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ENERGY AND SUSTAINABILITY STATEMENT

King Street, Blackpool

Issue 01

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Contents

1.0 Executive Summary

This Energy and Sustainability Report has been prepared on behalf of Muse Developments for the proposed new office building located within at King Street in Blackpool.

The building will be assessed under the following key criteria pertaining to sustainability.

- BREEAM New Construction (NC) 2018: Excellent Rating.
- Building Regulations Part L2A 2013 with 2016 Amendments.
- EPC rating 'A'.
- UK GBC 2030-2035 net zero carbon interim target for base building operational energy.

This report demonstrates that the proposed building will utilise a passive design approach, combined with energy-efficient features to minimise the office's carbon & environmental footprint, thus meeting the sustainable standards set out in both Building Regulations and BREEAM.

The proposed fabric first methodology and the building services strategy utilise a holistic approach which incorporates a number of energy reduction measures, the combination of which will produce a building with a superior environmental performance.

2.0 Introduction

2.1 Outline Project Information

This report has been produced to detail the sustainable and energy efficiency measures that could be incorporated into the design of the new office building at King Street, Blackpool.

The design of the building will be based on a holistic approach, which utilises the best of sustainable building design in combination with advanced building services and green technologies to minimise the offices carbon and environmental footprint.

Site Location

2.2 Project Description

The project comprises the construction a new office building in the town centre of Blackpool. The building is to be located on the site of buildings which will be demolished to make way for the new development and an existing surface car park. The building incorporates the following:

- Ground floor accommodation including reception, cycle facilities and showers.
- Fully fitted office space located on floors 1 to 6.
- Roof plant level.

Elevation

2.3 Planning Requirements

2.3.1 Blackpool Borough Council Planning Requirements

Outline planning permission has been granted for the development subject to the following condition in relation to sustainability:

> *'Prior to the commencement of above ground construction, a Sustainability Strategy shall be submitted to and agreed in writing by the Local Planning authority. This strategy shall;*
>
> *i. Specify energy efficiency measures to be used within the building.*
>
> *ii. Specify renewable energy features.*
>
> *iii. Specify measures to reduce water consumption.*
>
> *iv. Demonstrate that the building would achieve a BREEAM rating of 'very good'.*
>
> *The development hereby approved shall proceed and the building thereafter operated in full accordance with this strategy.'*

Subsequent sections of this report will detail how the building proposes to reduce energy demand and associated emissions through the application of the energy hierarchy to reduce energy consumption as far as possible.

The viability of low carbon and renewable technologies for this building will also be assessed and summarised. It will highlight how the building service strategy will utilise low carbon technology, and zero on-site fossil fuel use thus achieving a reduction in carbon emissions from the baseline.

2.3.2 Building Regulations

The office will be assessed under Building Regulations Part L2A, 2013 'Conservation of fuel and power in new buildings other than dwellings. The development will be designed to meet and where possible better the requirements of this standard.

2.3.3 BREEAM New Construction (NC) 2018

The building will be measured against the latest Building Research Establishments Environmental Assessment Method (BREEAM) New Construction 2018 methodology to achieve a target rating of 'Excellent'.

2.3.4 Sustainability Drivers Summary

Sustainability Drivers	Requirement
Building Regulations	Part L2A 2013
EPC	Rated 'A'
BREEAM NC 2018	Excellent Rating
On Site Renewable Energy Target	Renewable energy to be incorporated but with no specific targets

3.0 Energy & Sustainability Strategy

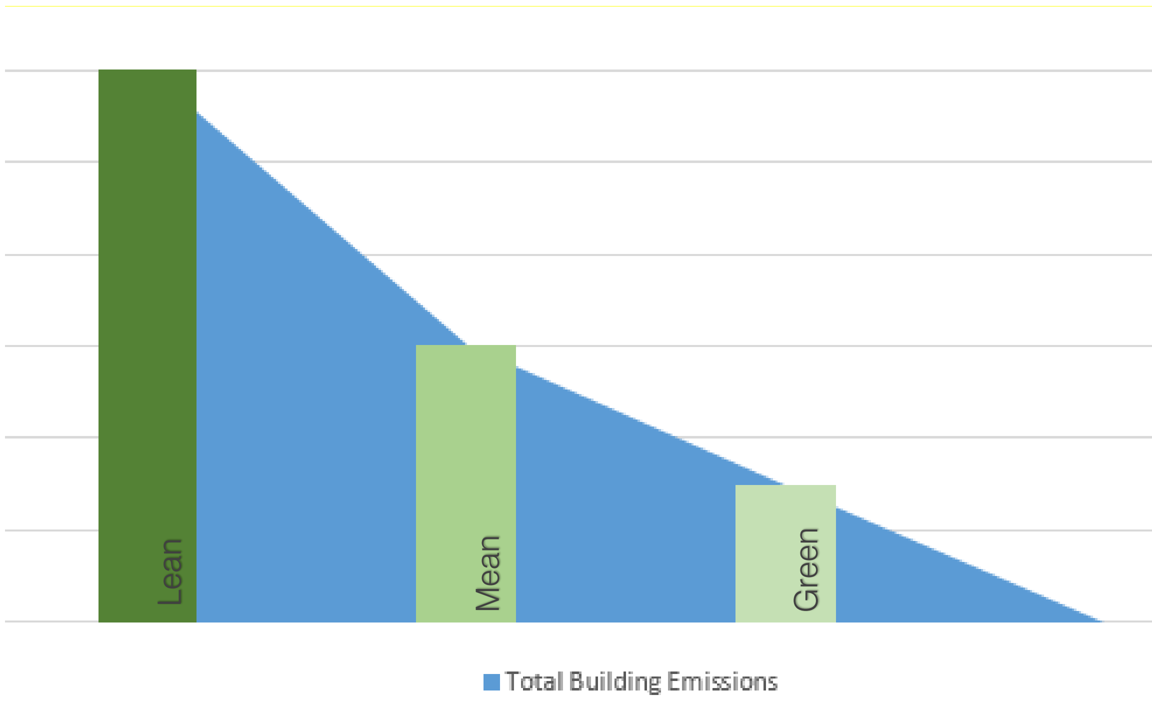
3.1 Energy Strategy

A sustainable office building will be delivered through the utilisation of a holistic approach, which considers, plans and monitors the use of natural resources. The strategy for achieving this is outlined as follows:

The Energy Hierarchy

The strategy for reducing carbon dioxide (CO_2) emissions and energy consumption within the office building will be to embrace a lean, mean and green approach as defined below.

- Lean – Reduce need for energy consumption by using advanced building modelling software and passive construction techniques – Can often have the biggest impact on reducing energy consumption and emissions from the baseline.
- Mean – Use energy as efficiently as possible through incorporation of high-efficiency systems and effective controls – further reduces demand and subsequent emissions.
- Green – Supply energy from low or zero-carbon technologies to help realise emission targets – meets remaining demand with low carbon solutions.



The Energy Hierarchy

3.1.1 Lean – Passive Building Design

Passive measures seek to find the optimum design of the building by balancing conflicting issues such as:

- Reducing solar gains and a need for natural daylighting to reduce lighting loads.
- Increased thermal mass and enhanced insulation and potential heat gains from future climate change scenarios.
- Reduced air permeability and increased ventilation loads.

Enhanced Insulation to the Building Envelope

Limiting heat losses across the entire building envelope will future proof the energy efficiency of the development over its whole life. To achieve this, the fabric thermal U-Value requirements as detailed within Approved Document L2A 2013 of the Building Regulations will be improved upon.

The table on the next page shows the limiting U-values required to meet Building Regulations compared to the targeted values which exceed the Building Regulations requirements.

The targeted values as noted above will be confirmed during the detailed design stage of the building in conjunction with finalisation of the energy efficiency measures included to meet the CO_2 emission rates required by the Building Regulations.

Building Element	AD L2A limiting U-Value (W/m².K)	Target U-Value (W/m².K)
Roof	0.25	0.10
External Wall	0.35	0.15
Ground Floor	0.25	0.10
Windows	2.20	1.25
External Doors	2.20	2.20

Engineered Facade Design

The glazed proportion of the building façades and the glazing location will be designed to maximise the use of natural daylight to offset demand for artificial lighting. A ratio of 40% glazed to 60% solid shall be targeted to limit solar gains whilst still ensuring sufficient provision of natural daylight.

At the same time as being designed to maximise passive solar gains, the façade will be designed to minimise thermal losses through the use of high-performance glazing, optimising the glazed to opaque proportion of the façade and enhanced insulation levels above the minimum set down by Building Regulations.

The table below shows the glazing g value used within the Part L2A 2013 calculations compared to the targeted values which improve upon the Building Regulations requirements.

Building Element	AD L2A Solar G Value	Target Solar G Value
Glazing	0.68	0.26

Reduced Air Permeability

A significant percentage of heat loss from buildings is due to air infiltration associated with poor airtightness. By improving the airtightness of the building, it is possible to reduce infiltration rates and thus reduce heat losses, energy use and the associated CO_2 emissions.

The development will be constructed to improved building airtightness criteria beyond the level required to comply with the Building Regulations.

The table below shows the comparison of the targeted air permeability for the building against the allowable maximum limit set within Approved Document L2A of the Building Regulations.

Building Regulation Document	Maximum allowable air permeability (m³/m²/hr at 50 Pascals)	Targeted air permeability (m³/m²/hr at 50 Pascals)
Approved Document L2A	10.0	2.0

3.1.2 Mean – High-Efficiency Systems, Plant and Controls

High-efficiency systems, plant, controls and equipment will be incorporated as follows:

Air Source Heat Pumps

The heating and domestic hot water demand within the building is proposed to be met through the use of air source heat pumps which ensure that the building demand is met through 100% electricity, and therefore eliminates the need for any on-site fossil fuel consumption.

As the grid continues to decarbonise, this ensures that the remaining emissions arising from building services will be reduced in line with the national grid carbon factors.

Optimised Plant Controls

Control of heating and cooling systems will be optimised to ensure plant operates as close to demand as possible and not at full capacity.

Variable Speed Drives

Variable speed drives shall be installed on circulation pumps and ventilation fans to allow the speed of the respective motors to be amended by the automatic controls to suit changing load of the building.

This will ensure energy usage matches demand requirements.

Energy Efficient LED Lighting

Internal lighting within the office areas will incorporate energy-efficient LED lighting throughout.

Lighting controls

Automatic presence detection will be included in appropriate areas. This form of control will ensure lights are automatically switched off during periods of non-occupancy and therefore limit energy wastage.

All internal lighting within the office areas will be daylight-linked to dim when daylight levels are sufficient.

The proposed building services for the building has the following low carbon features:-

- All electric HVAC strategy.
- Passive design analysis incorporated into building design to include high thermal mass concrete structure, improved glazing, improved air leakage rates, reduced glazing/wall proportions and improved thermal performance of floors, roof and walls.
- Manually openable windows for use outside of working hours rather than operatin central HVAC plant.
- Office ventilation via AHU’s with inverter driven fans.
- Air quality controlled via CO_2 monitoring.
- Heating and hot water generated via high efficiency heat pumps.
- Timed percussion spray taps.
- Low energy staged pump design with duty and assist and speed control linked to load requirements.
- Real time heat and cool metering to enhance plant control.
- Avoidance of oversizing of plant.
- Photo voltaic array at roof level.
- Automatically switched power factor correction equipment.
- Low energy lighting installation utilising LED lamp sources.
- Automatic lighting controls with occupancy and daylight sensing.
- Regenerative drive technology used in passenger lifts.
- Automatic BMS controls and energy metering system.
- Metering and monitoring of water supply to avoid leakages.
- Auto water shut off to toilet areas to avoid leakages causing wasted water.

3.1.3 Green – LZCs & Renewable Technologies

The design of the building as detailed above will place particular emphasis on passive energy saving by best practice design of the building and its services strategy.

To complement the energy savings previously detailed the following renewable, low carbon and sustainable measures have been considered for use within the scheme design within section 5.0 of this report.

- Ground source heat pumps (GSHP)
- Air source heat pump (ASHP)
- Wind power
- Photovoltaics (PV).
- Solar thermal water heating
- Biomass heating
- Combined heat and power (CHP)

Initial thermal modelling undertaken demonstrated that the passive design measures in conjunction with the highly efficient building services systems and associated control strategies alone will meet the CO_2 requirements for compliance with Part L2A 2013.

Regenerative Drive technology for Passenger Lifts

Power regeneration is the process of recovering kinetic energy created by a motor during stopping or braking and converting that energy to electricity and feeding it back into the power grid. This is especially effective in applications with frequent starts/stops and deceleration with high inertia loads such as high-rise lifts.

Regenerative elevator drives provide significant energy savings anywhere between 20 to 40 percent of the building's elevator electrical consumption and reduce the build-up of excess heat in the building.

Heat Recovery on Ventilation Systems

The ventilation systems installed within the development will also incorporate heat recovery within the air handling plant to recover waste heat from the exhaust air. This is then used to heat the incoming fresh air and therefore reduce energy usage.

The air handling plant will have a low specific fan power to minimise the energy used by the fans.

3.2 Sustainability Strategy

The building considers many aspects of sustainable best practice design which will be assessed using the BREEAM assessment methodology. These will include, but not be limited to the following:

- *Management* – responsible construction management, commissioning and handover, life cycle costing and data monitoring of construction site impacts.
- *Health and Well Being* – including visual comfort for building users, indoor air quality and ventilation, safe and healthy surroundings and security.
- *Energy* – reduction of carbon emissions, operational energy assessed, energy monitoring, efficient lighting and energy efficient lifts.
- *Transport* – Transport assessments and travel plan, including sustainable transport measures such as cycling facilities, and public transport accessibility.
- *Water* – reducing freshwater use through efficient sanitary ware, water monitoring, leak detection and automatic shut off of water supply.
- *Materials* – life cycle assessment of the embodied carbon of construction materials, the responsible sourcing of construction materials, consideration of materials to resist degradation and robustness.
- *Waste* – minimisation of waste generated during construction, operational waste storage, and considerations for designing out waste.
- *Land use and Ecology* – site selection, replacement and enhancement of ecology, and long-term habitat management.
- *Pollution* – selection of low GWP refrigerants, consideration of systems on local air quality, flood risk, reduction of noise and light pollution.

3.2.1 Building Research Establishment – Environmental Assessment Method (BREEAM)

BREEAM is the world's leading sustainability assessment method for the built environment. It recognises the value in higher performing assets across a building's life cycle from new construction to in-use and refurbishment.

BREEAM New Construction 2018

The proposed office building will be measured against the BREEAM 2018 New Construction assessment method to achieve a target rating of 'Excellent'.

The BREEAM rating benchmarks for projects assessed using the 2018 version of BREEAM UK New Construction as follows:

BREEAM Rating	% Score
Outstanding	≥ 85
Excellent	≥ 70
Very good	≥ 55
Good	≥ 45
Pass	≥ 30
Unclassified	< 30

3.2.2 Minimum Standards for BREEAM

A number of issues within specific categories have been set as minimum standards, i.e. particular credits that must be achieved to achieve the rating required irrespective of the percentage score achieved. For an Excellent rating, these are:

Minimum standards by BREEAM rating level	
BREEAM issue	**EXCELLENT Rating**
Man 03: Responsible Construction practices	One credit (responsible construction management)
Man04: Commissioning & Handover	One credit (commissioning- test schedule and responsibilities)
Man04: Commissioning & Handover	Criterion 11 (Building User Guide)
Man05: Aftercare	One credit (Commissioning – implementation)
Ene 01: Reduction of CO2 Emissions	Four credits
Ene02: Energy Monitoring	One credit (first sub-metering credit)
Wat01: Water Consumption	One credit
Wat 02: Water Monitoring	Criterion 1 only
Mat 03: Responsible Sourcing	Criterion 1 only
Wst 03: Operational Waste	One credit

3.2.3 Pre-assessment

Hannan Associates have been appointed as registered BREEAM assessors to undertake a BREEAM NC 2018 Pre-assessment, detailing the likely score for the proposed King Street office development. This preliminary review outlines the potential rating at present specification and highlights the requirements for attaining each credit.

