable buildings.

BREEAM is weighted across 10 categories. Credits are achieved at Design Stage through design, consultants reports & commitments. Credits are achieved at Post Construction through implementation of design & consultant reports to produce the final sustainable building.

To achieve a 'Good' rating, a score of 45% including all relevant minimum standards is required. Kestrel Way SEN School is currently targeting a score 0f 50.39%, which will comfortably achieve a 'Good' rating. The table below represents a breakdown of the targeted BREEAM credits, a detailed Pre-Assessment can be found in **Appendix 2**.

Table 5 BREEAM Target Scores

Category	Targeted Credits	Category Score (%)
Management	9	4.71
Health & Wellbeing	11	8.55
Energy	8	5.56
Transport	7	5.83
Water	4	3.11
Materials	4	4.28
Waste	3	2.00
Land Use & Ecology	11	11.00
Pollution	8	5.33
Total	65	50.39

6 SUMMARY

The proposed energy strategy comprises energy efficiency measures to result in a total saving of 10.3% below current (2021) Building Regulations, Part L1.

Solar PV is identified as the most feasible renewable energy option. The calculations are based on a fabric first approach and low carbon technology which satisfies the local planning requirements, as there are no specific reduction targets set. The 10.3% improvement through the deployment of PV represents a conscious design which incorporates measures to reduce energy, as per the criteria set out in the Luton Borough Council's Policy LLP37.

In addition, the provision electric vehicle charging points for 10% of car parking spaces satisfies the requirement for effective mitigation and demonstrates how the development will make a positive contribution to the aims of the Luton Borough Council's Local Transport Strategy (2021) Policy 6.

The addition of 26.5 kWp PV for this development will provide a CO_2 emissions reduction of 10.3%, meeting the requirements of Building Regulations Part L1 and Luton Borough's Policy LLP37, this equates to approx. 199 sqm of PV (30^o pitch orientated South). Therefore, the development contributes to sustainable development and represents a reduction in CO_2 compared to Building Regulations.

6.1 Further Work

Further work will be required as part of detailed architectural and M&E design and to progress the work reported here. Final as-built SBEM reports will need to be produced with EPCs in order to confirm the reductions presented here are met.

Appendix 1 – SBEM 2023 Checklists

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Kestral Way SEND

As designed

Date: Thu Jun 15 11:53:11 2023

Administrative information

Building Details

Address: Kestral Way, Luton,

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: iSBEM

Interface to calculation engine version: v6.1.e

BRUKL compliance module version: v6.1.e.0

Certifier details

Name: D Lloyd

Telephone number: 024 7650 5600

Address: Abbey Park Humber Way, Coventry, CV3 4AQ

Foundation area [m^2]: 1774.5

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	3.4	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	3.06	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	30.8	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	28.64	
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	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.18	0.18	F0/01/se
Floors	0.18	0.13	0.13	F0/01/f
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.12	0.12	F0/07/c
Windows** and roof windows	1.6	1.1	1.1	F0/01/se/g
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

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

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

* 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/m^2K

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	3

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	YES
Whole building electric power factor achieved by power factor correction	0.9 to 0.95

1- ASHP RAD

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	2.54	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

2- ASHP UF

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	2.54	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

1- HWS

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	Hot water provided by HVAC system	-
Standard value	N/A	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**		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	**Zone**	**Standard**
F0/01	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/02	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/03	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/04	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/07	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/09	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/10	-	-	-	-	1	-	-	-	-	0.85	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
F0/12	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/13	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/14	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/15	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/16	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/17	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/21	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/22	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/24	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/25	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/27	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F0/30	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/31	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/36	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/37	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/38	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/39	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/42	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/43	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F0/44	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F0/46	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/48	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/49	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/50	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/51	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/52	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/53	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F0/54	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F0/55	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F0/57	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/59	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/60	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/61	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/62	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/63	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F0/64	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/65	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/66	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F0/67	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F1/01	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/02	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/03	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/04	-	-	-	-	1	-	-	-	-	0.85	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
F1/05	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/06	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/07	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/08	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/09	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/10	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/11	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/12	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F1/13	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/14	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/15	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/16	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/17	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/18	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/19	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/20	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/21	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/22	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/23	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/24	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/26	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/25	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/27	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/28	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/29	-	-	-	-	1	-	-	-	-	0.85	N/A
F1/30	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F1/31	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F1/32	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F1/33	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F1/34	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F1/35	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F0/58	1.5	-	-	-	1	-	-	-	-	0.85	N/A
F0/05	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/06	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/08	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/11	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/18	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/19	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/20	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/23	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/26	0.3	-	-	-	1	-	-	-	-	0.85	N/A
F0/28	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/29	-	-	-	-	1	-	-	-	-	0.85	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
F0/32	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/33	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/32.1	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/34	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/35	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/40	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/41	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/45	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/47	-	-	-	-	1	-	-	-	-	0.85	N/A
F0/56	0.3	-	-	-	1	-	-	-	-	0.85	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
F0/01	98	-	-
F0/02	98	-	-
F0/03	98	-	-
F0/04	98	-	-
F0/07	98	-	-
F0/09	98	-	-
F0/10	98	-	-
F0/12	98	-	-
F0/13	98	-	-
F0/14	98	-	-
F0/15	98	-	-
F0/16	98	-	-
F0/17	98	-	-
F0/21	98	-	-
F0/22	98	-	-
F0/24	98	-	-
F0/25	98	-	-
F0/27	98	-	-
F0/30	98	-	-
F0/31	98	-	-
F0/36	98	-	-
F0/37	98	-	-
F0/38	98	15	9
F0/39	98	-	-
F0/42	98	-	-
F0/43	98	-	-
F0/44	98	-	-
F0/46	98	-	-
F0/48	98	-	-

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
F0/49	98	-	-
F0/50	98	-	-
F0/51	98	-	-
F0/52	98	-	-
F0/53	98	-	-
F0/54	98	-	-
F0/55	98	-	-
F0/57	98	-	-
F0/59	98	-	-
F0/60	98	-	-
F0/61	98	-	-
F0/62	98	-	-
F0/63	98	-	-
F0/64	98	-	-
F0/65	98	-	-
F0/66	98	-	-
F0/67	98	-	-
F1/01	98	-	-
F1/02	98	-	-
F1/03	98	-	-
F1/04	98	-	-
F1/05	98	-	-
F1/06	98	-	-
F1/07	98	-	-
F1/08	98	-	-
F1/09	98	-	-
F1/10	98	-	-
F1/11	98	-	-
F1/12	98	-	-
F1/13	98	-	-
F1/14	98	-	-
F1/15	98	-	-
F1/16	98	-	-
F1/17	98	-	-
F1/18	98	-	-
F1/19	98	-	-
F1/20	98	-	-
F1/21	98	-	-
F1/22	98	-	-
F1/23	98	-	-
F1/24	98	-	-
F1/26	98	-	-
F1/25	98	-	-