As a result of the pre-assessment, it is anticipated that a score of 77.68% is achievable which equates to a BREEAM 'Excellent' rating.

BREEAM Issue	Available Credits	Targeted Credits	%
Management	21	19	9.95%
Health & Well Being	18	13	10.11%
Energy	23	17	11.83%
Transport	12	9	7.50%
Water	9	7	5.44%
Materials	14	8	8.57%
Waste	11	10	5.45%
Land Use & Ecology	13	11	11.00%
Pollution	12	7	4.67%
Innovation	14	2	2.00%
Total:		103	76.53%

Graph to demonstrate targeted credits against available credits for the BREEAM Pre-Assessment.

4.0 Low and Zero Carbon Technologies

4.1 Introduction

This section of the report covers the feasibility of incorporating LZC technologies within the proposed new office building.

Each technology has been considered in terms of the overall building design, systems strategy and location factors to determine the feasibility for inclusion within the development.

The office will be built to Building Regulations Part L2A 2013 standards. Initial thermal modelling suggests that the Low and Zero Carbon ventilation strategy i.e. LED lighting, heat recovery and smart controls etc. alone will meet the uplift in CO_2 reduction expected for Part L2A 2013 compliance.

New non-domestic buildings – uplift in emissions target by building type.	%
Distribution Warehouse	4%
Deep Plan office with Air Conditioning	12%
Retail Warehouse	8%
Shallow-plan office	13%
Hotel	12%
School	9%
Small warehouse	3%
Aggregate across build mix	9%

Table showing uplift in emissions target by building type to meet Part L2A 2013 (Source: Modern Building Services Magazine)

The three leading factors which have been used to allow qualitative assessment of the available LZC technologies are:

- CO_2 Saving potential
- Cost effectiveness
- Technology risk

4.2 Authority Planning Requirements

Whilst no specific targets for on-site renewable contribution is stated, the outline planning condition indicates that renewable technologies should be incorporated.

4.3 Technologies Considered

The following low or zero carbon technologies have been considered for use within the development:

- Air Source Heat Pumps (ASHP)
- Wind Power
- Photovoltaics
- Solar Water Heating
- Biomass Heating
- Combined Heat and Power (CHP)
- Ground Source Heat Pump (GSHP)
- District heating

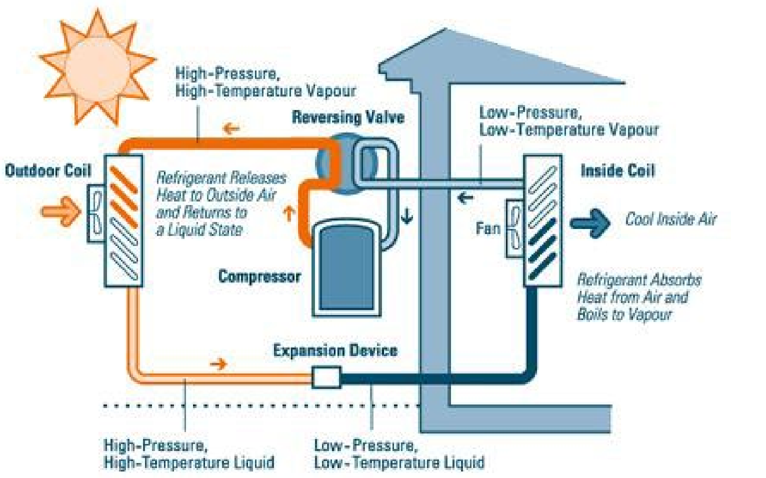
Each technology has been considered in detail in the subsequent pages to determine the suitability to allow an informed decision as to whether they would be beneficial to the development.

4.3.1 Air Source Heat Pumps

Heat pumps extract thermal energy from a variety of renewable sources, including the air, earth or water, and upgrade it to a higher, more useful temperature. If the heat source for the system is the air then it is known as an air source heat pump. The use of heat pumps can lead to savings in the use of fossil fuels and a subsequent reduction in the emission of greenhouse gases.

Air source heat pumps supply more useful energy than they consume. By extracting heat from the surrounding air, the heat energy released can be up to 5 times, the energy required to power the equipment.

An air source heat pump system consists of a compressor and a carefully matched evaporator coil and heat exchanger. A refrigerant liquid which circulates within the system has a boiling point as low as minus 40°C and evaporates when absorbing heat from the outside air. It is possible to extract considerable heat from the air at temperatures as low as minus 15°C. The resulting refrigerant gas is then compressed adding more heat energy and raising its temperature to around 75°C. Of course, the cycle is reversible for the provision of cooling into the space, i.e. the refrigerant liquid which circulates within the system evaporates when absorbing heat from the air within the space. The resulting refrigerant gas is then compressed adding more heat energy and raising its temperature to around 75°C and heat is expelled to the atmosphere via the air-cooled condensers.



This system process can be used to provide space heating through underfloor heating utilising heat pump boilers located internally or by heating the air using fan coil systems. Consideration would have to be given to noise generation from the roof mounted condensing units and the final plant and equipment selection will need to incorporate noise attenuation where necessary to ensure any planning conditions stipulating external noise levels are not exceeded and the system operation does not cause nuisance to adjacent buildings (including nearby residential properties).

System Viability

Advantages & Benefits:

- ✓ Can produce space heating and domestic hot water.
- ✓ No fuel deliveries required.
- ✓ Easier to install than ground & water source heat pumps.
- ✓ No combustion or potentially dangerous gases produced.

Disadvantages & Limitations:

- Increased use of refrigerant gas
- Increased plant space requirements
- Medium running costs
- Medium maintenance costs

Air Source Heat Pumps Summary	
Appropriateness of technology to the site/System viability	This is a very efficient system providing heating which can be utilised within the building and can be accommodated within the building design.
Lifetime & Payback	Lifetime: 15 – 20 years
Land Use	None – Air source heat pumps would be installed at roof level within external plant enclosure.
Local Planning Requirements	Details of the external plant enclosure required to house the heat pumps would need to be submitted as part of the planning application.
Noise	Plant noise attenuation requirements to be reviewed by the acoustic consultant and attenuation included within the design and installation as necessary to prevent noise egress.
Grant	Renewable Heat Incentive available
Carbon savings	Grid electricity 0.254 $kgCO_2/kWh$
Viability Conclusion	Viable

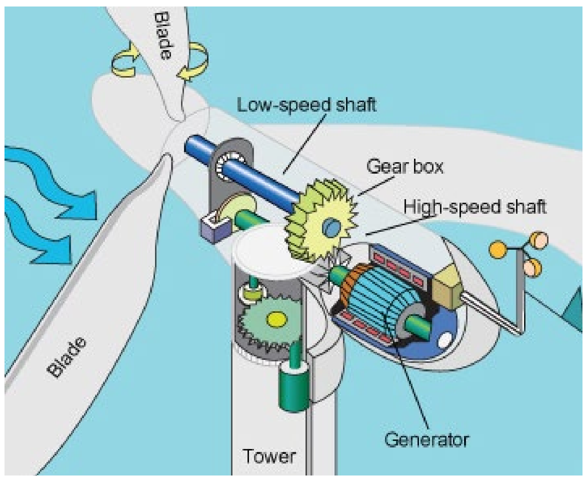
4.3.2 Wind Power

Energy can be generated using wind turbines. Harnessing wind as a renewable energy source involves converting the energy from a moving air mass (wind) into rotating shaft power which in turn generates electricity.

Wind turbines are commercially available in various sizes and outputs from a few hundred Watts (battery charging systems for boats and homes) to 2-3 Megawatts (wind farm turbines connected to the National Grid).

Most small turbines generate a direct current (DC) and need to be connected to an inverter to convert the direct current to alternating current (AC). There are two main types of wind turbine systems, grid connected systems and off grid systems.

Off grid systems incorporate batteries to store the energy produced by the turbine, an extra controller is required to ensure the batteries do not become over or under-charged. The controller diverts the electricity produced by the turbine to other electrical appliances when the batteries are fully charged (for example space and or water heaters).



Grid connected systems do not incorporate batteries and require a controller and inverter to ensure that electricity is produced at a quality acceptable to the grid. Surplus electricity can be exported back to the electricity grid via an export meter and sold back to the electricity supply company.

Small variations in wind speed can produce large changes in energy output. Wind speed increases with height and it is essential that the knowledge of the local wind resource is comprehensive to maximise the potential of the turbine.

Wind turbines are rated to a certain capacity in kW; however, this output is only achieved for the time that the wind is at its optimum level. As an approximate guide a good wind site will provide an average of 30% of the rated capacity of the turbine.

Building Mounted Wind turbines

Building mounted wind turbines on high rise buildings are becoming more common in urban locations, however, the urban environment has shown that street canyons affect urban wind flow, that wind speed up over the roof ridge is only evident for isolated single buildings, that the wind resource "seen" by a building mounted wind turbine is affected by positioning (height above roof ridge and position relative to the prevailing wind direction), that urban terrain roughness is high, and that adjacent buildings can cause wind shadow. This multiplicity of factors makes it difficult to generalise a wind resource estimation methodology for the urban environment.

The following needs to be fully considered when assessing the viability of using wind turbines as a possible low or zero carbon technology for incorporation within the office development:

- The suitability of location of mounting a wind turbine. Roof mounting would be most suitable.
- Wind turbines have a visual impact and require planning approval.
- Wind turbines generate noise in operation.
- Average wind speed in the area of the project needs to be in excess of 6.5 metres/second for the turbine to be feasible.

<u>System Viability</u>

Turbines should not be located in areas where the annual mean wind speed is less than 6.5 meters per second when measured at 40 metres above ground level.

Residential dwellings are in close proximity to the proposed site and therefore it is unlikely that a wind turbine would be acceptable due to noise concerns.

Location

- Latitude: 53.81891068275837
- Longitude: -3.0475229220549935
- Height above sea level: 130 m

Wind Speeds

estimates from NOABL data

- At 10m above ground level 6.1 m/s
- At 25m above ground level 6.8 m/s
- At 45m above ground level 7.4 m/s

Wind speed data at FY1 3EJ (Source: RenSMART NOABL data)

Wind Turbines	
Appropriateness of technology to the project/System viability	Whilst the electricity generated by wind turbines could be utilised within the building to reduce the consumption of grid electricity, the presence of residential buildings in close proximity discount wind turbines as a possible viable renewable energy technology for the building.
Lifetime & Payback	Lifetime: 20 years. Payback: Not calculated as system is not viable
Land Use	Wind turbine(s) would have to be roof mounted due to the restricted development site area and roof top space already limited.
Local Planning Requirements	Planning permission would be required for the wind turbines.
Noise	Noise is an issue due to the proximity of residential buildings.
Grant	None – Feed in Tariffs no longer available
Carbon savings	Grid electricity 0.254 $kgCO_2$/kWh
Viability Conclusion	Non-Viable due to close proximity to residential buildings and space limitations

4.3.3 Photovoltaics

Photovoltaic means electricity from light. The photovoltaic (PV) process converts free solar energy the most abundant energy source on the planet - directly into electricity. Photovoltaic systems use daylight to power ordinary electrical equipment, for example, household appliances, computers and lighting.

A PV cell consists of two or more thin layers of semi-conducting material, most commonly silicon. When the silicon is exposed to light, electrical charges are generated, and this can be conducted away by metal contacts as a direct electrical current (DC).

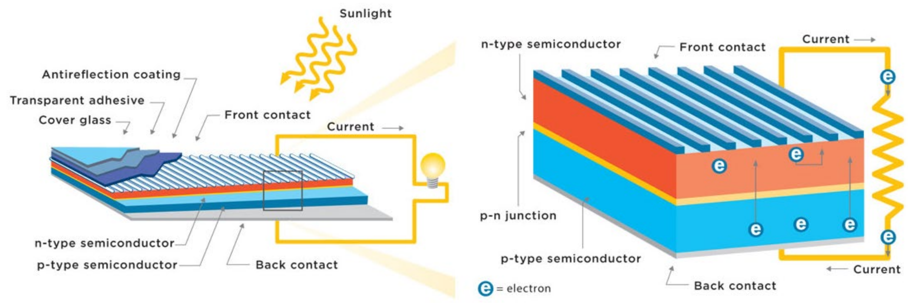
The electrical output from a single cell is small, so multiple cells are connected together and encapsulated (usually behind glass) to form a module (sometimes referred to as a "panel"). The PV module is the principle building block of a PV system and any number of modules can be connected together to give the desired electrical output.

In the UK, the sun's energy delivers about 950kWh/yr for every m² of southerly facing surface. PV panels are between 10% and 15% efficient at converting sunlight into electricity, which means you gain about 150kWh/yr of DC electrical energy for every m² of PV on your roof. This is converted to AC 220V and provides approximately 110kWh/yr/m² if the panels are installed on a south facing facade with a pitch of approximately 35 degrees. East or West facing PV panels provide approximately 80 percent of that yielded from a South facing PV panel.

PV equipment has no moving parts and as a result requires minimal maintenance. It generates electricity without producing emissions of greenhouse or any other gases, and its operation is virtually silent and unlikely to create a nuisance to the adjacent buildings and in particular the residential buildings.

PV systems can be incorporated into buildings in various ways: on sloped roofs and flat roofs, in facades, atria and shading devices. Modules can be mounted using frames or they can be fully incorporated into the actual building fabric; for example, PV roof tiles are available which can be fitted in place of standard tiles.

PVs generate DC output; an inverter and other equipment is needed to deliver the power to a building or the grid in an acceptable alternating current (AC) form. The alternative is to source DC motors for plant and equipment such as fan and filter motors whereby the electricity produced by the PV panels can be used directly.



<u>System Viability</u>

Advantages & Benefits:

- ✓ Generates on-site electricity whilst reducing carbon emissions – electricity can be sold back to the grid during periods of low demand within the building.
- ✓ Low maintenance costs.
- ✓ Mature and established technology.

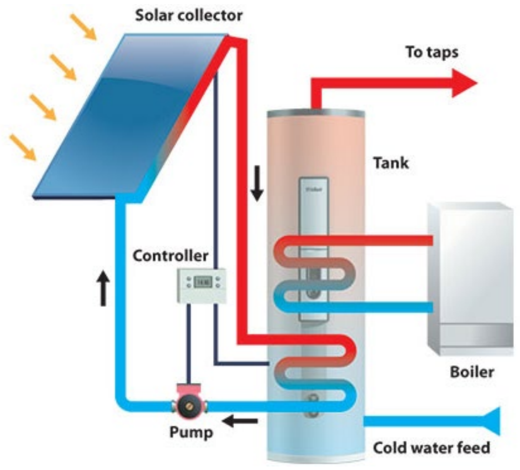
Disadvantages & Limitations:

- – Large external area required to locate PV panels – roof space is already limited with this building.
- – Feed in Tariffs no longer available.

Photovoltaics	
Appropriateness of technology to the site/system viability	Electricity generated by the PV array could be utilised within the office to reduce the consumption of grid electricity. System can be easily integrated into the building and can be used as a bolt on technology alongside other LZCs and is not influenced by the building services strategy.
Lifetime & Payback	Lifetime: 25 years Payback: 8-9 years
Land Use	Usually installed at roof level at an incline of 30 - 45° and south facing. Limited space on roof due to rooftop plant
Local Planning Requirements	Planning permission would be required for the photovoltaic array.
Noise	Not an issue with this type of system.
Grant	None – Feed in Tariffs no longer available
Carbon savings	Grid electricity 0.254 kgCO_2/kWh
Viability Conclusion	Viable

4.3.4 Solar Thermal Water Heating

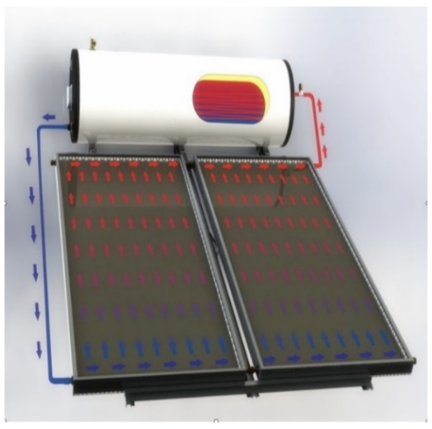
Solar thermal water heating uses heat from the sun to warm up an energy absorbing media pumped through a solar absorbing panel usually situated on the roof of the building served. The heated media is then pumped through a heat exchanger typically to heat hot water within a storage cylinder. Solar Water heating is more efficient at yielding energy from the sun than photovoltaics.