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
F1/27	98	-	-
F1/28	98	-	-
F1/29	98	-	-
F1/30	98	-	-
F1/31	98	-	-
F1/32	98	-	-
F1/33	98	-	-
F1/34	98	-	-
F1/35	98	-	-
F0/58	98	-	-
F0/05	98	-	-
F0/06	98	-	-
F0/08	98	-	-
F0/11	98	-	-
F0/18	98	-	-
F0/19	98	-	-
F0/20	98	-	-
F0/23	98	-	-
F0/26	98	-	-
F0/28	98	-	-
F0/29	98	-	-
F0/32	98	-	-
F0/33	98	-	-
F0/32.1	98	-	-
F0/34	98	-	-
F0/35	98	-	-
F0/40	98	-	-
F0/41	98	-	-
F0/45	98	-	-
F0/47	98	-	-
F0/56	98	-	-

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?
F0/01	YES (+35%)	NO
F0/02	YES (+53%)	NO
F0/04	YES (+121.9%)	NO
F0/07	YES (+114.3%)	NO
F0/09	YES (+10.3%)	NO
F0/10	YES (+52.9%)	NO
F0/24	YES (+98.2%)	NO
F0/25	YES (+10.1%)	NO
F0/36	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
F0/37	YES (+42.6%)	NO
F0/38	YES (+82.3%)	NO
F0/39	N/A	N/A
F0/42	N/A	N/A
F0/46	YES (+82.8%)	NO
F0/49	YES (+60.7%)	NO
F0/59	N/A	N/A
F0/60	YES (+67.1%)	NO
F0/61	N/A	N/A
F0/62	N/A	N/A
F0/65	YES (+187.2%)	NO
F1/01	N/A	N/A
F1/02	YES (+88.5%)	NO
F1/10	N/A	N/A
F1/11	N/A	N/A
F1/15	N/A	N/A
F1/16	N/A	N/A
F1/17	YES (+9.7%)	NO
F1/18	YES (+60.6%)	NO
F1/19	YES (+65.5%)	NO
F1/20	YES (+40.6%)	NO
F1/21	YES (+68%)	NO
F1/26	YES (+7.6%)	NO
F1/27	YES (+69%)	NO
F1/28	YES (+64.1%)	NO
F1/29	YES (+50.6%)	NO
F1/35	YES (+48.3%)	NO
F0/06	YES (+80.3%)	NO
F0/08	YES (+51.8%)	NO
F0/23	YES (+89.5%)	NO
F0/29	YES (+149.8%)	NO
F0/33	YES (+72.8%)	NO
F0/34	N/A	N/A
F0/35	N/A	N/A
F0/40	YES (+36.5%)	NO
F0/41	N/A	N/A
F0/47	YES (+57.4%)	NO

Regulation 25A: Consideration of high efficiency 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
Floor area [m^2]	3549	3549
External area [m^2]	5928.4	5928.4
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	3	3
Average conductance [W/K]	1248.35	1730.25
Average U-value [W/m^2K]	0.21	0.29
Alpha value* [%]	22.33	16.01

* 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
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
82	**Residential Institutions: Residential Schools**
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
18	**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/m^2]

	Actual	Notional
Heating	1.69	5.11
Cooling	0	0
Auxiliary	10.24	5.2
Lighting	9.74	7.46
Hot water	4.27	7.38
Equipment*	22.13	22.13
TOTAL**	**25.94**	**25.15**

* 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/m^2]

	Actual	Notional
Photovoltaic systems	6.23	3.34
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*6.23*	*3.34*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	144.53	98.29
Primary energy [kWh_{PE}/m^2]	28.64	30.8
Total emissions [kg/m^2]	3.06	3.4

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] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	14.3	131.4	1.7	0	10.7	2.39	0	2.54	0
	Notional	33.2	64.5	4.9	0	5	1.87	0	----	----
[ST] Central heating using water: floor heating, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	15.9	123.1	1.9	0	7.8	2.39	0	2.54	0
	Notional	40.1	61.4	6	0	3.7	1.87	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

SBEM Main Calculation Output Document

Thu Jun 15 11:53:10 2023 v6.1.e.0

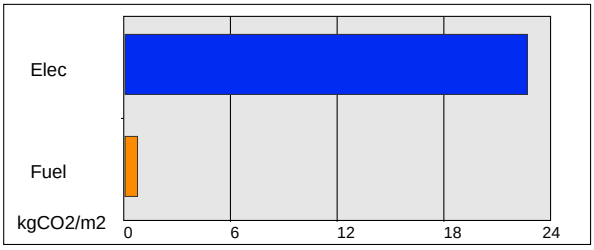
Building name

Kestral Way SEND

Building type: Residential Institutions: Residential Schools

SBEM is an energy calculation tool for the purpose of assessing and demonstrating compliance with Building Regulations (Part L for England and Wales, Section 6 for Scotland, Part F for Northern Ireland, and Building Bye-laws Jersey Part 11) and to produce Energy Performance Certificates and Building Energy Ratings. Although the data produced by the tool may be of use in the design process, **SBEM is not intended as a building design tool.**

Building Energy Performance and CO2 emissions

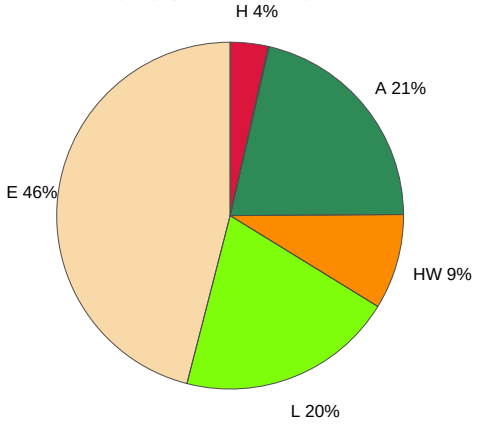


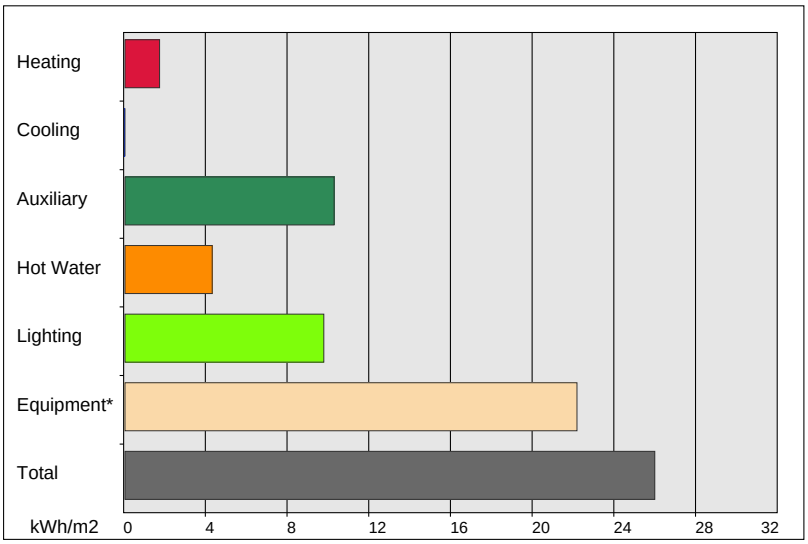
0.8 kgCO2/m2 displaced by the use of renewable sources.

Building area is 3549.04 m2

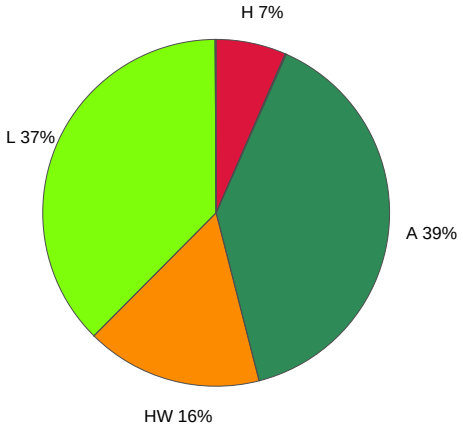
Annual Energy Consumption

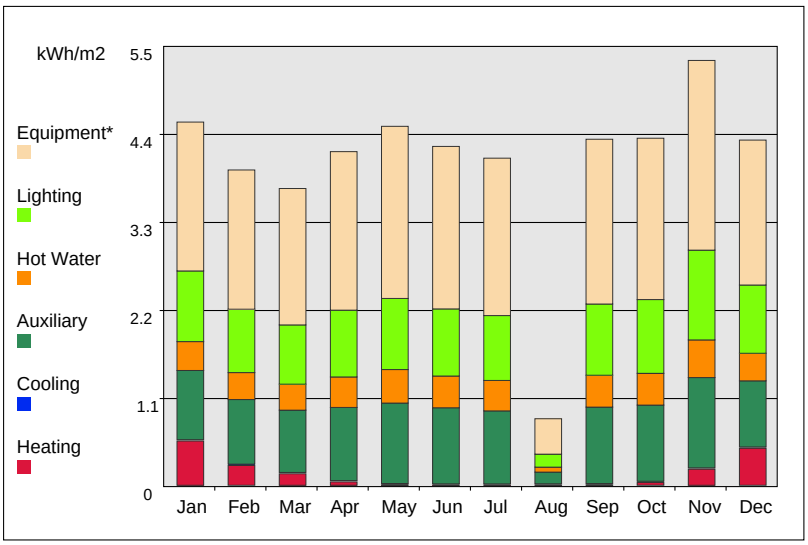
(Pie chart including Equipment end-use)





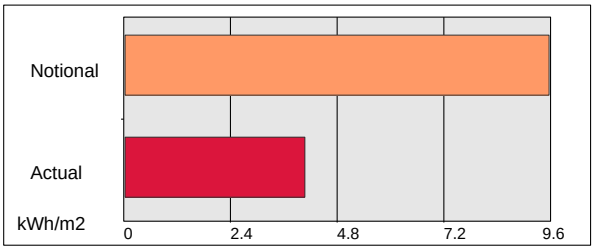
(Pie chart excluding Equipment end-use)

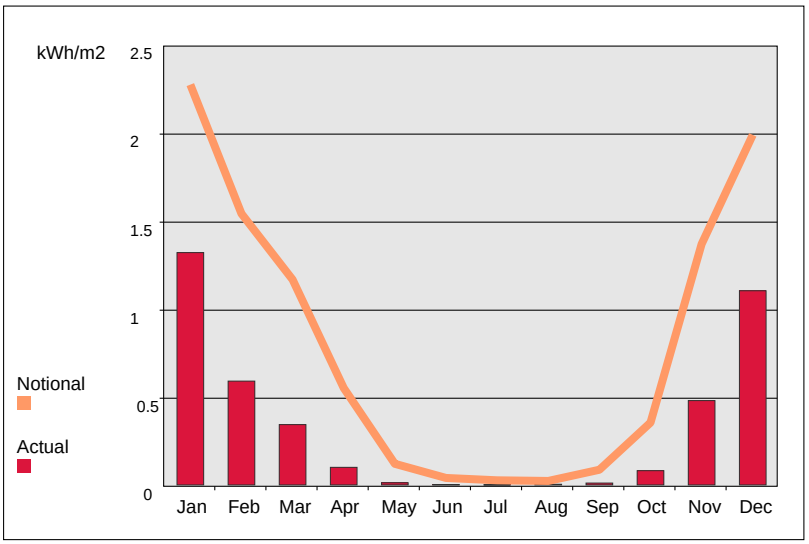




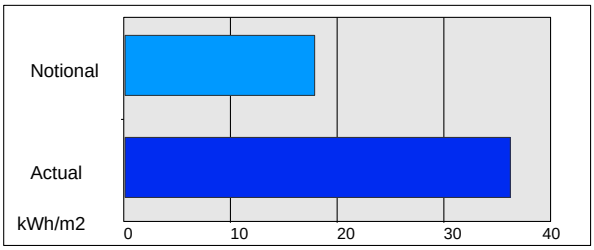
(*) Although energy consumption by equipment is shown in the graphs for information, this end-use has not been included in the total results of the building or the calculation of the ratings.