The hot water demand requirements of the building served, and size of the hot water storage vessel have a significant effect on the viability of a solar water heating system.

The major applications for this type of system are associated with the generation of low-grade hot water, often in the range of 30°C – 50°C, dependant on the geographical location of the installation. The media used as an energy absorber is usually water or a water/glycol mixture.

There are two main options when considering solar water heating. These are either flat plate or evacuated tube systems.



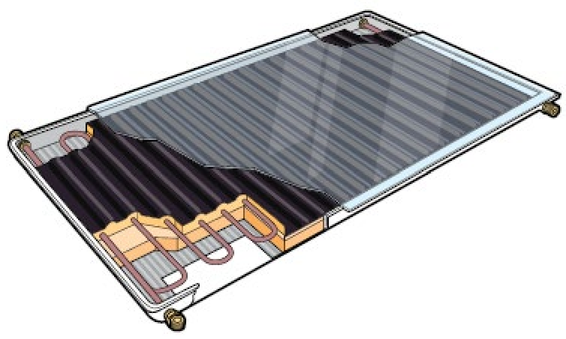
An evacuated solar heat pipe collector is a more efficient system (approximately 40% in comparison with a flat plate system which has an efficiency of approximately 30%) and uses a refrigerant as the transfer media. This allows higher-grade heat energy to be produced (typically 50°C – 70°C in summer.) In simple terms, an evacuated solar heat pipe collector is effectively a boiler that works throughout the day, whether you need it to or not. The heat it generates needs to be removed and used immediately. Long stagnation will damage collectors permanently. The performance of the collector is directly related to the amount of light (solar radiation) that it receives.

The collector transfers the heat to a copper pipe in the manifold via thermal clamps. This eliminates collector contact with the fluid (water), and provides a double-walled heat exchanger that allows the manifold to accept water company water pressures.

A closed loop system uses a transfer fluid, usually non-toxic propylene glycol, to transfer the heat from the collector to a heat exchanger through a pressurised closed loop, as well as controller and pump this system needs a heat exchanger or a tank with a coil, expansion tank, pressure relief valve, air vents and possibly a check valve to stop night time thermosyphoning. The glycol provides excellent protection against freezing.

It is possible to power the circulation pump directly by photovoltaics, eliminating the need for a controller, making the system truly independent. If the system can be designed with the manifold below the heat exchanger, the system will thermosyphon, and the pump can be eliminated.

The peak irradiation level is achieved by a South facing solar panels at 45 degrees inclination. Solar panels are not normally installed at less than 20 degrees inclination.



<u>System Viability</u>

Advantages & Benefits:

✓ The operational noise from a solar thermal panel array is virtually silent and unlikely to cause any disturbance to the adjacent buildings and in particular the residential buildings.

Disadvantages & Limitations:

- Large external area required to locate solar panels.
- Visual impact which would require planning approval.
- Hot water storage plant space required local to the panel.
- High capital costs.
- More efficient system where there are is a higher DHW demand.

Solar Thermal Water Heating Summary	
Appropriateness of technology to the site/system viability	The hot water generated by solar collectors could be utilised for domestic usage within the building, however the office will have a low DHW demand and therefore the technology would have little impact in reducing CO_2 emissions. It is therefore not deemed to be viable in this instance. There is also insufficient roof space to accommodate the system itself.
Lifetime & Payback	Lifetime: 20 years. Payback: Not calculated as system is not viable.
Land Use	Solar collectors generally installed at roof level, south facing at an incline of 30 - 45°.
Local Planning Requirements	Planning permission would be required, and details of the solar collectors would have to be included within the planning submission.
Noise	Not an issue with this type of system.
Grant	Renewable Heat Incentive available
Carbon savings	Grid electricity 0.254 $kgCO_2/kWh$
Viability Conclusion	Non-Viable due to space limitations and high capital costs

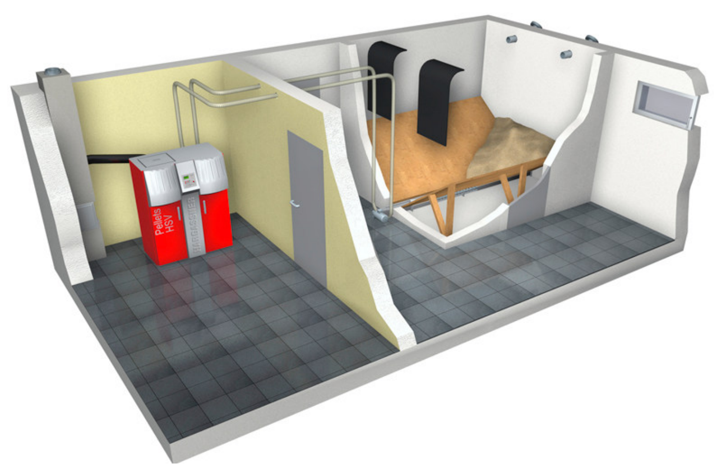
4.3.5 Biomass Heating

Biomass, also known as bio fuels or bio energy, is obtained from organic matter, either directly from plants or indirectly from industrial, commercial, domestic or agricultural products (logs, wood chips, pellets, etc.).

The use of biomass is generally classed as a 'carbon-neutral' process because the carbon dioxide released during the generation of energy is balanced by that absorbed by plants during their growth. However, it is important to account for any other energy inputs that may affect this carbon-neutral balance on a case-by-case basis, for example any use of fertiliser, or energy consumed in vehicles when harvesting or transporting the biomass to its point of use.

Bio mass boilers require additional space for fuel storage which can be significant and arrangements for flues are more onerous than those for gas or oil boilers, access will also be required for ash removal. Outside access to the plant room and storage is important for handling the delivered fuel, which should be appropriate to its means of transportation. The noise and disruption associated with the delivery of the biomass fuel could cause a nuisance to the adjacent residential building.

Sufficient fuel storage is required to cover the time between deliveries. The quantity of fuel in a single delivery will depend upon the size of the boiler and the cost and reliability of fuel supply. The fuel type also needs to be considered as logs and wood chips take up more space than pellets for the same heat output.



Biomass boilers have to run for some time before they achieve the desired output temperature and hence some form of heat storage is desirable to provide instant heating and hot water. Heat storage also allows the boiler to operate at a higher efficiency as lower temperatures over a longer burning time is a better and more sustainable regime.

As biomass boilers are more expensive than gas or oil boilers with the same heat output, it is both safer and cheaper to size the biomass boiler to meet a base load, and to provide additional top up/back up gas or oil boilers.

Biomass fuel prices vary as to its availability and the quantity of fuel purchased. Bulk buying of fuel means that it can be purchased at a more competitive rate. It should also be noted that CO_2 is emitted in the transportation of the biomass fuel. If the fuel is being transported long distances, then the carbon emitted and associated environmental effect in doing this must be taken into account.

<u>System Viability</u>

Advantages & Benefits:

- ✓ Where fuel is sourced appropriately, the system can achieve net zero carbon emissions
- ✓ Per kWh – biomass fuel is slightly cheaper than other fossil fuels

Disadvantages & Limitations:

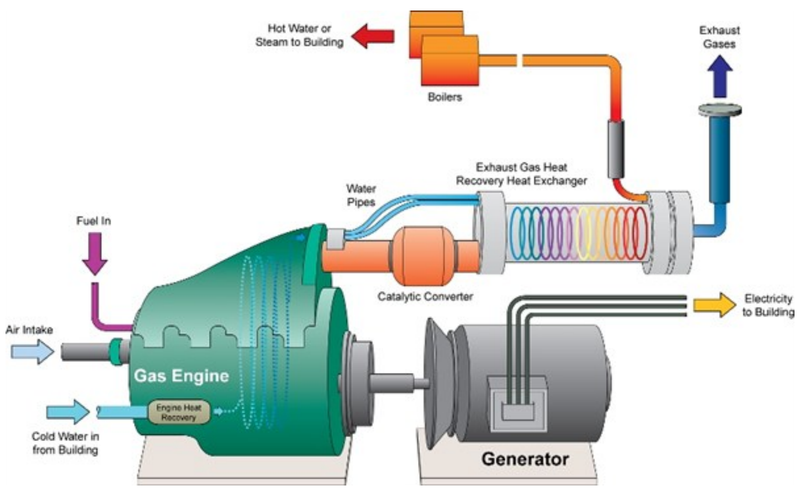
- Increased plant space requirements for storage of biomass fuel
- Noise issues associated with biomass fuel delivery and location of residential properties nearby.
- The availability of biomass fuel local to the development is currently unknown
- CO_2 emissions associated with fuel delivery if the fuel is not sourced locally
- Reliability of biomass heating plant
- Increased maintenance requirements and costs
- High capital cost
- Possible higher insurance premium commensurate

The use of biomass heating to reduce CO_2 emissions is not considered to be a viable solution for the proposed office as summarised below.

Biomass Heating Summary	
Appropriateness of technology to the site/system viability	The current plans do not provide enough plant space to allow for the fuel storage to be provided. In addition, noise from fuel delivery would not be acceptable due to the residential properties within the vicinity.
Lifetime & Payback	Lifetime: 15 – 20 years Payback: 9 years based on RHI contribution
Land Use	Biomass boiler plant and the associated fuel storage would have to be accommodated internally within the building due to the restricted plot site area for the office.
Local Planning Requirements	Flue would have to comply with the Clean Air Act.
Noise	Possible issues associated with the delivery of the biomass fuel.
Grant	Renewable Heat Incentive available
Carbon savings	Not calculated due to system being considered as non-viable.
Viability Conclusion	Non-Viable due to space limitations

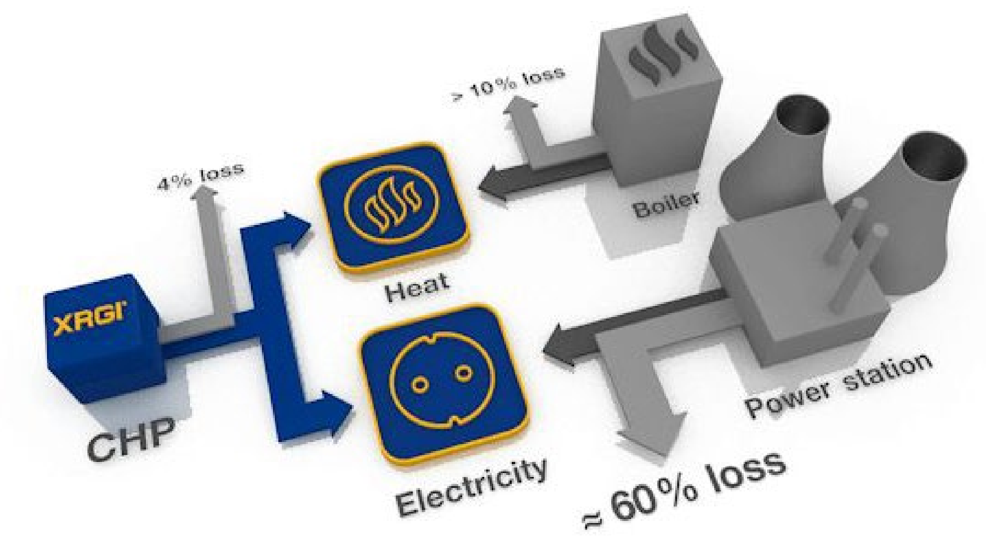
4.3.6 Combined Heat and Power (CHP)

The principal is that a gas or oil-fired engine drives a generator that produces electricity. The heat from the engine block, oil cooler and exhaust are absorbed into a coolant and this is used as a heat source within the building. This is not as such a "sustainable energy" but is considered highly energy efficient and reduces the production of CO2 as the heat that is usually wasted during electricity production is utilised and mains distribution losses associated with the distribution of electricity from power stations to the site are minimised. The ratio of electricity to heat production is in the region of 1 unit of electricity to 2 units of heat, though this may vary between different manufacturers of combined heat and power units.



The key to both the economic and carbon efficiency of combined heat & power is the constant requirement for the heat produced throughout the year. If the heat produced is not utilised, then combined heat & power becomes less carbon efficient at producing electricity than a power station on the national electricity grid. If the combined heat & power is only used when there is a requirement for heat, thus is used infrequently the pay-back time on the unit would not make economic sense.

Noise associated with the operation of the CHP unit can cause nuisance and the final location of the CHP plant and the construction of the plantroom enclosure would have to be carefully considered and incorporate



the necessary specification of noise attenuation to minimise noise breakout.

System Viability

Advantages & Benefits:

- ✓ Potential to reduce energy costs due to cogeneration of heat and power
- ✓ Free onsite electricity helps reduce carbon emissions
- ✓ High overall efficiencies

Disadvantages & Limitations:

- Constant heat load requirement.
- Plant location (noise and vibration).
- High capital cost.
- Increased maintenance requirements and costs.
- Potential issues associated with noise egress.
- Systems need to run for thousands of hours per year to achieve high efficiencies, therefore limiting the financial viability where not used effectively.

For a CHP system to be successful, a constant requirement to utilise the heat produced must be available within the building throughout the year. The office development would have a domestic hot water demand throughout the year; however the CHP plant should be sized to supply not less than 45% of the annual total heating demand. The domestic hot water demand would be low and therefore it is unlikely that a CHP could meet this target and the CHP would only have a small impact on reducing carbon emissions.

Combined Heat and Power (CHP) Summary	
Appropriateness of technology to the site/system viability	Heat produced by the CHP unit could be utilised to meet a proportion of the domestic hot water demand however the office will not have a large DHW requirement therefore the benefit of installing CHP will be small.
Lifetime & Payback	Lifetime: 15 years Payback: Not calculated as system is not viable.
Land Use	CHP plant would have to be accommodated internally within the building due to the restricted development site area.
Local Planning Requirements	Flue would have to comply with the Clean Air Act.
Noise	Noise could be an issue due to the close proximity of the residential buildings.
Grant	None – Feed in Tariffs no longer available
Carbon savings	Not calculated due to system being considered as non-viable.
Viability Conclusion	Non-Viable for building type

4.3.7 Ground Source Heat Pumps (GSHP)

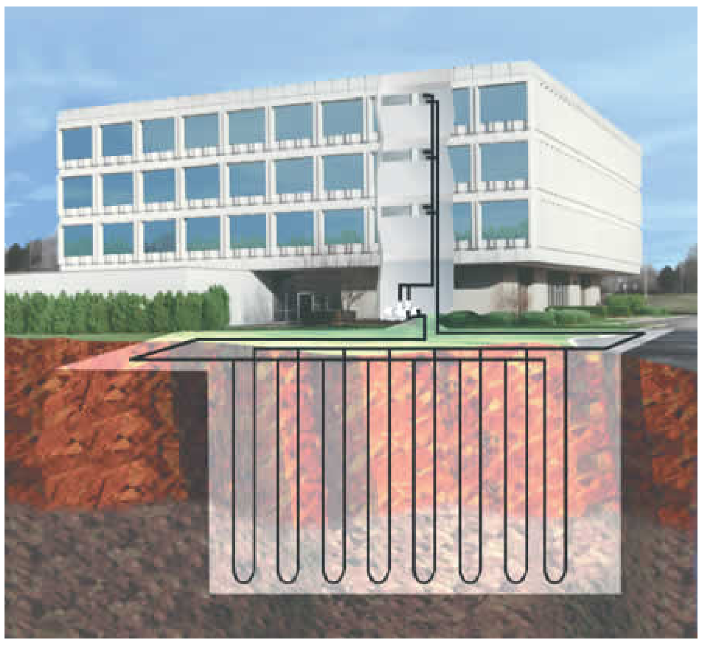
Ground source heat pumps take heat from the ground, raise its temperature and use the energy to provide heat within the building served by the system. They operate on the same refrigeration cycle principles as a fridge but use the cycle in reverse to generate spatial heating and hot water. Heat absorption is achieved by circulating water mixed with antifreeze through a closed collector pipework system. The temperature of the earth at one metre below ground level remains fairly consistent between approximately 9 - 12°C throughout the year depending on geographical location and soil type.

The advantage of using a ground source heat pump is its efficiency. The coefficient of performance of ground source heat pumps are typically between 3 and 4, therefore for every kW used to power the heat pump 3 to 4kW of energy is extracted from the ground.

A ground source heat pump installation typically consists of a heat pump, ground collector (either a bore hole or array), a manifold, circulation pumps to move the energy around the system, various automatic and manual valves, an expansion vessel, a buffer tank to store the energy, a hot water cylinder for heating domestic hot water and a control system.

The following issues have been considered when assessing the possibility of utilising a ground source heat pump installation within the building:

- Space required for the closed collector pipework system.
- Suitability of internal heat emitters.
- High capital cost.
- Piling or bores would be required on site.



<u>System Viability</u>

Advantages & Benefits:

- ✓ Can produce both space heating and domestic hot water
- ✓ High efficiencies can save on fuel costs and reduce carbon emissions produced
- ✓ No fuel deliveries required
- ✓ Low maintenance requirements

Disadvantages & Limitations:

- Higher installation costs.
- More expensive to install that air source heat pumps.
- Significant space and access required at ground level for pipe-works.
- Typically associated with lower heat outputs.
- More significant construction impacts associated with piling required.

Ground source heat pumps provide heat at a lower temperature than other forms of heating. This makes it best suited to underfloor heating applications. Aside from the main reception area it is not intended to include underfloor heating within the office building. The office development does not have sufficient external area for installation of a horizontal collector system and therefore a geothermal piling system would be required.

Ground Source Heat Pumps (GSHP) Summary	
Appropriateness of technology to the site/system viability	Heat produced is at a low temperature and does not suit the proposed heating system. The system is not viable as there is no space to install collector pipework.
Lifetime & Payback	Lifetime: 20 years Payback: Not calculated as the system is not viable
Land Use	Limited external land use required for geothermal bore holes. Horizontal arrays require external space for installation.
Local Planning Requirements	No specific issues / implications.
Noise	No noise issues
Grant	Renewable Heat Incentive available
Carbon savings	Not calculated due to system being considered as non-viable.
Viability Conclusion	Non-Viable due to location and space limitations

5.0 Conclusion

The report concludes that the development's overarching design philosophy is in keeping with the principles of sustainable design. The office building has been designed to utilise the optimal sustainability approach in line with the energy / carbon hierarchy, to maximise the reduction of carbon dioxide (CO_2) emissions, whilst minimising energy consumption in line with the hierarchy's prioritised methodology.

Lean – the use of advanced building modelling software IES and passive construction techniques including enhanced insulation to the building envelope, windows with high thermal insulation, optimisation between glazed and solid façade areas, reduced air permeability, maximisation of daylight and optimisation of glazing solar energy transmittance.

Mean – Incorporation of high efficiency systems and effective controls including LED lighting, presence and absence detection, automated heating and cooling systems.

Green – The report concludes that the most suitable LZC technology for incorporation within the office building would be air source heat pumps for the heating system and for the generation of hot water plus photovoltaic panels at roof level.

The other renewable energy technologies investigated such as wind turbines, biomass boilers, etc. are not considered to be viable options due to the development's location, space limitations, fiscal restraints and technology payback period.

5.1 Energy Consumption

Initial thermal modelling of the buildings has been carried out using IES accredited software version VE2019. The software was used to create a dynamic simulation model of the office building based on the plans and elevations of the building as provided by Make Architects.

The dynamic simulation software has been used to determine compliance with Criterion 1 of Approved Document L2A 'Achieving the Target Emissions Rate (TER)'.

The building was simulated using the enhanced building fabric, energy efficiency and renewable/low carbon measures as described previously. All construction fabric details, system details and efficiencies will be confirmed during detailed design by the main contractor to provide the design stage Part L2A calculations.

The results are as shown below:

Compliance with Criterion 1 of Approved Document L2A 'Achieving the Target Emission Rate (TER)'

	Target Emission Rate (kg.CO_2/m^2 annum) TER	Building Emission Rate (kg.CO_2/m^2 annum) BER	PASS / FAIL
Criterion 1 Achieving the BER	21.6	11.1	PASS – 48.7% improvement

Refer to Appendix B for the BRUKL Output Document confirming the above.

Compliance with Criterion 3 of Approved Document L2A 'Limiting the Effects of Heat Gains in Summer'

The Part L2A 2013 assessment shows that all occupied areas pass the requirements of Criterion 3.

5.2 Sustainability

BREEAM New Construction 2018 Pre-Assessment

A Design Stage pre-assessment has been carried out which indicates an anticipated percentage score of ≥76.53% can be achieved based on the current design, consequently the design has the potential to meet the Excellent target rating (>70%).

Refer to Appendix A or a copy of each pre-assessment estimator.

6.0 Appendix

6.1 Appendix A – BREEAM Pre-Assessment

MUSE Developments

King Street, Blackpool

BREEAM Pre-assessment
BREEAM NC 2018 (Fully Fitted)

Design Stage

30/04/2021

Hannan Associates
MEP Design Solutions

Summary

Hannan Associates have been appointed as registered BREEAM assessors to undertake a BREEAM NC 2018, Fully Fitted Pre-assessment, detailing the likely score for the proposed development at King Street, Blackpool.

The results of this report are based on initial discussions, specification brief and available plans etc.

As a result of the above analysis, it is anticipated that a score of 76.53% is achievable which equates to a BREEAM 'Excellent' rating.

It is advised that a minimum 5% buffer is maintained in order that the target rating is unaffected by variations during the design and construction phases.

Following a review of the remaining credits, it has been established that a number of additional credits could be targeted should any of the targeted credits be deemed unachievable.

These credits have been highlighted in each particular credit section.

Following a formal review of the Pre-assessment with the design team, each credit will be assigned a specific discipline / individual who will be responsible for completion of their respective credit(s) by a predetermined date.

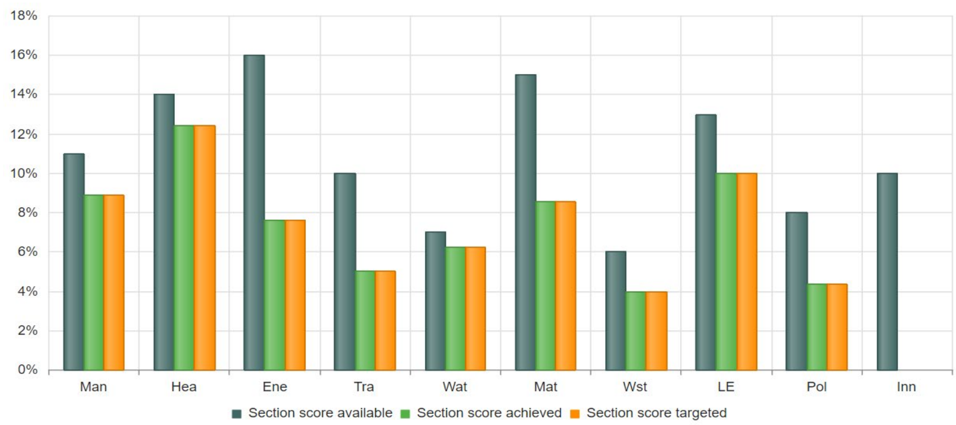
	Minimum standards by BREEAM rating level				
BREEAM issue	Pass	Good	Very Good	Excellent	Outstanding
Man 03 Responsible construction practices	None	None	None	One credit (responsible construction management)	Two credits (responsible construction management)
Man 04 Commissioning and handover	None	None	One credit (commissioning-test schedule and responsibilities)	One credit (commissioning-test schedule and responsibilities)	One credit (commissioning-test schedule and responsibilities)
Man 04 Commissioning and handover	None	None	Criterion 11 (Building User Guide)	Criterion 11 (Building User Guide)	Criterion 11 (Building User Guide)
Man 05 Aftercare	None	None	None	One credit (commissioning-implementation)	One credit (commissioning-implementation)
Ene 01 Reduction of energy use and carbon emissions	None	None	None	Four credits (Energy performance)	Six credits (Energy performance) and Four credits (Energy modelling and reporting)
Ene 02 Energy monitoring	None	None	One credit (First sub-metering credit)	One credit (First sub-metering credit)	One credit (First sub-metering credit)
Wat 01 Water consumption	None	One credit	One credit	One credit	Two credits
Wat 02 Water monitoring	None	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1 only
Mat 03 Responsible sourcing of construction products	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1 only
Wst 01 Construction waste management	None	None	None	None	One credit
Wst 03 Operational waste	None	None	None	One credit	One credit

Current Rating (Subject to Minimum Standards)	Pass	Good	VG	Excellent	Outstanding
	YES	YES	YES	YES	NO

BREEAM Categories	CREDIT SCORING STATUS				
	Potential			Targeted	
	Credits	%		Credits	%
Management	19.00	9.95%		19.00	9.95%
Health & Well Being	16.00	12.44%		13.00	10.11%
Energy	17.00	11.83%		17.00	11.83%
Transport	9.00	7.50%		9.00	7.50%
Water	8.00	6.22%		7.00	5.44%
Materials	9.00	9.64%		8.00	8.57%
Waste	10.00	5.45%		10.00	5.45%
Land Use & Ecology	12.00	12.00%		11.00	11.00%
Pollution	9.00	6.00%		7.00	4.67%
Innovation	2.00	2.00%		2.00	2.00%
Performance Indices	111.00	83.04%		103.00	76.53%

BREEAM Minimum Standards	BREEAM Rating - Minimum Credits				
	PASS	GOOD	VERY GOOD	EXCELLENT	OUTSTANDING
Man 03: Responsible Construction Practices				Y	Y
Man 04: Commissioning and handover				Y	Y
Man 5: Aftercare				n/a	n/a
Ene 01: Reduction of energy use and carbon emissions				Y	N
Ene 02: Energy monitoring			Y	Y	Y
Wat 01: Water consumption		Y	Y	Y	Y
Wat 02: Water monitoring		Y	Y	Y	Y
Mat 03: Responsible sourcing of materials	Y	Y	Y	Y	Y
Wst 01: Construction waste management					Y
Wst 03: Operational waste				Y	Y
LE 03: Minimising impact on existing site ecology			Y	Y	Y

Project Completion Progress %	0%
BREEAM Pre-Assessment Progress %	100%
BREEAM Design Stage Progress %	0%
BREEAM Post Construction Progress %	0%



Management

BREEAM NC 2018 Issue List						No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage				King Street, Blackpool							
MANAGEMENT			Issue	Criterion	Evidence Required						
Man	01	Project brief and design	**Project delivery planning**	1 Prior to completion of the Concept Design, the project delivery stakeholders meet to identify and define for each key phase of project delivery: 1.a Roles 1.b Responsibilities 1.c Contributions. 2 Consider each one of the following items when defining roles, responsibilities and contributions for each key phase of the project: 2.a End user requirements 2.b Aims of the design and design strategy 2.c Particular installation and construction requirements or limitations 2.d Occupiers' budget and technical expertise in maintaining any proposed systems 2.e Maintainability and adaptability of the proposals 2.f Operational energy 2.g Requirements for the production of project and end user documentation 2.h Requirements for commissioning, training and aftercare support. Where the building occupants are not known, the list of considerations above still applies. The appropriate project delivery stakeholder considers each item, based on likely scenarios of building occupancy. 3 The project team demonstrates how the project delivery stakeholders' contributions and the consultation process outcomes influence the following: 3.a Initial Project Brief 3.b Project Execution Plan 3.c Communication Strategy 3.d Concept Design.	Design team meeting minutes Project Directory Project delivery plan	1	1	1	Concept Design	Project Manager	
			Stakeholder consultation (interested parties)	4 Prior to completion of the Concept Design, the design team consult with all interested parties on matters that cover the minimum consultation content. 5 Demonstrate how the stakeholder contributions and consultation exercise outcomes influence the Initial Project Brief and Concept Design. 6 Prior to completion of the detailed design (RIBA Stage 4, Technical Design or equivalent), all interested parties give and receive consultation feedback.	A list of stakeholders consulted A consultation plan setting out the process and the scope of the consultation Agenda / minutes from consultation and meetings Documentation demonstrating consultation feedback and subsequent actions Independent party consultation documents and CV.	1	0	0		Project Manager	Not Targeted
			Prerequisite for BREEAM Advisory Professional credits (Concept and Developed Design)	8 The project team, including the client, formally agree strategic performance targets early in the design process, (with the support of the BREEAM AP where appointed).	Formal agreement statement	P	P	P	Concept Design	Project Manager	Please provide appointment confirmation of Hannan's as AP
			BREEAM AP (Concept Design)	9 Involve a BREEAM AP in the project at an appropriate time and level to: 9.a Work with the project team, including the client, to consider the links between BREEAM issues and assist them in maximising the project's overall performance against BREEAM, from their appointment and throughout Concept Design. 9.b Monitor progress against the performance targets agreed under criterion 8 above throughout all stages after their appointment where decisions critically impact BREEAM performance. 9.c Proactively identify risks and opportunities related to the achievement of the targets agreed under criterion 8 above. 9.d Provide feedback to the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets. 9.e Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team.	BREEAM AP Appointment letter Relevant section / clauses of the building specification or contract	1	1	1	Concept Design	BREEAM AP	
			BREEAM AP (Developed Design)	10 Criteria 8 and 9 above are achieved. 11 Involve the BREEAM AP in the project at an appropriate time and level to: 11.a Work with the project team, including the client, to consider the links between BREEAM issues and to assist them in maximising the project's overall performance against BREEAM throughout Developed Design. 11.b Monitor progress against the performance targets agreed under criterion 8 above throughout all stages where decisions critically impact the specification and tendering process and the BREEAM performance. 11.c Proactively identify risks and opportunities related to the achievement of the targets agreed under criterion 8 above. 11.d Provide feedback to the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets. 11.e Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team.	Project programme indication the dates by which the key work stages (preparation and design) are to be completed. Meeting notes/minutes, recorded correspondence or schedules that can demonstrate BREEAM issues are a regular agenda item and AP attendance The AP progress report (for each work stage) Design stage BREEAM Assessment report	1	1	1		BREEAM AP	
Man	02	Lifecycle cost and service life planning	**Two credit - Elemental life cycle cost (LCC)**	1 A competent person (see Definitions on the facing page) carries out an outline, entire asset LCC plan at Process Stage 2 (equivalent to Concept Design - RIBA Stage 2) together with any design options appraisals in line with 'Standardised method of life cycle costing for construction procurement' PD 156865: 2008(6). 2 The elemental LCC plan: 2.a Provides an indication of future replacement costs over a period of analysis as required by the client (e.g. 20, 30, 50 or 60 years); 2.b Includes service life, maintenance and operation cost estimates. The study period should ideally be agreed by the client, in line with the design life expectancy of the building. However, where the life expectancy of the building is not yet formally agreed (due to being at very early design stages), the default design life of 60 years should be used for modelling purposes (in line with the UK default). 3 Demonstrate, using appropriate examples provided by the design team, how the elemental LCC plan has been used to influence building and systems design and specification to minimise life cycle costs and maximise critical value.	Elemental life cycle cost plan	2	2	2	Concept Design	Quantity Surveyor (QS)	QS to complete LCC in accordance with 2018 criteria
			One credit - Component level LCC options appraisal	4 A competent person develops a component level LCC options appraisal by the end of Process Stage 4 (equivalent to Technical Design – RIBA Stage 4) in line with PD 156865: 2008. The component level LCC includes (where present): 4.a Envelope, e.g. cladding, windows, or roofing 4.b Services, e.g. heat source, cooling source, or controls 4.c Finishes, e.g. walls, floors or ceilings 4.d External spaces, e.g. alternative hard landscaping, boundary protection. The Component level LCC option appraisal should review all of the above component types (where present). However, you do not need to consider every single example cited under each component; only a selection of those most likely to draw valued comparisons. This is to ensure that a wide range of options are considered and help focus the analysis on components which would benefit the most from appraisal. 5 Demonstrate, using appropriate examples provided by the design team, how the component level LCC options appraisal has been used to influence building and systems design and specification to minimise life cycle costs and maximise critical value.	Component level life cycle cost plan	1	1	1	Developed & Technical design	Quantity Surveyor (QS)	
			One credit - Capital cost reporting	6 Report the capital cost for the building in pounds per square metre of gross internal floor area (£k/m²) as part of the submission to BRE.	Letter or report confirming the predicted capital cost for the building in pounds per square metre (£k/m2).	1	1	1		Quantity Surveyor (QS)	
			Prerequisite - Legally harvested and traded timber	1 All timber and timber-based products used during the construction process of the project are legally harvested and traded timber	Timber certificates / receipts etc. (FSC / PEFC) and chain of custody evidence	P	P	P		Principal Contractor	
			One credit – Environmental management	3 All parties who at any stage manage the construction site (e.g. the principal contractor, the demolition contractor) operate an EMS covering their main operations. The EMS must: 3.a Be third party certified, to ISO 14001: 2015, EMAS (EU Eco-Management and Audit Scheme) or equivalent standard; OR 3.b In compliance with BS 8555: 2016 have: 3.b.i Appropriate structure 3.b.ii Reached implementation stage phase four 'implementation and operation of the environmental management system' 3.b.iii Completed defined phase audits one to four. 4 All parties who at any point manage the construction site (e.g. the principal contractor, the demolition contractor) implement best practice pollution prevention policies and procedures on site in accordance with Working at construction and demolition sites: PPG6, Pollution Prevention Guidelines.	A copy of the principal contractors EMS/EMAS certificate (ISO 14001 / BS8555) Tool box talks and H&S sections Completed PPG6	1	1	1		Principal Contractor	