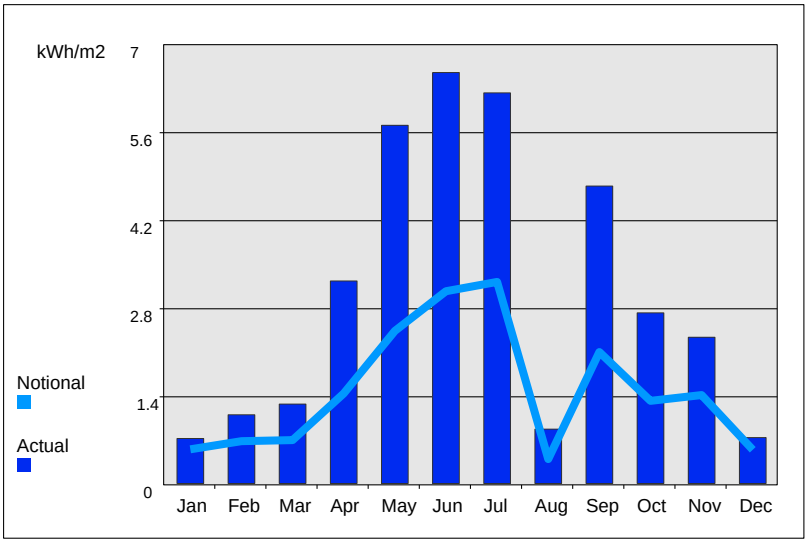
Annual Heating Demand





Annual Cooling Demand





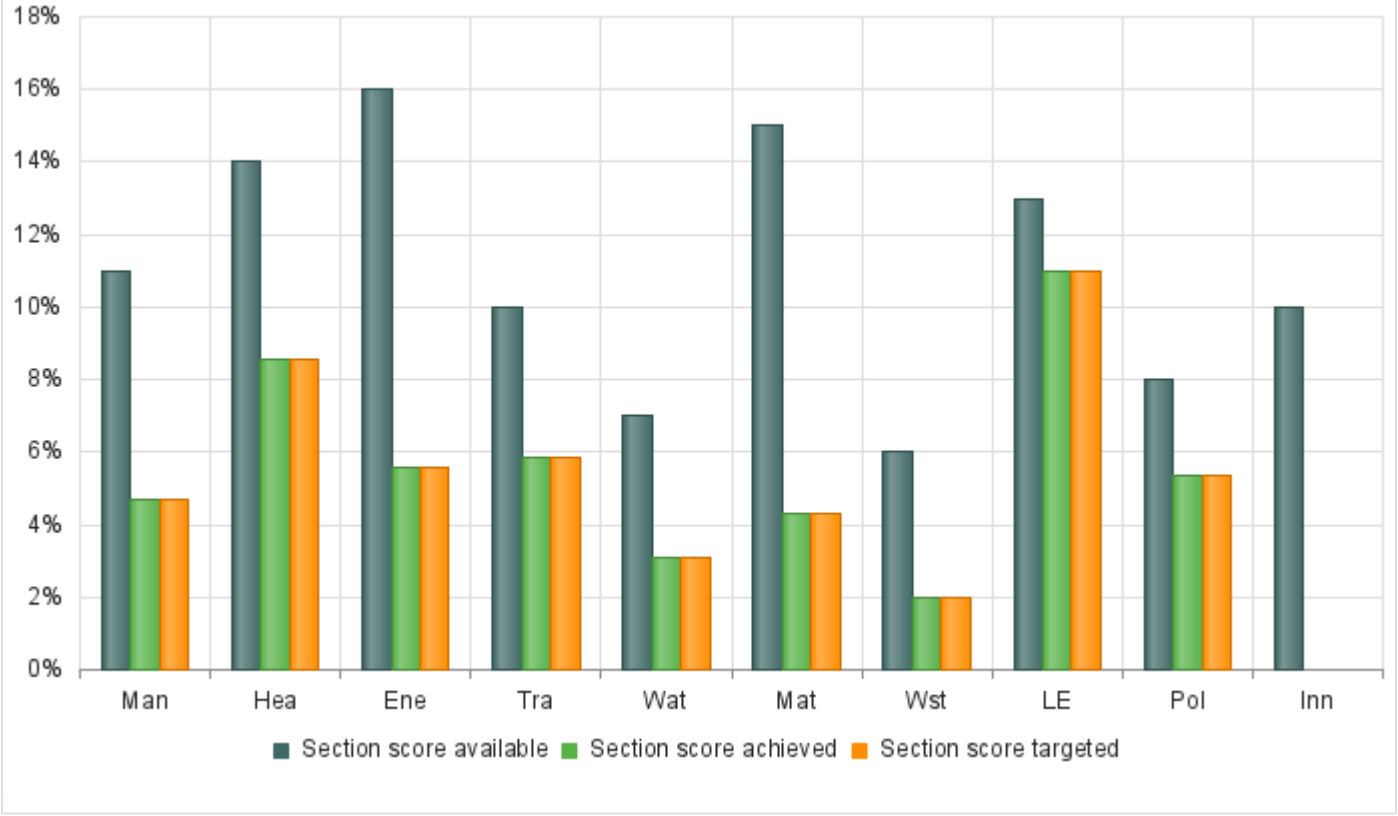
Appendix 2 – BREEAM Pre-Assessment

Pre-assessment : Design (Interim) : Kestrel Way SEND School (714456)

BREEAM Rating

	Credits available	Credits achieved	% Credits achieved	Weighting	Category score
Man	21.0	9.0	42.86%	11.00%	4.71%
Hea	18.0	11.0	61.11%	14.00%	8.55%
Ene	23.0	8.0	34.78%	16.00%	5.56%
Tra	12.0	7.0	58.33%	10.00%	5.83%
Wat	9.0	4.0	44.44%	7.00%	3.11%
Mat	14.0	4.0	28.57%	15.00%	4.28%
Wst	9.0	3.0	33.33%	6.00%	2.00%
LE	13.0	11.0	84.62%	13.00%	11.00%
Pol	12.0	8.0	66.67%	8.00%	5.33%
Inn	10.0	0.0	0.00%	10.00%	0.00%
Total	141.0	65.0	46.10%	-	50.39%
Rating	-	-	-	-	★★☆☆☆ **Good**

Performance by environmental category



Pre-assessment : Design (Interim) : Kestrel Way SEND School (714456)
Issue scores

Please Note: X means the exemplary credit for the relevant issue

Management

Man 01 Project Brief and design
2 / 4

Man 02 Life cycle cost and service life planning
1 / 4

Man 03 Responsible construction practices
4 / 6 X: 0 / 1

Man 04 Commissioning and handover
2 / 4

Man 05 Aftercare
0 / 3

Health and Wellbeing

Hea 01 Visual comfort
5 / 5 X: 0 / 2

Hea 02 Indoor air quality
2 / 4 X: 0 / 1

Hea 04 Thermal comfort
0 / 3

Hea 05 Acoustic performance
3 / 3

Hea 06 Security
0 / 1 X: 0 / 1

Hea 07 Safe and Healthy Surroundings
1 / 2

Energy

Ene 01 Reduction of energy use and carbon emissions

3 / 13 X: 0 / 5

Ene 02 Energy monitoring

2 / 2

Ene 03 External lighting

1 / 1

Ene 04 Low carbon design

0 / 3

Ene 05 Energy efficient cold storage

N/A

Ene 06 Energy efficient transportation systems

2 / 2

Ene 07 Energy efficient laboratory systems

N/A

Ene 08 Energy efficient equipment

0 / 2

Transport

Tra 01 Transport assessment and travel plan

2 / 2

Tra 02 Sustainable transport measures

5 / 10

Water

Wat 01 Water consumption

2 / 5 X: 0 / 1

Wat 02 Water monitoring

1 / 1

Wat 03 Water leak detection

0 / 2

Wat 04 Water efficient equipment

1 / 1

Materials

Mat 01 Life cycle impacts

0 / 7 X: 0 / 3

Mat 02 Environmental impacts from construction products

0 / 1

Mat 03 Responsible sourcing

3 / 4 X: 0 / 1

Mat 05 Designing for durability and resilience

1 / 1

Mat 06 Material efficiency

0 / 1

Waste

Wst 01 Construction waste management

2 / 4 X: 0 / 1

Wst 02 Use of recycled and sustainably sourced aggregates

0 / 1 X: 0 / 1

Wst 03 Operational waste

1 / 1

Wst 04 Speculative finishes (Offices only)