BREEAM NC 2018 Issue List						No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage				King Street, Blackpool							
MANAGEMENT			**Issue**	**Criterion**	**Evidence Required**						
Man	03	Responsible construction practices	**BREEAM AP (Construction)**	Prerequisite for the BREEAM AP credit 5 The client and the contractor formally agree performance targets. One credit – BREEAM AP (site) 6 Involve a BREEAM AP in the project at an appropriate time and level to: 6.a Work with the project team, including the client, to consider the links between BREEAM issues and assist them in achieving and if possible going beyond the design intent, to maximise the project's performance against the agreed performance targets throughout the Construction, Handover and Close Out stages. 6.b Monitor construction progress against the performance targets agreed under criterion 5 above throughout all stages where decisions critically impact BREEAM performance. 6.c Proactively identify risks and opportunities related to the procurement and construction process and the achievement of the targets agreed under criterion 5 above. 6.d Provide feedback to the constructors and the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets. 6.e Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team and the provision to the assessor.	The AP Appointment letter Relevant section / clauses of the building specification or contract	1	1	1		BREEAM AP	
Man	03	Responsible construction practices	**Responsible construction management**	One Credit 7 Achieve items listed as required for one credit in the table below Two credits 8 Achieve criterion 7 on the previous page . 9 Achieve six additional items in the above table. (Table 4.1 below)	Risk evaluation and implementation plan	2	2	2		Principal Contractor	

Table 4.1 Responsible construction management items

Ref.	Criteria	Required for one credit
Risk evaluation and implementation		
The principal contractor evaluates the risks (on site and off site), plans and implements actions to minimise the identified risks, covering the following, where appropriate:		
Vehicle movement		
a	Manage the construction site entrance to minimise the impacts (e.g. safety, disruption) arising from vehicles approaching and leaving the development footprint.	✓
b	Ensure the development footprint is accessible for delivery vehicles fitted with safety features (e.g. side under run protection) to remove or limit the need for on-street loading or unloading. Where on-street loading is unavoidable, this should be appropriately managed.	
c	Identify access routes to the development footprint, including for heavy vehicles to minimise traffic disruption and safety risks to others.	
Pollution management		
d	Minimise the risks of air, land and water pollution.	✓
e	Minimise the risks of nuisance from vibration, light and noise pollution.	
Tidiness		
f	Practices ensure the development footprint is safe, clean and organised at all times. This includes, but is not limited to, facilities, materials and waste storage.	✓
g	Ensure clear and safe access in and around the buildings at the point of handover.	✓
Health and wellbeing		
h	Provide processes and equipment required to respond to medical emergencies.	✓
i	The principal contractor identifies and implements initiatives to promote and maintain the health and wellbeing of all site operatives within the development footprint. This can be via site facilities, site management arrangements, staff policies etc.	
j	Establish management practices and facilities encouraging equality, fair treatment and respect of all site operatives.	✓
k	Provide secure, clean and organised facilities (e.g. changing and storage facilities) for site operatives within the development footprint.	
Security processes		
l	Minimise risks of the site becoming a focus for antisocial behaviour in the local community (e.g. robust perimeter fencing, CCTV, avoid creating dark corners etc.).	
Training, awareness and feedback		
See Definitions on page 56. The principal contractor is responsible for ensuring:		
m	Aspects of the construction process that might impact the community are communicated regularly, ensuring that nuisance and intrusion are minimised.	
n	Ensure ongoing training is provided, and up to date, for personnel and visitors (covering items a to l, as appropriate.)	✓
o	The principal contractor ensures that site operatives are trained for the tasks they are undertaking (including any site-specific considerations).	✓
p	The fleet operators (see Definitions on page 56), undertakes driver training and awareness to promote safety within the development footprint and off site.	
Monitoring and reporting		
The principal contractor ensures:		
q	The fleet operators, captures and investigates any road accidents, incidents and near misses and reports them back to the principal contractor. The principal contractor analyses these items.	
r	All visitor, workforce and community accidents, incidents and near misses are recorded and action is taken to reduce the likelihood of them reoccurring.	✓
s	Processes are in place to facilitate collecting and recording feedback from the community and to address any concerns related to the development footprint.	

Category	No.	Section	Issue	Criterion	Evidence Required	No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Man	03	Responsible construction practices	**Monitoring of construction site impacts**	10. Assign responsibility to an individual for monitoring, recording and reporting energy use, water consumption and transportation data (where measured) resulting from all on-site construction processes (and dedicated off-site manufacturing) throughout the build programme. To ensure the robust collection of information, this individual must have the appropriate authority and responsibility to request and access the data required. Where appointed, the BREEAM AP could perform this role.	Commitment letter	P	P	P			
Man	03	Responsible construction practices	**Up to two credits - Monitoring of construction site impacts**	First monitoring credit - Utility consumption Energy consumption 11 Achieve criterion 10. 12 Set targets for the site energy consumption in kWh (and where relevant, litres of fuel used) as a result of the use of construction plant, equipment (mobile and fixed) and site accommodation. 13 Monitor and record data for the energy consumption described in criterion 12. 14 Report the total carbon dioxide emissions (total $kgCO_2$/project value) from the construction process via BREEAM Projects (for the purposes of potential future BREEAM performance benchmarking). Water consumption 15 Achieve criterion 10. 16 Set targets for the potable water consumption (m^3) arising from the use of construction plant, equipment (mobile and fixed) and site accommodation. 17 Monitor and record data for the potable water consumption described in criterion 16. 18 Use the collated data to report the total net water consumption (m^3), i.e. consumption minus any recycled water use from the construction process via BREEAM Projects (for the purposes of potential future BREEAM performance benchmarking).	Monitoring and Reporting spreadsheet	1	1	1		Principal Contractor	
				Second monitoring credit - transportation of construction materials and waste 19 Achieve criterion 10. 20 Set targets for transportation movements and impacts resulting from delivery of the majority of construction materials to site and construction waste from site. As a minimum cover: 20.a transportation of materials from the point of supply to the building site, including any transport, intermediate storage and point of supply (see Definitions on page 56). Monitor as a minimum: 20.a.i Materials used in major building elements (i.e. those defined in BREEAM issue Mat 01 Environmental impacts from construction products - Building life cycle assessment (LCA) on page 223). 20.a.ii Ground works and landscaping materials. 20.b transportation of construction waste from the construction gate to waste disposal processing or recovery centre gate. This monitoring must cover the construction waste groups outlined in the project's resource management plan. 21 Monitor and record data for the transportation movements as described in criterion 20 above. 22 Using the collated data, report separately for materials and waste, the total transport-related carbon dioxide emissions ($kgCO_2$-eq), plus total distance travelled (km) via BREEAM Projects (for the purposes of potential future BREEAM performance benchmarking).	Monitoring and Reporting spreadsheet	1	1	1		Principal Contractor	

BREEAM NC 2018 Issue List						No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage				King Street, Blackpool							
MANAGEMENT			Issue	Criterion	Evidence Required						
Man	04	Commissioning and handover	**Commissioning - testing schedule and responsibilities**	1 Prepare a schedule of commissioning and testing. The schedule identifies and includes a suitable timescale for commissioning and re-commissioning of all complex and non-complex building services and control systems and for testing and inspecting building fabric. 2 The schedule identifies the appropriate standards for all commissioning activities to be conducted, where applicable, in accordance with: 2.a Current Building Regulations 2.b BSRIA guidelines(16) 2.c CIBSE guidelines(17) 2.d Other appropriate standards (see Methodology on the next page). Exclude from the assessment any process or manufacture-related equipment specified as part of the project. However, include such equipment in cases where they form an integral part of the building HVAC services, such as some heat recovery systems. 3 Where a building management system (BMS) is specified: 3.a Carry out commissioning of air and water systems when all control devices are installed, wired and functional 3.b Include physical measurements of room temperatures, off-coil temperatures and other key parameters, as appropriate, in commissioning results 3.c The BMS or controls installation should be running in auto with satisfactory internal conditions prior to handover 3.d All BMS schematics and graphics (if BMS is present) are fully installed and functional to user interface prior to handover 3.e Fully train the occupier or facilities team in the operation of the system. 4 Appoint an appropriate project team member to monitor and programme pre-commissioning, commissioning and testing. Where necessary include re-commissioning activities on behalf of the client. 5 The principal contractor accounts for the commissioning and testing programme, responsibilities and criteria within their budget and the main programme of works. Allow the required time to complete all commissioning and testing activities prior to handover.	Commissioning commitment schedule	1	1	1		Principal Contractor/ MEP Sub Contractor	
Man	04	Commissioning and handover	**Commissioning - design and preparation**	6 Achieve criteria 1 to 5. 7 During the design stage, the client or the principal contractor appoints an appropriate project team member (see criterion 4), provided they are not involved in the general installation works for the building services systems, with responsibility for: 7.a Undertaking design reviews and giving advice on suitability for ease of commissioning. 7.b Providing commissioning management input to construction programming and during installation stages. 7.c Management of commissioning, performance testing and handover or post-handover stages. For buildings with complex building services and systems, this role needs to be carried out by a specialist commissioning manager		1	1	1		Client Or Principal Contractor	
Man	04	Commissioning and handover	**Testing and inspecting building fabric**	8 Achieve criteria 1 to 5. 9 Complete post-construction testing and inspection to quality-assure the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths (this is through airtightness testing and a thermographic survey). A suitably qualified professional undertakes the survey and testing in accordance with the appropriate standard. 10 Rectify any defects identified during post-construction testing and inspection prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building or element as defined at the design stage.	Commissioning Letter	1	1	1		Principal Contractor	
Man	04	Commissioning and handover	**One credit - Handover**	11 Prior to handover, develop two building user guides for the following users: 11.a A non-technical user guide for distribution to the building occupiers. 11.b A technical user guide for the premises facilities managers. A draft copy is developed and discussed with users first (where the building occupants are known) to ensure the guide is most appropriate and useful to potential users. 12 Prepare two training schedules timed appropriately around handover and proposed occupation plans for the following users: 12.a A non-technical training schedule for the building occupiers. 12.b A technical training schedule for the premises facilities managers.		1	1	1		Principal Contractor	
Man	05	Aftercare	**One credit - Aftercare Support**	1 Provide aftercare support to the building occupiers through having in place operational infrastructure and resources. This includes as a minimum: 1.a A meeting between the aftercare support team or individual, and the building occupier or management team (prior to initial occupation, or as soon as possible thereafter) to: 1.a.i Introduce the aftercare support available, including the content of the building user guide (where it exists) and training schedule. 1.a.ii Present key information about features of the building including the design intent and how to use the building to ensure it operates as efficiently and effectively as possible. 1.b On-site facilities management training including: 1.b.i a walkabout of the building AND 1.b.ii introduction to and familiarisation with the building systems, their controls and how to operate them in accordance with the design intent and operational demands. 1.c Provide initial aftercare support for at least the first month of building occupation, e.g. weekly attendance on-site, to support building users and management (the level of frequency will depend on the complexity of the building and building operations). 1.d Provide longer term aftercare support for occupiers for at least the first 12 months from occupation, e.g. a helpline, nominated individual or other appropriate system to support building users and management. 2 Establish operational infrastructure and resources to coordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months, once the building is substantially occupied. This facilitates analysis of discrepancies between actual and predicted performance, with a view to adjusting systems and user behaviours accordingly.	Contract to provide compliant aftercare support and training Evidence of either existing procedures or a commitment / contract to put in place a mechanism to: 1) Collect, compare and analyse relevant data 2) Undertake suitable adjustments if necessary	1	1	1		Principal Contractor	
Man	05	Aftercare	**One credit - Commissioning - implementation**	3 Complete the following commissioning activities over a minimum 12-month period, once the building becomes substantially occupied: 3.a Complex systems: The specialist commissioning manager will: 3.a.i Identify changes made by the owner or operator that might have caused impaired or improved performance. 3.a.ii Test all building services under full load conditions, i.e. heating equipment in mid-winter, cooling and ventilation equipment in mid-summer and under part load conditions (spring and autumn). 3.a.iii Where applicable, carry out testing during periods of extreme (high or low) occupancy. 3.a.iv Interview building occupants (where they are affected by the complex services) to identify problems or concerns regarding the effectiveness of the systems. 3.a.v Produce monthly reports comparing sub-metered energy performance to the predicted one (see Ene 01 Reduction of energy use and carbon emissions on page 128). 3.a.vi Identify inefficiencies and areas in need of improvement. 3.a.vii Re-commission systems (following any work needed to serve revised loads), and incorporate any revisions in operating procedures into the operations and maintenance (O&M) manuals. 3.b Simple systems (naturally ventilated): The external consultant, aftercare team or facilities manager will: 3.b.i Review thermal comfort, ventilation, and lighting, at three, six and nine month intervals after initial occupation, either by measurement or occupant feedback. 3.b.ii Identify deficiencies and areas in need of improvement. 3.b.iii Re-commission systems and incorporate any relevant revisions in operating procedures into the O&M manuals.	Seasonal commissioning records/reports and letter of appointment	1	1	1		Principal Contractor/ MEP Sub Contractor	
Man	05	Aftercare	**One credit - Post-occupancy evaluation (POE)**	4. The client or building occupier commits to carry out a POE exercise one year after the building is substantially occupied. This gains comprehensive in-use performance feedback and identifies gaps between design intent and in-use performance. The aim is to highlight any improvements or interventions that need to be made and to inform operational processes. 5. An independent party (see Definitions on the facing page) carries out the POE covering: 5.a A review of the design intent and construction process (review of design, procurement, construction and handover processes). 5.b Feedback from a wide range of building users including facilities management on the design and environmental conditions of the building covering: 5.b.i Internal environmental conditions (light, noise, temperature, air quality) 5.b.ii Control, operation and maintenance 5.b.iii Facilities and amenities 5.b.iv Access and layout 5.b.v Energy and water consumption 5.b.vi Other relevant issues, where appropriate 6. The independent party provides a report with lessons learned to the client and building occupiers. 7. The client or building occupier commits funds to pay for the POE in advance. This requires an independent party to be appointed to carry out the POE as described in criterion 5. Evidence of the appointment of the independent party and schedule of responsibilities which fulfils the BREEAM criteria are acceptable to demonstrate compliance.	Signed and dated commitment by the client / developer or future building occupier	1	0	0		Client / Developer	Credit not targeted