N/A

Wst 05 Adaptation to climate change

0 / 1 X: 0 / 1

Wst 06 Design for disassembly and adaptability

0 / 2

Land use and ecology

LE 01 Site selection

0 / 2

LE 02 Ecological risks and opportunities

2 / 2 X: 0 / 1

LE 03 Managing impacts on ecology

3 / 3

LE 04 Ecological change and enhancement

4 / 4 X: 0 / 1

LE 05 Long term ecology management and maintenance

2 / 2

Pollution

Pol 01 Impact of refrigerants

2 / 3

Pol 02 Local air quality

0 / 2

Pol 03 Flood and surface water management

4 / 5

Pol 04 Reduction of Night Time Light Pollution

1 / 1

Pol 05 Noise attenuation

1 / 1

Innovation

Inn 01 Innovation

0 / 0 X: 0 / 10

Kestrel Way SEND School Pre-Assessment Good - BREEAM NC 2018 Tracker

Credit Name	Sub Credit	Max Available Credits	Targeted Credits	Potential Extra Credits	Targeted Credits Weighting	Potential Credits Weighitng	Achieved Credits	Achieved Score	Status	Responsibility and Deadline dates	Evidence Criteria	Data Requirement	RSK / Team Comments
Management													
MAN 01 - Project Brief and Design	Project delivery planning	1	1	0	0.52	0.00		0.00	Incomplete	Client, Architect	1-3	Letters, meeting minutes, agendas, project scope, specifications, contracts, emails, invites Consultation Documents.	RIBA Stage 2 -4
	Stakeholder Consultation	1	1	0	0.52	0.00		0.00	Incomplete	Client, Architect	4-6 (7)	> Consultation plan setting out the process and scope of the consultation. > Consultations documents > Letter	RIBA Stage 2- 4
	Prerequisite for BREEAM Advisory Professional credits								Incomplete	Design Team, RSK?	8	Formal agreement of strategic performance targets from client and project team	RIBA Stage 2
	BREEAM Advisory Professional (AP)	2	0	2	0.00	1.05		0.00	Incomplete	Design Team, RSK?	9-11	> Letter of appointment	RIBA Stage 3 **Needs AP appointment** **RSK can provide this if required**
MAN 02- Service life planning and costing	Elemental Life Cycle Cost	4	1	0	0.52	0.00		0.00	Incomplete	Cost consultant / QS	1 -2	Elemental life cycle cost plan	RIBA Stage 2
	Component Level LCC plan										3-4	Component level life cycle cost plan > Design drawings or Specification > Letter / email	RIBA Stage 4
	Capital Cost Report										5	Report the capital cost for the building in pounds per square metre (£k/ m2),	Will be kept confidential RIBA Stage 4
MAN 03 - Responsible Construction Practices	Pre-requisite								Incomplete	Client (contractor)	1	Letter / certificates	Ensure written into tender documents for contractor agreement RIBA Stage 3
	Environmental Management	1	1	0	0.52	0.00		0.00	Incomplete	Client (contractor)	3-4	> ISO 14001 / EMAS or equivalent standard > Letter (criteria 3)	RIBA Stage 3
	BREEAM Advisory Professional (AP)	1	0	1	0.00	0.52		0.00	Incomplete	RSK ? BREEAM AP	5-6	> Letter (criteria 4) > Contract (criteria 5)	RIBA Stage 3 **RSK can provide this if required**
	Responsible construction management	2	1	1	0.52	0.52		0.00	Incomplete	Client (contractor)	7-9	Completed Table 4.1	RIBA Stage 3
	Monitoring of Construction Site Impacts	2	2	0	1.05	0.00		0.00	Incomplete	Client (contractor)	10-22	> Letter of appointment > Contract	RIBA Stage 3
MAN 04 Commissioning and Handover	Commissioning - testing schedule and responsibilities	1	1	0	0.52	0.00		0.00	Incomplete	M&E	1-5	> Schedule > Letter of appointment	RIBA Stage 3-4
	Commissioning - design and preparation	1	1	0	0.52	0.00		0.00	Incomplete	M&E	6-7	Letter of appointment	RIBA Stage 3
	Testing and inspecting building fabric	1	0	1	0.00	0.52		0.00	Not Sought	Thermographic Surveyor / RSK ?	8-10	Thermographic Survey confirmation letter of appointment, contract, scope, programme of works	
	Handover	1	0	1	0.00	0.52		0.00	Incomplete	Client (contractor)	11-12	> Building User Guide or commitment to produce one > Training schedule or commitment to produce one	RIBA Stage 3/4
MAN 05 Aftercare	Aftercare Support	1	0	0	0.00	0.00		0.00	Not Sought	Client	1-2	Evidence of meeting, training and aftercare support already in place or Commitment Letter	
	Commissioning	1	0	0	0.00	0.00		0.00	Not Sought	Client / M&E	3	Letter of commitment	
	Post Occupancy Evaluation	1	0	0	0.00	0.00		0.00	Not Sought	Client	4-7	Letter of commitment	Must be done by a third party RIBA Stage 3/4
Section Total		21	9	6	4.71	3.14	0	0.00					
Health and Wellbeing													
HEA 01 - Visual comfort	Control of glare from sunlight	1	1	0	0.78	0.00		0.00	Incomplete	Architect	1-3	> Design Drawings or Specification > Strategy or Letter	RIBA Stage 3/4
	Daylighting	2	2	0	1.56	0.00		0.00	Incomplete	Client, Daylighting Consultant / RSK?	4	Daylighting calculations > Drawings > Calculations both for (a) or (b) & (c) table 11.	RIBA Stage 3/4 RSK have been instructed on this
	View Out	1	1	0	0.78	0.00		0.00	Incomplete	Architect	5-6	> Drawings > Calculations	RIBA Stage 3/4

	Internal/External lighting levels, zoning and controls	1	1	0	0.78	0.00		0.00	Incomplete	M&E	7-13	> Letter or Specification > Drawings	RIBA Stage 3/4
HEA 02 - Indoor air quality	Indoor air quality (prerequisite)								Incomplete	Indoor Air Quality Consultant / RSK?	1	A compliant Indoor Air Quality Plan	RIBA Stage 3 RSK have been instructed on this
	Ventilation	1	0	1	0.00	0.78		0.00	Incomplete	M&E	2	> Specification > Drawings	RIBA Stage 3/4 comfort cooling
	Emissions from construction products	2	1	1	0.78	0.78		0.00	Incomplete	Indoor Air Quality Consultant / RSK?	3-4	Specification or Letter	Requires getting carcinogen informaton from finishes naterials suppliers and this is proving difficult
	Post-construction indoor air quality measurement	1	1	0	0.78	0.00		0.00	Incomplete	Indoor Air Quality Consultant / RSK?	5-10	Specification or Letter	RIBA Stage 3 RSK have been instructed on this
HEA 03 - Safe Containment in Laboratories			This is no longer assessed as a separate issue within BREEAM UK New Construction 2018.						Not Sought				
HEA 04 - Thermal comfort		3	0	3	0.00	2.33		0.00	Incomplete	M&E / RSK?	1-4	Thermal Modelling Report	RIBA Stage3/4
											5-8	Thermal Modelling Report or Statement from project team	requries climate change scenario RIBA Stage3/4
											9-11	Thermal zoning and control stategy	RIBA Stage3/4
HEA 05 - Acoustic performance		3	3	0	2.33	0.00		0.00	Incomplete	Acoustic Consultant RSK ?	1	Acoustian's report	RIBA Stage 4 RSK have been instructed on this
											2	Acoustian's report (and appointment letter if critera 3 targetted)	RIBA Stage 4 RSK have been instructed on this
											3 (Acoustic performance for Residential institutions (short term and long term stay))	Multi-residential specificWhere Robust Details are to be used, the following must be provided: >1. Design team confirmation that Robust Details chosen will achieve the required performance standards for sound insulation. > 2. Purchase Statement from RDL which confirms that the relevant plots are registered with RDL	
HEA 06 - Security of site and building		1	0	1	0.00	0.78		0.00	Incomplete	Client, Security Consultant, Architect, M&E	1-3	> Drawing > Specification or Statement	Require correspondence from ALO, CPDA, SbD officer RSK can provide a fee for this RIBA Stage 2
HEA 07 - Safe & Healthy Surroundings	Safe access	1	0	0	0.00	0.00		0.00	Not Sought	Landscape Architect, M&E, Client	1-6	> Drawing > Specification or Statement	
	Outside Space	1	1	0	0.78	0.00		0.00	Incomplete	Landscape Architect, Client	7	Drawing showing compliant outside space.	RIBA Stage 4
Section Total		18	11	6	8.56	4.67	0	0.00					
Energy													
ENE 01 - Reduction of energy use and carbon emissions	Energy Performance	9	3	2	2.09	1.39		0.00	Incomplete	M&E / RSK?	1	A copy of the building regulations output document from the approved software. The output documents must be based on the design stage of analysis. A copy of the building regulations output document from the design stage SAP calculations (where relevant for multiresidential buildings).	RIBA Stage 3/4
	Pre-requisite - Prediction of operational energy								Not Sought	M&E	2	Workshop minutes, agreed outcomes	RIBA Stage 3
	Energy modelling and reporting	4	0	0	0.00	0.00		0.00	Not Sought	M&E	3-5	Predicted energy consumption values; design assumptions; input data and risk assessments reported as detailed in the Energy Prediction and Post-occupancy guidance available from the BREEAM website. Confirmation of suitably qualified energy	RIBA Stage 3
ENE 02 - Energy monitoring		2	2	0	1.39	0.00		0.00	Incomplete	M&E	1-5	> Letter or; > Design drawings/specification	RIBA Stage 3/4
ENE 03 - Energy efficient external lighting		1	1	0	0.70	0.00		0.00	Incomplete	M&E	1-2	> Letter or; > Design drawings/specification	Second credit is not available to primary schools - confirm age range
ENE 04 - LZC Technologies	Passive Design Analysis	1	0	0	0.00	0.00		0.00	Not Sought	Architect, M&E / RSK?	1 -4	> Evidence to show analysis of building > Evidence to show passive design measures implemented. > Results from a dynamic simulation model demonstrating the reduced energy demand and CO_2-eq emissions from the specified passive design measures.	RIBA Stage 2
	Free cooling	1	0	0	0.00	0.00		0.00	Not Sought	M&E / RSK?	5-8	Results from a dynamic simulation model and other used methods demonstrating that the free cooling strategy can meet the building's cooling demand.	RIBA Stage 2-3
												One or more of the appropriate evidence types listed.	
	Low and zero carbon technologies	1	0	1	0.00	0.70		0.00	Incomplete	M&E / RSK?	9-12	>Feasibility Study	RIBA Stage 2
												Results from a dynamic simulation model demonstrating reductions in CO_2-eq emissions from the specified low and zero carbon technology	
ENE 05 - Energy efficienct cold storage systems		0	0	0	0.00	0.00		0.00	Not Sought		1	Letter	
											3-4	Documentary evidence confirms the GHG savings	
ENE 06 - Energy efficienct transportation systems		2	2	0	1.39	0.00		0.00	Incomplete		1	Documentary evidence confirming all criteria is met	