Available	Target	Potential
21	19	19
	9.95%	9.95%

Health and Wellbeing

BREEAM 2018 Issue List							No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage				King Street, Blackpool								
HEALTH & WELLBEING			Issue	Criterion	Evidence Required							
Hea	01	Visual Comfort	Glare Control	1.The potential for disabling glare has been designed out of all relevant building areas using a glare control strategy, either through building form and layout and/or building design measures. 2.The glare control strategy avoids increasing lighting energy consumption, by ensuring that: a. The glare control system is designed to maximise daylight levels under all conditions while avoiding disabling glare in the workplace or other sensitive areas. The system should not inhibit daylight from entering the space under cloudy conditions, or when sunlight is not on the façade. AND b. The use or location of shading does not conflict with the operation of lighting control systems.	Design Drawings Specification		1	1	1		Architect	
Hea	01	Visual Comfort	Daylighting	4 Daylighting criteria have been met using either of the following options: 4.a The relevant building areas meet good practice daylight factors and other criteria as outlined in Table 5.1 below and Table 5.2 on the next page OR 4.b The relevant building areas meet good practice average and minimum point daylight illuminance criteria as outlined in Table 5.3 on page 77. Additional alternative route for healthcare building types only: 4.c The relevant building areas meet the median daylight factors and minimum daylight factors in Table 5.4 on page 78 .	Daylight calculations and design drawings		2	0	2		Architect	Possible credit - architect to complete dayligh calcs?
Hea	01	Visual Comfort	View Out	5. 95% of the floor area in 95% of spaces for each relevant building area provides an adequate view out 6. In addition, the building type criteria in Table 5.6 below are applicable to view out criteria.	Design Drawings Design Calculations		1	0	1		Architect	Where relevant building areas are within 8m of an external wall which has a window or permanent opening, and the window or opening is ≥20% of the surrounding wall area. Where the room depth is greater than 8m, the percentage of window or opening must instead be the same as, or greater than, the values in Table 1.0 BS8206: Part 2. The view out must be a view of a landscape or buildings (rather than just the sky) at seated eye level (1.2–1.3m) within the relevant building areas and should ideally be through an external window. A view into an internal courtyard or atrium will comply provided the distance from the opening to the back wall of the courtyard or atrium is at least 10m (therefore allowing enough distance for the eyes to refocus). The view cannot be an internal view across the room, as this is likely to become obstructed by partitions, filing cabinets etc. In addition to this, an external view out can offer positive effects on health and wellbeing that cannot be offered by an internal view.
Hea	01	Visual Comfort	Internal, External Lighting, Zoning & Controls	Internal lighting 7. All fluorescent and compact fluorescent lamps are fitted with high frequency ballasts. 8. Internal lighting in all relevant areas of the building is designed to provide an illuminance (lux) level appropriate to the tasks undertaken, accounting for building user concentration and comfort levels. This can be demonstrated through a lighting design strategy that provides illuminance levels in accordance with the SLL Code for Lighting 2012 and any other relevant industry standard. 9. For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 72 sections 2.4, 2.20, and 6.10 to 6.20. This gives recommendations highlighting: a. Limits to the luminance of the luminaires to avoid screen reflections. (Manufacturers' data for the luminaires should be sought to confirm this.) b. For uplighting, the recommendations refer to the luminance of the lit ceiling rather than the luminaire; a design team calculation is usually required to demonstrate this. c. Recommendations for direct lighting, ceiling illuminance, and average wall illuminance. External lighting 10. All external lighting located within the construction zone is designed to provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night. To demonstrate this, external lighting provided is specified in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas3 and BS EN 12464-2:2014 Light and lighting - Lighting of work places - Part 2: Outdoor work places. Zoning and occupant control 11. Internal lighting is zoned to allow for occupant control (see Relevant definitions) in accordance with the criteria below for relevant areas present within the building: a. In office areas, zones of no more than four workplaces b. Workstations adjacent to windows/atria and other building areas separately zoned and controlled c. Seminar and lecture rooms: zoned for presentation and audience areas d. Library spaces: separate zoning of stacks, reading and counter areas e. Teaching space or demonstration area f. Whiteboard or display screen g. Auditoria: zoning of seating areas, circulation space and lectern area h. Dining, restaurant, café areas: separate zoning of servery and seating/dining areas i. Retail: separate zoning of display and counter areas j. Bar areas: separate zoning of bar and seating areas k. Wards or bedded areas: zoned lighting control for individual bed spaces and control for staff over groups of bed spaces l. Treatment areas, dayrooms, waiting areas: zoning of seating and activity areas and circulation space with controls accessible to staff. 12. Areas used for teaching, seminar or lecture purposes have lighting controls provided in accordance with CIBSE Lighting Guide 54	Design Drawings Specification		1	1	1		Electrical Engineer	Lighting of cycle spaces must be considered
Hea	02	Indoor Air Quality	Indoor Air Quality (IAQ) Plan	1 A site-specific indoor air quality plan has been produced and implemented in accordance with the guidance in Guidance Note GN06. The objective of the plan is to facilitate a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during occupation of the building. The indoor air quality plan must consider the following: 1.a Removal of contaminant sources 1.b Dilution and control of contaminant sources: 1.b.i Where present, consideration is given to the air quality requirements of specialist areas such as laboratories 1.c Procedures for pre-occupancy flush out 1.d Third party testing and analysis 1.e Maintaining good indoor air quality in-use.	Indoor Air Quality (IAQ) Plan		P	P	P		Mechanical - Electrical Engineer	
Hea	02	Indoor Air Quality	Ventilation	The building has been designed to minimise the concentration and recirculation of pollutants in the building as follows: 2.Provide fresh air into the building in accordance with the criteria of the relevant standard for ventilation. 3.Design ventilation pathways to minimise the build-up of air pollutants in the building, as follows: a.In air conditioned and mixed mode buildings/spaces: i.The building's air intakes and exhausts are over 10m apart and intakes are over 20m from sources of external pollution; OR ii. The location of the building's air intakes and exhausts, in relation to each other and external sources of pollution, is designed in accordance with BS EN 13779:20071 Annex A2. b. In naturally ventilated buildings/spaces: openable windows/ventilators are over 10m from sources of external pollution. 4. Where present, HVAC systems must incorporate suitable filtration to minimise external air pollution, as defined in BS EN 13779:2007 Annex A3. 5. Areas of the building subject to large and unpredictable or variable occupancy patterns have carbon dioxide (CO_2) or air quality sensors specified and: a. In mechanically ventilated buildings/spaces: sensor(s) are linked to the mechanical ventilation system and provide demand-controlled ventilation to the space. b. In naturally ventilated buildings/spaces: sensors either have the ability to alert the building owner or manager when CO_2 levels exceed the recommended set point, or are linked to controls with the ability to adjust the quantity of fresh air, i.e. automatic opening windows/roof vents.	Design Drawings Specification		1	0	0		Mechanical - Electrical Engineer	Credit not targeted

BREEAM 2018 Issue List						No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage				**King Street, Blackpool**							
HEALTH & WELLBEING			**Issue**	**Criterion**	**Evidence Required**						
			Emissions from construction products	One credit 3. Three out of the five product types meet the emission limits, testing requirements and any additional requirements listed in Table 5.11 below. Where wood-based products are not one of three selected product types, all wood-based products used for internal fixtures and fittings must be tested and classified as formaldehyde E1 class as a minimum. Two Credits 4. All of the product types listed meet the emission limits, testing requirements and any additional requirements listed in Table 5.11 below.	Manufacturers literature confirming VOC content of products Hea 02 VOC spreadsheet	1	1	1		Architect	
			Post-construction indoor air quality measurement	5. The formaldehyde concentration in indoor air is measured post construction (but pre-occupancy) and does not exceed 100µg/m^3 averaged over 30 minutes (World Health Organization guidelines for indoor air quality: Selected pollutants, 2010). 6. The formaldehyde sampling and analysis is performed in accordance with ISO 16000-2and ISO 16000-3. 7. The total volatile organic compound (TVOC) concentration in indoor air is measured post construction (but pre-occupancy) and does not exceed 500µg/m^3over 8 hours. 8. The TVOC sampling and analysis is performed in accordance with ISO 16000-5 and ISO 16000-6 or ISO 16017-1. 9. Where levels are found to exceed these limits, the project team confirms the measures that have, or will be, undertaken in accordance with the IAQ plan, to reduce the TVOC and formaldehyde levels to within the above limits. 10. The measured concentration levels of formaldehyde (µg/m^3) and TVOC (µg/m^3) are reported, via the BREEAM Scoring and Reporting Tool.	Commitment to carry out necessary testing post construction	1	0	1		Principal Contractor	Credit highlighted as a potential item.
Hea	04	Thermal Comfort	**Thermal Modelling**	1 Thermal modelling has been carried out using software in accordance with CIBSE AM11(79) Building Energy and Performance Modelling. 2 The software used to carry out the simulation at the detailed design stage provides full dynamic thermal analysis. For smaller and more basic building designs with less complex heating or cooling systems, an alternative less complex means of analysis may be appropriate (such methodologies must still be in accordance with CIBSE AM11). 3 The modelling demonstrates that: 3.a For air-conditioned buildings, summer and winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5; or other appropriate industry standard (where this sets a higher or more appropriate requirement or level for the building type). 3.b For naturally ventilated buildings: 3.b.i Winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5. Or other appropriate industry standard (where this sets a higher or more appropriate requirement or level for the building type). 3.b.ii The building is designed to limit the risk of overheating, in accordance with the adaptive comfort methodology outlined in either of the following standards as appropriate; CIBSE TM52: The limits of thermal comfort: avoiding overheating in European buildings or CIBSE TM59: Design methodology for the assessment of overheating risk in homes. 4 For air-conditioned buildings, the PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied) indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.	Thermal modelling results	1	1	1		MEP Sub Contractor	
			Design for future thermal comfort	5 Criteria 1 to 4 are achieved. 6 The thermal modelling demonstrates that the relevant requirements set out in criterion 3 on the previous page are achieved for a projected climate change environment. 7 Where criterion 6 above is not met, the project team demonstrates how the building has been adapted, or designed to be easily adapted in future using passive design solutions in order to subsequently meet the requirements under criterion 6 above. 8 For air-conditioned buildings, the PMV and PPD indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.	Formal correspondence from the design team Thermal Model results	1	1	1		Architect /Mechanical - Electrical Engineer/MEP Sub Contractor	
			Thermal zoning and controls	9 Criteria 1 to 4 on the previous page are achieved. 10 The thermal modelling analysis (criteria1 on the previous page to 4 on the previous page) has informed the temperature control strategy for the building and its users. 11 The strategy for proposed heating or cooling systems demonstrates that it has addressed the following: 11.a Zones within the building, and how the building services could efficiently and appropriately heat or cool these areas. For example consider the different requirements for the central core of a building compared with the external perimeter adjacent to the windows. 11.b The degree of occupant control required for these zones. This is based on discussions with the end user (or alternatively building type or use specific design guidance, case studies, feedback) and considers: 11.b.i User knowledge of building services. 11.b.ii Occupancy type, patterns and room functions (and therefore appropriate level of control required). 11.b.iii How the user is likely to operate or interact with the systems, e.g. are they likely to open windows, access thermostatic radiator valves (TRV) on radiators, change air-conditioning settings etc. 11.b.iv The user expectations (this may differ in the summer and winter) and degree of individual control (i.e. obtaining the balance between occupant preferences, for example some occupants like fresh air and others dislike draughts). 11.c How the proposed systems will interact with each other (where there is more than one system) and how this may affect the thermal comfort of the building occupants. 11.d The need or otherwise for an accessible building user actuated manual override for any automatic systems.	Thermal comfort study heating and cooling drawings Heating and Cooling control drawings	1	1	1		Mechanical - Electrical Engineer/MEP Sub Contractor	
Hea	05	Acoustic Performance	**Sound Insulation**	Achieve the performance standards set out in Section 1 of Building Bulletin 93: Acoustic design of schools: performance standards, February 2015 (BB93) relating to airborne sound insulation between spaces and impact sound insulation of floors. The sound insulation between rooms and other occupied areas complies with the performance criteria given in Section 7 of BS 8233:2014. This should be based on the layout and function of the different spaces within the building.	Suitably qualified acoustician (SQA) Professional report / study and calculations from the acoustician Letter of appointment or other confirmation demonstration when the acoustician was appointed	1	1	1		Acoustician	
			Indoor Ambient Noise Level	Achieve the indoor ambient noise level standards set out within Section 1 of BB93 for all room types. Achieve indoor ambient noise levels that comply with the design ranges given in Section 7 of BS 8233:2014.	Suitably qualified acoustician (SQA) Professional report / study and calculations from the acoustician Letter of appointment or other confirmation demonstration when the acoustician was appointed	1	1	1		Acoustician	
			Room acoustics.	Room acoustics (Control of reverberation, sound absorption and speech transmission index (STI)): Teaching and study spaces achieve the requirements relating to reverberation time for teaching and study spaces set out within Section 1 of BB93. Open plan teaching spaces achieve the performance requirements relating to reverberation time and STI set out within Section 1 of BB93. Corridor and stairwells, for those that give direct access to teaching and study spaces, achieve the performance requirements relating to sound absorption. Acoustic environment (control of reverberation and sound absorption): Achieve the requirements relating to sound absorption and reverberation times, where applicable, set out in Section 7 of BS 8233:2014.	Suitably qualified acoustician (SQA) Professional report / study and calculations from the acoustician Letter of appointment or other confirmation demonstration when the acoustician was appointed	1	1	1		Acoustician	
Hea	06	Security	**Security of site and building**	1 A Suitably Qualified Security Specialist (SQSS) conducts an evidence-based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent). The purpose of the SNA will be to identify attributes of the proposal, site and surroundings which may influence the approach to security for the development . 2 The SQSS develops a set of security controls and recommendations for incorporation into the proposals. Those controls and recommendations shall directly relate to the threats and assets identified in the preceding SNA. 3 The controls and recommendations shall be incorporated into proposals and implemented in the as-built development. Any deviation from those controls and recommendations shall be justified and agreed with the SQSS.	Security Needs Assessment (SNA)	1	1	1	Concept Design	Cundall	

BREEAM 2018 Issue List						No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage				King Street, Blackpool							
HEALTH & WELLBEING			Issue	Criterion	Evidence Required						
Hea	07	Safe and healthy surroundings	Safe Access	1 Dedicated and safe cycle paths are provided from the site entrance to any cycle storage, and connect to offsite cycle paths where applicable. 2 Dedicated and safe footpaths are provided on and around the site providing suitable links for the following: 2.a The site entrance to the building entrance 2.b Car parks (where present) to the building entrance 2.c The building to outdoor space 2.d Connecting to off-site paths where applicable. 3 Pedestrian drop-off areas are designed off, or adjoining to, the access road and should provide direct access to other footpaths. Where vehicle delivery access and drop-off areas form part of the assessed development, the following apply: 4 Delivery areas are not accessed through general parking areas and do not cross or share the following: 4.a pedestrian and cyclist paths 4.b outside amenity areas accessible to building users and general public. 5 There is a dedicated parking or waiting area for goods vehicles with appropriate separation from the manoeuvring area and staff and visitor car parking. 6 Parking and turning areas are designed for simple manoeuvring according to the type of delivery vehicle likely to access the site, thus avoiding the need for repeated shunting.	Design drawings (including a scaled site plan) AND/OR Relevant sections of the specification highlighting all necessary compliant features and dimensions	1	1	1		Architect	
			Outside space	7 There is an outside space providing building users with an external amenity area.	Design Drawings	1	1	1			It must be outdoor, landscaped, open to the sky, have appropriate seating and be non-smoking.