												2-5	Manufacturer data sheets	
ENE 07 Energy Efficient Laboratory Systems	Design Specification	0	0	0	0.00	0.00		0.00	Not Sought			1-4	Proof of consultation.	
	Best practice energy efficient measures	0	0	0	0.00	0.00		0.00	Not Sought			5-8	One or more of the appropriate evidence types listed	
ENE 08 - Energy efficient equipment (process)		2	0	0	0.00	0.00		0.00	Not Sought			1-3	One or more of the appropriate evidence types listed	RIBA Stage 3
Section Total		23	8	3	5.57	2.09	0	0.00						
Transport														
TRA 01 - Transport Assessment & Travel Plan	Travel Plan	2	2	0	1.67	0.00		0.00	Incomplete	Client, Transport Consultant - RSK?		1-5	> Travel Plan AND if occupier is known > Evidence that they have been involved inb the development of the travel plan	RIBA Stage 2 RSK can provide this if required
TRA 02 - Sustainable Transport Measures	Pre-requisite								Incomplete	Client, Transport Consultant		1	Achieve Tra 01 above	RIBA Stage 2
	Transport Options Implementation	10	5	2	4.17	1.67		0.00	Incomplete	Client, Transport Consultant, Architect, M&E		2-3	Identify the sustainable transport measures, see Table 7.4 Award credits according to the existing Accessible Index (AI) of the project, and the total number of points achieved for the options implemented, see Table 7.3	RIBA Stage 3-4
Section Total		12	7	2	5.83	1.67	0	0.00						
Water														
WAT 01 - Water consumption		5	2	1	1.56	0.78		0.00	Incomplete	Architect, M&E		1-6	A completed copy of the BREEAM Wat 01 calculator Documentary evidence supporting the data used to complete the calculator tool.	RIBA Stage 3/4
													One or more of the appropriate evidence types listed to show: > Water consumption of all water consuming components > Amount of all these components being installed.	
WAT 02 - Water monitoring		1	1	0	0.78	0.00		0.00	Incomplete	M&E		1-6	One or more of the appropriate evidence types listed, right.	RIBA Stage 3/4
WAT 03 - Water leak detection		2	0	2	0.00	1.56		0.00	Incomplete	M&E		1-3	Two or more of the appropriate evidence types listed, right.	RIBA Stage 3/4
WAT 04 - Water efficient equipment		1	1	0	0.78	0.00		0.00	Incomplete	M&E		1-2	One or more of the appropriate evidence types listed.	
Section Total		9	4	3	3.11	2.33	0	0.00						
Materials														
MAT 01 - Environmental impacts from construction products - Building life cycle assessment (LCA)	Superstructure	6	0	0	0.00	0.00		0.00	Not Sought	LCA Assessor - RSK ?		1-6	The Mat 01/02 Results Submission Tool – The options appraisal summary document – Evidence that the LCA options appraisal summary document has been received by the design team and client (meeting minutes, letter of acknowledgement) – Evidence of how the LCA design options have informed the design decision-making process (e.g. meeting minutes, documented design development showing how the LCA options have affected the design). The LCA options appraisal summary document includes substructure and hard landscaping according to the criteria.	RIBA Stage 2 and 4 RSK can provide this if required
	Substructure and hard landscaping options appraisal during Concept Design	1	0	0	0	0.00		0.00	Not Sought	LCA Assessor - RSK ?		7	The LCA options appraisal summary document includes substructure and hard landscaping according to the criteria.	
MAT 02 - Environmental impacts from construction products - Environmental Product Declarations (EPD)		1	0	0	0.00	0.00		0.00	Not Sought	LCA Assessor - RSK ?		1-2	One or more of the appropriate evidence types listed in The BREEAM evidential requirements on page 28 can be used to demonstrate compliance with these criteria.	RIBA Stage 3/4 RSK can provide this if required
													The Mat 01/02 Results Submission tool All Copies of EPD certificates	
MAT 03 - Responsible sourcing of construction products	Pre-requisite: Legally harvested and traded timber								Incomplete	Client (contractor)		1	> Certificate or letter of commitment that all timeber based prodcuts are responsibly sourced.	RIBA Stage 3
	Enabling sustainable procurement	1	1	0	1.07	0.00		0.00	Incomplete	Client (contractor)		2	Evidence of a Sustainable Procurement Plan	RIBA Stage 2
	Measuring responsible sourcing	3	2	1	2.14	1.07		0.00	Incomplete	Client, Architect, M&E, Civils / Structures (contractor)		3	Evidence of level of responsible sourcing achieved for each construction product. For example, certificates Completed copy of the Mat 03 Calculator tool. Evidence to show how the Mat 03 calculator tool has been completed.	RIBA Stage 3/4
MAT 04 - Insulation	Embodied Impact		This is no longer assessed as a separate issue within BREEAM UK New Construction 2018						Not Sought					
MAT 05 - Designing for Durability and Resilience		1	1	0	1.07	0.00		0.00	Incomplete	Architect		1-4	One or more of the appropriate evidence types listed.	RIBA Stage 3/4
MAT 06- Material Efficiency		1	0	0	0.00	0.00		0.00	Not Sought	Architect		1-2	One or more of the appropriate evidence types listed.	
Section Total		14	4	1	4.29	1.07	0	0.00						
Waste														
WST 01 - Construction	Pre-demolition audit	0	0	0	0.00	0.00		0.00	Not Sought			1-2	One or more of the appropriate evidence types listed. A copy of the Resource Management plan and, where relevant, pre-demolition audit.	Requires competent person to complete audit a RIBA Stage 2