Available	Target	Potential
18	13	16
	10.11%	12.44%

Energy

BREEAM 2018 Issue List

Design Stage			King Street, Blackpool			No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
ENERGY			Issue	Criterion	Evidence Required						
Ene	01	Reduction of Energy Use and Carbon Emissions	**Energy Performance**	The Energy Performance Ratio for New Constructions (EPRNC) will be greater than 0.075. This is a figure calculated from the Part L calculations using a BREEAM calculator and indicates improvements over the Target Emission Rate	A copy of the Building Regulations Output Document from the approved software.	9	4	4		Mechanical - Electrical Engineer/MEP Sub Contractor	Excellent Requires 4 credits to be achieved (equivalent to an EPR of at least 0.5).
Ene	01	Reduction of Energy Use and Carbon Emissions	**Prediction of operational energy consumption**	2 Involve relevant members of the design team in an energy design workshop focusing on operational energy performance. 3 Undertake additional energy modelling during the design and post-construction stage to generate predicted operational energy consumption figures. 4 Report predicted energy consumption targets by end use, design assumptions and input data (with justifications). 5 Carry out a risk assessment to highlight any significant design, technical, and process risks that should be monitored and managed throughout the construction and commissioning process.	energy design workshop results additional energy modelling resulta risk assessment	4	4	4		Mechanical - Electrical Engineer/Sustainbility Consultant	An energy design workkshop must be completed
Ene	02	Energy Monitoring	**Sub-metering of end-use categories**	1 Install energy metering systems so that at least 90% of the estimated annual energy consumption of each fuel is assigned to the end-use categories (see Methodology on the next page). 2 Meter the energy consumption in buildings according to the total useful floor area: 2.a If the area is greater than 1,000m², by end-use category with an appropriate energy monitoring and management system. 2.b If the area is less than 1,000m², use either: 2.b.i an energy monitoring and management system or 2.b.ii separate accessible energy sub-meters with pulsed or other open protocol communication outputs, for future connection to an energy monitoring and management system. 3 Building users can identify the energy consuming end uses, for example through labelling or data outputs.	Design Drawings Specification Metering calculation	1	1	1		Mechanical - Electrical Engineer/MEP Sub Contractor	Systems that consume energy to perform the following functions within a building: a. Space heating b. Domestic hot water heating c. Humidification d. Cooling e. Ventilation, i.e. fans (major) f. Pumps g. Lighting h. Small power i. Renewable or low carbon systems (separately) j. Controls k. Other major energy-consuming systems/plant
Ene	02	Energy Monitoring	**Sub-metering of high energy load and tenancy areas**	4 Monitor a significant majority of the energy supply with: 4.a An accessible energy monitoring and management system for: 4.a.i tenanted areas or 4.a.ii relevant function areas or departments in single occupancy buildings. OR 4.b Separate accessible energy sub-meters with pulsed or other open protocol communication outputs for future connection to an energy monitoring and management system for: 4.b.i tenanted areas or 4.b.ii relevant function areas or departments in single occupancy buildings. 5 Sub-meter per floor plate in large single occupancy or single-tenancy buildings with one homogeneous function, for example hotel bedrooms, offices.	Design Drawings Specification	1	1	1		Mechanical - Electrical Engineer/MEP Sub Contractor	
Ene	03	External Lighting	**Energy Efficient Light Fittings**	1 No external lighting (which includes lighting on the building, at entrances and signs). OR 2 External light fittings within the construction zone with: 2.a Average initial luminous efficacy of not less than 70 luminaire lumens per circuit Watt 2.b Automatic control to prevent operation during daylight hours 2.c Presence detection in areas of intermittent pedestrian traffic.	Design Drawings Manufacturer Literature Specification Lighting calculation	1	1	1		Mechanical - Electrical Engineer/MEP Sub Contractor	
Ene	04	Low carbon design	**Passive Design Analysis**	1 Achieve the first credit Hea 04 Thermal comfort: One credit - Thermal modelling to demonstrate that the building design delivers appropriate thermal comfort levels in occupied spaces. 2 The project team analyses the proposed building design and development during Concept Design to identify opportunities for the implementation of passive design measures. 3 Implement passive design measures to reduce the total heating, cooling, mechanical ventilation, lighting loads and energy consumption in line with the passive design analysis findings. 4 Quantify the reduced total energy demand and carbon dioxide (CO_2-eq) emissions resulting from the passive design measures.	Passive design analysis Design drawings Manufacturer Literature	1	1	1		Mechanical Engineer / Architect	Hannan to complete early passive design analysis
Ene	04	Low carbon design	**Free Cooling**	5 Achieve the passive design analysis credit. 6 Include a free cooling analysis in the passive design analysis carried out under criterion 2. 7 Identify opportunities for the implementation of free cooling solutions. 8 The building is naturally ventilated or uses any combination of the free cooling strategies listed in Free cooling analysis on the next page.	Results from a dynamic simulation model demonstrating the feasibility of the free cooling strategy and meeting the first credit for Hea 04. Correspondence from the building services engineer summarising the 'purpose designed' free cooling strategy.	1	0	0		Mechanical Engineer / Architect	
Ene	04	Low carbon design	**Low and zero carbon technologies**	9 An energy specialist completes a feasibility study (see Low and zero carbon feasibility study on the next page) by the end of Concept Design. 10 Establish the most appropriate recognised local (on-site or near-site) low and zero carbon (LZC) energy sources for the building or development, based on the feasibility study. 11 Specify local LZC technologies for the building or development in line with the feasibility study recommendations. 12 Quantify the reduced regulated carbon dioxide (CO_2-eq) emissions resulting from the feasibility study.	Low Zero Carbon Feasibility Study Confirmation letter that LZC technology has been specified Design drawings	1	1	1		Mechanical - Electrical Engineer/Sustainbility Consultant	
Ene	06	Energy Efficient Transportation Systems	**Energy Consumption**	1 For specified lifts, escalators or moving walks (transportation types): 1.a Analyse the transportation demand and usage patterns for the building to determine the optimum number and size of lifts, escalators or moving walks 1.b Calculate the energy consumption in accordance with BS EN ISO 25745 Part 2 or Part 3 for one of the following: 1.b.i At least two options for each transportation type (e.g. for lifts, hydraulic, traction or machine room less (MRL)) OR 1.b.ii At least two options considering different system arrangements and control strategies. 1.c Consider the use of regenerative drives, subject to the requirements in Regenerative drives on the facing page 1.d Specify the transportation system with the lowest energy consumption.	Professional report/study of transportation analysis Calculations	1	1	1		Mechanical - Electrical Engineer/ Principle Contractor	
Ene	06	Energy Efficient Transportation Systems	**Lifts**	3 Specify the following three energy efficient features for each lift: 3.a A standby condition for off-peak periods 3.b The lift car lighting and display lighting provides an average luminous efficacy across all fittings in the car of > 70 luminaire lumens per circuit Watt 3.c Use of a drive controller capable of variable speed, variable-voltage, and variable-frequency (VVVF) control of the drive motor. 4 Specify regenerative drives where their use is demonstrated to save energy.	Relevant section/clauses of the building specification or contract AND EITHER Manufacturers products details OR Formal letter of commitment from the system(s) manufacturer/supplier	1	1	1		Mechanical - Electrical Engineer/ Principle Contractor	
Ene	08	Energy Efficient Equipment	**Energy Efficient Equipment**	1 Identify the building's unregulated energy consuming loads. Estimate their contribution to the total annual unregulated energy consumption of the building, assuming a typical or standard specification. 2 Identify the systems or processes that use a significant proportion of the total annual unregulated energy consumption of the building. 3 Demonstrate a meaningful reduction in the total annual unregulated energy consumption of the building. Table 6.5 below lists some examples of significant contributors to unregulated energy consumption, and the associated criteria. If additional significant contributors, not listed in the table, will be specified, the design team should justify how a meaningful reduction will be achieved for these contributors.	Relevant section/clauses of the building specification or contract. Manufacturers product details. Documentation confirming compliance with the relevant scheme or standard outlined in the criteria e.g. details of compliance with the ECA scheme. Design drawings and/or calculations. Life Cycle Analysis	2	2	2		Mechanical - Electrical Engineer / Client	

Available	Target	Potential
23	17	17
	11.83%	11.83%

Transport

BREEAM 2018 Issue List						No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage				King Street, Blackpool							
TRANSPORT			Issue	Criterion	Evidence Required						
Tra	01	Transport assessment and travel plan	**Transport assessment and Travel plan**	1 No later than Concept Design stage, undertake a site-specific transport assessment (or develop a travel statement) and draft travel plan, which can demonstrably be used to influence the site layout and built form; 2 The site-specific travel assessment (or statement) shall cover as a minimum: 2.a If relevant, travel patterns and attitudes of existing building or site users towards cycling, walking and public transport, to identify relevant constraints and opportunities. 2.b Predicted travel patterns and transport impact of future building or site users. 2.c Current local environment for pedestrians and cyclists, accounting for any age-related requirements of occupants and visitors. 2.d Reporting of the number and type of existing accessible amenities, see Table 7.1 below, within 500m of the site. 2.e Disabled access accounting for varying levels and types of disability, including visual impairment. 2.f Calculation of the existing public transport Accessibility Index (AI), see Methodology on the facing page. 2.g Current facilities for cyclists. 3 Following a transport assessment (in accordance with the requirements set out in criteria 2), develop a sitespecific travel plan that provides a long term management strategy which encourages more sustainable travel. The travel plan includes measures to increase or improve more sustainable modes of transport and movement of people and goods during the building's operation see Methodology on the facing page. 4 If the occupier is known, involve them in the development of the travel plan. 5 Demonstrate that the travel plan will be implemented and supported by the building's management in operation.	Compliant transport assessment and travel plan	2	2	2	Concept Design	Transport consultant	Transport consultant should be appointed to complete site specific transport assessment, travel plan plus proximity to amenities and accessibility index calcs.
Tra	02	Sustainable transport measures	**Prerequisite**	1 Achieve criteria 3-5 in the Tra 01 Transport assessment and travel plan	Criteria 3-5 in Tra 01	P	P	P			
			Transport options implementation	2 Identify the sustainable transport measures, see Table 7.4 Sustainable public, private and active transport measures (listed below) 3 Award credits according to the existing Accessible Index (AI) of the project, and the total number of points achieved for the options implemented.	Marked-up site plan or map highlighting: 1. location of assessed building 2. Location and type of amenities 3. The route to the amenities 4. Plan / map scale	10	7	7		Architect	
			Public transport measures	1. The existing AI calculated in Tra 01 achieves the following: ≥ 4 for prison or MOD sites, rural location sensitive buildings, and other building group 3 ≥ 8 for all other building types	Tra 01 tranposrt index results					Architect	
			Public transport measures	2. Demonstrate an increase over the existing Accessibility Index through negotiation with local bus, train or tram companies to increase the frequency of the local service provision for the development; OR 3. Demonstrate an increase over the existing Accessibility Index. This could be through provision of a diverted bus route, a new or enhanced bus stop, or other similar solutions. OR 4. Provide a dedicated service, such as a bus route or service.	Details of uplifted public transport measure Tra 01 tranposrt index					Architect	
			Public transport measures	5. Provide a public transport information system in a publicly accessible area, to allow building users access to up-to-date information on the available public transport and transport infrastructure. This may include signposting to public transport, cycling, walking infrastructure or local amenities.	Provide a public transport information system (signage)					Architect	
			Private transport measures	6. Provide electric recharging stations of a minimum of 3kW for at least 10% of the total car parking capacity for the development.	Electric recharging stations drawing Calculations					Architect	
			Private transport measures	7. Set up a car sharing group or facility to facilitate and encourage building users to car share. 8. Raise awareness of the sharing scheme with marketing and communication materials. 9. Provide priority spaces for car sharers for at least 5% of the total car parking capacity for the development. 10. Locate priority parking spaces nearest the development entrance used by the sharing scheme participants.	Car share review Share scheme marketing and communication materials Car share drawings					Architect	
			Active travel measures	11. During preparation of the brief, the design team consults with the local authority (LA) on the state of the local cycling network and public accessible pedestrian routes, to focus on whichever the LA deems most relevant to the project, and how to improve it. 12. Agree and implement one proposition chosen with the local authority. The proposition supported by the development is additional to existing local plans and has a significant impact on the local cycling network or on pedestrian routes open to the public.	Consultation summary Drawings					Architect	
			Active travel measures	13. Install compliant cycle storage spaces to meet the minimum levels set out in Table 7.5 on the facing page.	Cycle storage drawings Cycle storage calc					Architect	
			Active travel measures	14. Option 7 has been achieved. 15. Provide at least two compliant cyclists' facilities for the building users, (including pupils where appropriate to the building type) – see Definitions on page 194 for the scope of each compliant facility: –Showers –Changing facilities –Lockers –Drying spaces.	Cycle facilities drawings Cycle facilities calc					Architect / Mechanical Engineer	
			Active travel measures	Existing amenities: 16. At least three existing accessible amenities are present, see Table 7.6, where relevant for a Building Group.	Amenities assessment and drawings					Architect	
			Active travel measures	Enhanced amenities: 17. Ensure a minimum of one new accessible amenity, in accordance with Table 7.6 , for the relevant Building Group, is provided. OR 18. Ensure more than one new accessible amenity, in accordance with Table 7.6 for the relevant Building Group, is provided.	Amenities assessment and drawings					Architect	
			Assessment option	19. Implement one site-specific improvement measure, not covered by the options already listed in this issue, in line with the recommendations of the travel plan.	Travel Plan Travel plan site-specific improvement measure					Architect	

Table 7.6 Amenities applicable for option 9 and 10 for different Building Groups (BG).