waste management	Construction resource efficiency	3	1	2	0.67	1.33		0.00	Incomplete	Client (contractor)	3-4	One or more of the appropriate evidence types listed.	RIBA Stage 3
	Diversion of resources from landfill	1	1	1	0.67	0.67		0.00	Incomplete	Client (contractor)	5-6	One or more of the appropriate evidence types listed.	
WST 02 - Use of recycled and sustainably sourced aggregates	Pre-requisite								Not Sought	Civils / Structures	1	One or more of the appropriate evidence types listed.	RIBA Stage 3
	Project Sustainable Aggregate Points	0	0	0	0.00	0.00		0.00	Not Sought	Civils / Structures	2-6	A completed copy of the Wst 02 calculator. Documentary evidence supporting the data used to complete the Calculator tool.	Total amount of recycled or secondary aggregates specified, and meeting criterion 1, is greater than 25% (by weight or volume) of the total high
WST 03 - Operational waste		1	1	0	0.67	0.00		0.00	Incomplete	Architect, Client	1-2	One or more of the appropriate evidence types listed.	RIBA Stage 3/4
											3	HEALTHCARE:One or more of the appropriate evidence types listed.	RIBA Stage 3
											4	MULTI-RESIDENTIAL: One or more of the appropriate evidence types listed.	
											5-7	MULTI-RESIDENTIAL: One or more of the appropriate evidence types listed.	
WST 04 - Speculative floor and ceiling finishes		0							Not Sought		1-2	One or more of the appropriate evidence types listed.	
Wst 05 Adaptation to Climate Change		1	0	1	0.00	0.67		0.00	Incomplete	Civils / Structures, Architect / RSK?	1-3	One or more of the appropriate evidence types listed. Adaptation matrix, table showing hazards, mitigation measures, etc.	RIBA Stage 2 and 4 RSK can provide this if required
Wst 06 Functional Adaptability	Design for disassembly and functional adaptability - recommendations	1	0	1	0.00	0.67		0.00	Incomplete	Civils / Structures, Architect, M&E	1-2	One or more of the appropriate evidence types listed. Disassembly and functional adaptability study, implementation plan report, building adaptability and disassembly guide.	RIBA Stage 2
	Disassembly and functional adaptability – implementation	1	0	1	0.00	0.67		0.00	Incomplete	Civils / Structures, Architect, M&E	3-5	Disassembly and functional adaptability study, implementation plan report, building adaptability and disassembly guide.	RIBA Stage 4
Section Total		9	3	6	2.00	4.00	0	0.00					
Land Use and Ecology													
LE 01 - Site selection	Previously occupied land	1	0	0	0.00	0.00	0	0.00	Not Sought	Landscape Architect	1	One or more of the appropriate evidence types listed.	Not previously developed land? RIBA Stage 3
	Contaminated land	1	0	0	0.00	0.00		0.00	Not Sought	Contaminated Land Specialist, Client	2-3	A letter confirming the remediation will take place A copy of the remediation strategy and implementation plan	
LE 02 - Identifying and understanding the risks and opportunities for the project	Pre-requisite - Assessment route selection								Incomplete	Client, Ecologist / RSK?	1-2	Completed Guidance Note 34: BREEAM, CEEQUAL and HQM Ecology Risk Evaluation Checklist. One or more of the appropriate evidence types listed in The	RIBA Stage 1
	Survey and evaluation	1	1	0	1.00	0.00	0	0.00	Incomplete	Client, Ecologist / RSK?	3 4-6	One or more of the appropriate evidence types listed in The BREEAM evidential requirements on page 28 can be used to demonstrate compliance with these criteria. A copy of the Ecological Survey and Evaluation document. Note: A phase 1 habitat assessment or other equivalent type of assessment can act as acceptable evidence as long as it can be shown that they cover the content of the assessment criteria.	RIBA Stage 1
	Determining the ecological outcomes for the site (Route 2 only)	1	1	0	1.00	0.00	0	0.00	Incomplete	Client, Ecologist / RSK?	7-10	One or more of the appropriate evidence types listed.	RIBA Stage 2/3
LE 03 - Managing negative impacts on ecology	Pre-requisite - Identification and understanding the risks and opportunities for the site								Incomplete	Client, Ecologist / RSK?	1	One or more of the appropriate evidence types listed in The BREEAM evidential requirements on page 28 can be used to demonstrate compliance with these criteria.	RIBA Stage 1
	Planning, liaison, implementation and data	1	1	0	1.00	0.00	0	0.00	Incomplete	Client, Ecologist / RSK?	2-4		RIBA Stage 1 and 2
	Managing negative impacts of the project (Route 1 or 2 dependent)	2	2	0	2.00	0.00	0	0.00	Incomplete	Client, Ecologist / RSK?	5-8		RIBA Stage 2/3
LE 04 - Change and enhancement of ecological value	Pre-requisite: Managing negative impacts on ecology								Incomplete	Client, Ecologist / RSK?	1-2	One or more of the appropriate evidence types listed in The BREEAM evidential requirements on page 28 can be used to demonstrate compliance with these criteria.	RIBA Stage 2/3
	Route 1: Change and enhancement of ecology	0							Not Sought		3		
	Route 2: Liaison, implementation and data collation	1	1	0	1.00	0.00	0	0.00	Incomplete	Client, Ecologist / RSK?	4-5		RIBA Stage 2/3
	Change and enhancement of ecology (Route 2 only)	3	3	0	3.00	0.00	0	0.00	Incomplete	Client, Ecologist / RSK?	6		RIBA Stage 2/3
LE 05 - Long term ecology management and maintenance	Pre-requisite: Roles and responsibilities, implementation, statutory obligations								Incomplete	Client, Ecologist / RSK?	1-2	One or more of the appropriate evidence types listed in The BREEAM evidential requirements on page 28 can be used to demonstrate compliance with these criteria.	RIBA Stage 3
	Planning, liaison, data, monitoring and review management and maintenance	1	1	0	1.00	0.00	0	0.00	Incomplete	Client, Ecologist / RSK?	3-6		
	Landscape and ecology management plan (or similar) development	1	1	0	1.00	0.00	0	0.00	Incomplete	Client, Ecologist / RSK?	7		
Section Total		13	11	0	11.00	0.00	0	0.00					
Pollution													

POL 01 - Impact of Refrigerants	No refrigerants	0	0	0	0.00				Not Sought		1	Letter or Specification	
	Pre-requisite (if refrigerants in building)								Incomplete	M&E	2	One or more of the appropriate evidence types listed.	RIBA Stage 3/4
	Impact of Refrigerant	2	2	0	1.33	0.00		0.00	Incomplete	M&E	3-5	Completed copy of the Pol 01 calculator tool	RIBA Stage 3/4
												Documentary evidence supporting the data used to complete the calculator tool. > Formal letter from manufacturer / data sheets	RIBA Stage 3/4
	Leak Detection	1	0	1	0.00	0.67		0.00	Incomplete	M&E	6-7	One or more of the appropriate evidence types listed.	RIBA Stage 3/4
POL 02 - Local air quality		2	0	2	0.00	1.33		0.00	Incomplete	M&E	1 or 2	Confirmation: All heating and hot water is supplied by non-combustion systems. For example, only powered by electricity.	Can we source extra low NOx boilers?
												Emissions do not exceed levels in Table 12.4 and Table 12.5	RIBA Stage 3/4
POL 03 - Flood and surface water management	Pre-requisite								Incomplete	Civils / Structures	1	One or more of the appropriate evidence types listed in The BREEAM evidential requirements on page 28 can be used to demonstrate compliance with these criteria.	RIBA Stage 3
	Flood resilience	2	2	0	1.33	0.00		0.00	Incomplete	Civils / Structures	2-4	Site Specific FRA	RIBA Stage 3
	Pre-requisite								Incomplete	Civils / Structures	5	One or more of the appropriate evidence types listed.	RIBA Stage 3
	Surface Water Runoff	2	2	0	1.33	0.00		0.00	Incomplete	Civils / Structures	6-16	Calculation results for the pre-and postdevelopment peak rate of run-off Information showing the proposed drainage solution, system failure flood flow routes, potential flood ponding levels and ground floor levels Calculation results for the pre- and postdevelopment volume of run-off Calculation results for the limiting discharge	RIBA Stage 3
	Minimising water course pollution	1	0	1	0.00	0.67		0.00	Not Sought	Civils / Structures	17-24	One or more of the appropriate evidence types listed in The BREEAM evidential requirements on page 28 can be used to demonstrate compliance with these criteria.	RIBA Stage 3
POL 04 - Reduction of night time light pollution		1	1	0	0.67	0.00		0.00	Incomplete	M&E	1-5	One or more of the appropriate evidence types listed.	RIBA Stage 3/4
POL 05 - Reduction of Noise Pollution		1	1	0	0.67	0.00		0.00	Incomplete	Acoustic Consultant RSK ?	1-5	One or more of the appropriate evidence types listed. Confirmation acoustician suitably qualified Noise report, confirmation of testing	RIBA Stage 4 RSK have been instructed on this
Section Total		12	8	4	5.33	2.67	0	0.00					
Overall Total		153	65	31	50.40	21.63	0	0.00					

	Score	Level
Targeted Score (Targeted and Potential Score)	**50.40**	**Good**