Criteria	BG 1	BG 2	BG 3	BG 4	BG 5	BG 6
Proximity (metres)	500	500	500	500	500	500
Appropriate food outlet	✔	✔	✔	✔	✔	✔
Access to cash	✔	✔	✔	✔	✔	✔
Access to an outdoor open space (public or private, provided suitably sized and accessible to building users)	✔	✔	✔	✔	✔	✔
Access to a recreation or leisure facility for fitness or sports	✔	✔	✔	✔	✔	✔
Publicly available postal facility	✔	✔	✔	✔	✔	✔
Community facility	✔	✔	✔		✔	✔
Over the counter services associated with a pharmacy	✔	✔	✔	✔	✔	✔
Public sector GP surgery or general medical centre			✔		✔	✔
Child care facility or school	✔		✔		✔	✔

Available	Target	Potential
12	9	9
	7.50%	7.50%

Water

BREEAM 2018 Issue List						No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage			King Street, Blackpool								
WATER			Issue	Criterion	Evidence Required						
Wat	01	Water Consumption	**Water Consumption (Litres / person / day)**	1 Use the BREEAM Wat 01 calculator to assess the efficiency of the domestic water-consuming components. 2 Use the standard Wat 01 method to compare the water consumption (litres/person/day) for the assessed building against a baseline performance. BREEAM credits based upon the following Wat 01 Water Consumption Water % Improvement / No. of BREEAM Credits: 25% – 2 40% – 3 50% – 4 55% – 5 65% – Exemplary performance 3 If a greywater or rainwater system is specified, use its yield in L/person/day to offset potable water demand from components. 4 If a greywater or rainwater system is specified and installed: 4.a Greywater systems in compliance with BS 8525-1:2010 Greywater systems - Part 1 Code of Practice. 4.b Rainwater systems in compliance with BS EN 16941-1:2018.	Completed copy of the BREEAM Wat 01 calculator Relevant section / clauses of the building specification Design drawings confirming technical details of; 1. Sanitary components	5	3	4		Mechanical - Electrical Engineer / Architect	Rainwater and greywater collection system required to meet the 50% improvement over baseline
Wat	02	Water Monitoring	**Water Meter**	1 Specify a water meter on the mains water supply to each building. This includes instances where water is supplied via a borehole or other private source. 2 For water-consuming plant or building areas consuming 10% or more of the building's total water demand: 2.a Fit easily accessible sub-meters OR 2.b Install water monitoring equipment integral to the plant or area. 3 For each meter (main and sub): 3.a Install a pulsed or other open protocol communication output AND 3.b Connect it to an appropriate utility monitoring and management system, e.g. a building management system (BMS), for the monitoring of water consumption. If there is no BMS system in operation at Post-Construction stage, award credits provided that the system used enables connection when the BMS becomes operational. 4 In buildings with swimming pools, or large water tanks and aquariums, fit separate sub-meters on the water supply of the above and any associated changing facilities (toilets, showers etc.) irrespective of their water consumption levels. 5 In buildings containing laboratories, fit a separate water meter on the water supply to any process or cooling loop for 'plumbed-in' laboratory process equipment, irrespective of their water consumption levels. Additionally for those pursuing a post occupancy stage certification: 6 The water monitoring strategy used enables the identification of all water consumption for sanitary uses as assessed under Wat 01 (litres/person/day), if a post occupancy stage certification is sought.	Relevant section / clauses of the building specification Design drawings showing location of Water meters Technical details of meter (manufacturers literature)	1	1	1		Mechanical - Electrical Engineer/MEP Sub Constractor	
Wat	03	Water Leak Detection	**Leak Detection System**	1 Install a leak detection system capable of detecting a major water leak: 1.a On the utilities water supply within the buildings, to detect any major leaks within the buildings AND 1.b Between the buildings and the utilities water supply, to detect any major leaks between the utilities supply and the buildings under assessment. 2 The leak detection system is: 2.a A permanent automated water leak detection system that alerts the building occupants to the leak OR an inbuilt automated diagnostic procedure for detecting leaks 2.b Activated when the flow of water passing through the water meter or data logger is at a flow rate above a pre-set maximum for a pre-set period of time. This usually involves installing a system which detects higher than normal flow rates at meters or sub-meters. It does not necessarily require a system that directly detects water leakage along part or the whole length of the water supply system 2.c Able to identify different flow and therefore leakage rates, e.g. continuous, high or low level, over set time periods. Although high and low level leakage rates are not specified, the leak detection equipment installed must have the flexibility to distinguish between different flow rates to enable it to be programmed to suit the building type and owner's or occupier's usage patterns. 2.d Programmable to suit the owner's or occupier's water consumption criteria 2.e Where applicable, designed to avoid false alarms caused by normal operation of large waterconsuming plant such as chillers. Where there is physically no space for a leak detection system between the utilities water meter and the building, alternative solutions can be used, provided that a major leak can still be detected.	Relevant section / clauses of the building specification Design drawings showing location of meters and leaks detection equipment BMS systems breakdown	1	1	1		Mechanical - Electrical Engineer/MEP Sub Constractor	
			Flow Control Devices	3 Install flow control devices that regulate the water supply to each WC area or sanitary facility according to demand, in order to minimise undetected wastage and leaks from sanitary fittings and supply pipework.	Relevant section / clauses of the building specification Design drawings showing location of shut-off valves	1	1	1		Mechanical - Electrical Engineer/MEP Sub Constractor	
Wat	04	Water Efficient Equipment	**Unregulated Water Consumption**	1 Identify all water demands from uses other than those listed under - Calculation of water efficiency performance on page 204 that could be realistically mitigated or reduced. Where there is no water demand from uses other than domestic-scale, sanitary use components in the building, this issue is not applicable. 2 Identify systems or processes to reduce the relevant water demand (criterion 1 above), and establish, through either good practice design or specification, a demonstrable reduction in the total water demand of the building.	Relevant section / clauses of the building specification Design drawings showing location of irrigation systems Letter of confirmation that no irrigation systems are present	1	1	1		Mechanical - Electrical Engineer / Architect	

Available	Target	Potential
9	7	8
	5.44%	6.22%

Materials

MATERIALS			Issue	Criterion	Evidence Required	No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
			BREEAM 2018 Issue List								
Design Stage			**King Street, Blackpool**								
Mat	01	Environmental impacts from construction products - Building life cycle assessment (LCA)	**Comparison with the BREEAM LCA benchmark during Concept Design (office, industrial and retail buildings only)**	Superstructure (office, industrial and retail buildings (except for Simple Buildings and where Notes 1.1 and 1.2 above apply)) 1 During the Concept Design, demonstrate the environmental performance of the building as follows: 1.a Carry out a building LCA on of the superstructure design using either the BREEAM Simplified Building LCA tool or an IMPACT Compliant LCA tool according to the methodology (see Methodology on page 226). 1.b Submit the Mat 01/02 Results Submission Tool to BRE at the end of Concept Design, and before planning permission is applied for (that includes external material or product specifications).	BREEAM Simplified Building LCA tool or an IMPACT Compliant LCA tool Specification providing a detailed description of each applicable element and its constituent materials specification Design drawings or specification detailing the location and area (m2) of each applicable element	6	4	3	Concept Design	Cundall	
Mat	01	Environmental impacts from construction products - Building life cycle assessment (LCA)	**Comparison with the BREEAM LCA benchmark during Technical Design (office, industrial and retail buildings only)**	2 During Technical Design, demonstrate the environmental performance of the building as follows: 2.a As criterion 1.a 2.b Submit the Mat 01/02 Results Submission Tool to BRE at the end of Technical Design. Where a project has not achieved criterion 1, criterion 2 may still be achieved.	BREEAM Simplified Building LCA tool or an IMPACT Compliant LCA tool Specification providing a detailed description of each applicable element and its constituent materials specification Design drawings or specification detailing the location and area (m2) of each applicable element					Cundall	
Mat	01	Environmental impacts from construction products - Building life cycle assessment (LCA)	**Option appraisal during Concept Design (all building types)**	3. For office, industrial and retail building types, achieve criterion 1 (except where Notes 1.0, 1.1 and 1.2 on the previous page apply). 4 During Concept Design, identify opportunities for reducing environmental impacts as follows: 4.a Carry out building LCA options appraisal of 2 to 4 significantly different superstructure design options (applicable to the Concept Design stage, see Methodology on the next page). 4.b Use a building LCA tool that is recognised by BREEAM (as suitable for assessing superstructure during Concept Design) according to the methodology (see Methodology on the next page). 4.c For each design option, fulfil the same functional requirements specified by the client and all statutory requirements (to ensure functional equivalency). 4.dIntegrate the LCA options appraisal activity within the wider design decision-making process. Record this in an options appraisal summary document. 4.e Record the following in the Mat 01/02 Results Submission Tool: The differences between the design options; the design option selected by the client to be progressed beyond Concept Design; the reasons for selecting it and the reasons for not selecting the other design options. 4.f Submit the Mat 01/02 Results Submission Tool to BRE at the end of Concept Design, and before planning permission is applied for (that includes external material or product specifications). If the building LCA tool recognised by BREEAM and used for criteria 3 to 5 (and 6 to 9, if pursued) is not an IMPACT Compliant LCA tool and criteria 1 to 2 are applicable, then the BREEAM Simplified Building LCA tool (or an IMPACT Compliant LCA tool) shall be used for criteria 1 to 2 .	LCA options appraisal Options appraisal summary document Mat 01/02 Results Submission Tool (differences) Document confirming reasons for selecting option.					Cundall	
Mat	01	Environmental impacts from construction products - Building life cycle assessment (LCA)	**Options appraisal during Technical Design (all building types)**	5. During Technical Design identify opportunities for reducing environmental impacts as follows: 5.a Carry out building LCA options appraisal of 2 to 3 significantly different superstructure design options (based on the selected Concept Design option and as applicable to the Technical Design stage, see Methodology on the next page). 5.b Use a building LCA tool that is recognised by BREEAM (as suitable for assessing superstructure during Technical Design) according to the methodology (see Methodology on the next page). 5.c As criteria 4.c to 4.e above. Where an options appraisal summary document was produced during Concept Design, update it to include the Technical Design options. 5.d Submit the Mat 01/02 Results Submission Tool to BRE at the end of Technical Design. Where a project has not achieved criteria 3 and 4, criterion 5 may still be achieved.	LCA options appraisal					Architect	
Mat	01	Environmental impacts from construction products - Building life cycle assessment (LCA)	**One credit – Substructure and hard landscaping options appraisal during Concept Design (all building types)**	6. Criteria 3 and 4 are achieved. 7. During Concept Design identify opportunities for reducing environmental impacts as follows: 7.a Carry out building LCA options appraisal of a combined total of at least six significantly different substructure or hard landscaping design options (at least two shall be substructure and at least two shall be hard landscaping). 7.b Using a building LCA tool that is recognised by BREEAM (as suitable for assessing substructure and hard landscaping during Concept Design) according to the methodology (see Methodology below). 7.c As criteria 4.c to 4.f on the previous page.	LCA options appraisal	1	0	1	Concept Design	Architect / Landscape Architect	Credit hightlights as a potential item.
Mat	02	Environmental impacts from construction products - Environmental Product Declarations (EPD)	**Specification of products with a recognised environmental product declaration (EPD)**	1 Specify construction products with EPD that achieve a total EPD points score of at least 20, according to the Methodology 2 Enter the details of each EPD into the Mat 01/02 Results Submission Tool, including the material category classification. The Mat 01/02 Results Submission Tool will verify the EPD points score and credit award.	Specification providing a detailed description of each applicable element and its constituent materials specification Design drawings or specification detailing the location and area (m2) of each applicable element EPD certificates for each material Simplified Mat 02 tool	1	1	1		Architect	
Mat	03	Responsible Sourcing of Materials	**Prerequisite - Legally harvested and traded timber**	1 All timber and timber-based products used on the project are legally harvested and traded timber as per the UK Government's Timber Procurement Policy (TPP). Compliance with criterion 1 is a minimum requirement for achieving any BREEAM rating. There are no prerequisite requirements for other materials.	Written confirmation from the supplier/s that all timber is sourced in compliance with the UK Government Timber Procurement Policy for legal and sustainable sourcing	P	P	P		Principal Contractor	
Mat	03	Responsible Sourcing of Materials	**Enabling sustainable procurement**	2 A sustainable procurement plan must be used by the design team to guide specification towards sustainable construction products. The plan must: 2.a Be in place before Concept Design. 2.b Include sustainability aims, objectives and strategic targets to guide procurement activities. Note: targets do not need to be achieved for the credit to be awarded but justification must be provided for targets that are not achieved. 2.c Include a requirement for assessing the potential to procure construction products locally. There must be a policy to procure construction products locally where possible. 2.d Include details of procedures in place to check and verify the effective implementation of the sustainableprocurement plan. In addition, if the plan is applied to several sites or adopted at an organisational level it must: 2.e Identify the risks and opportunities of procurement against a broad range of social, environmental and economic issues following the process set out in BS ISO 20400:2017.	Sustainable procurement plan	1	1	1	Concept Design	Principal Contractor	
Mat	03	Responsible Sourcing of Materials	**Measuring responsible sourcing**	3 Use the Mat 03 calculator tool and methodology to determine the number of credits achieved for the construction products specified or procured. Credits are awarded in proportion to the scope of the assessment and the number of points achieved, as set out in Table 9.10 BREEAM credits available for each scope level and percentage of points achieved	Completed copy of the Mat 03 Calculator tool Specification providing a detailed description of each applicable element and its constituent materials specification Design drawings or specification detailing the location and area (m2) of each applicable element A copy of the relevant responsible sourcing scheme certificate(ISO 14001, BES6001 etc.) for the relevant specifications/products.	3	1	2		Architect	
		and Resilience	**Protecting Vulnerable Parts of the Building from Damage**	1. Protection measures are incorporated into the building's design and construction to reduce damage to the building's fabric or materials in case of accidental or malicious damage occurring. These measures must provide protection against: 1.a Negative impacts of high user numbers in relevant areas of the building (e.g. corridors, lifts, stairs, doors etc.). 1.b Damage from any vehicle or trolley movements within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas. 1.c External building fabric damage by a vehicle. Protection where parking or manoeuvring areas are within 1 metre of the building façade and where delivery areas or routes are within 2 metres of the façade, i.e. specifying bollards or protection rails. 1.d Potential malicious damage to building materials and finishes, in public and common areas where appropriate.	Design drawings illustrating vulnerable areas / parts of the building. Design drawings and / or relevant section / clauses of the building specification or contract confirming the durability measures specified.					Architect	

BREEAM 2018 Issue List						No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage			King Street, Blackpool								
MATERIALS		**Issue**	**Criterion**	**Evidence Required**							
Mat	**05**	**Designing for Durability**	**Protecting Exposed Parts of the Building from Material Degradation**	2 Key exposed building elements have been designed and specified to limit long and short term degradation due to environmental factors. This can be demonstrated through one of the following: 2.a The element or product achieving an appropriate quality or durability standard or design guide, see Table 9.14 on the next page. If none are available, use BS 7543:2015(173) as the default appropriate standard OR 2.b A detailed assessment of the element's resilience when exposed to the applicable material degradation and environmental factors. 3 Include convenient access to the roof and façade for cost-effective cleaning, replacement and repair in the building's design. 4 Design the roof and façade to prevent water damage, ingress and detrimental ponding. Table 9.14 on the next page is a list of relevant industry durability and quality standards than can be used to achieve compliance.	1. Identify from the list of 'applicable building elements' under Table - 9.14 the elements that are appropriate to the building being assessed. 2. Establish from the 'environmental factors' list those factors that are likely to cause material degradation effects in the identified applicable building elements. 3. Confirm the design and specification measures in place to limit these degradation effects.	1	1	1		Architect	
Mat	**06**	**Material Efficiency**		1 At the Preparation and Brief and Concept Design stages, set targets and report on opportunities and methods to optimise the use of materials. These must be done for each of the following stages. See Table 9.15 below: 1.a Preparation and Brief 1.b Concept Design 1.c Developed Design 1.d Technical Design 1.e Construction. 2 Develop and record the implementation of material efficiency, see Table 9.15 below, during: 2.a Developed Design 2.b Technical Design 2.c Construction. 3 Report the targets and actual material efficiencies achieved.	Reports (at Preparation and Brief stage) outlining the activity relating to material efficiency (ideas discussed, analysis and decisions taken) Drawings or building integrated model (BIM), calculations showing reduction of material use through design (Concept Design/Developed Design stages) Meeting notes, construction program, responsibilities schedule (indicating parties consulted).	1	0	0		Architect	Not Targeted

Available	Target	Potential
14	8	9
	8.57%	9.64%

Waste

BREEAM 2018 Issue List						No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage				King Street, Blackpool							
WASTE			Issue	Criterion	Evidence Required						
Wst	01	Construction Waste Management	**Pre-demolition audit**	1 Complete a pre-demolition audit of any existing buildings, structures or hard surfaces being considered for demolition. This must be used to determine whether refurbishment or reuse is feasible and, in the case of demolition, to maximise the recovery of material for subsequent high grade or value applications. The audit must cover the content of Pre-demolition audit scope and: 1.a Be carried out at Concept Design stage (RIBA Stage 2) by a competent person prior to strip-out or demolition works 1.b Guide the design, consider materials for reuse and set targets for waste management 1.c Engage all contractors in the process of maximising high grade reuse and recycling opportunities 2 Make reference to the audit in the resource management plan (RMP). 3 Compare actual waste arisings and waste management routes used with those forecast and investigate significant deviations from planned targets.	Pre-demolition audit	1	1	1		Principal Contractor	Pre-demolition audit for the prject will be undertaken.
			Construction Resource Efficiency	4 Prepare a compliant Resource Management Plan (RMP) covering: 4.a Non-hazardous waste materials (from on-site construction and dedicated off-site manufacture or fabrication, see Definitions on page 262), including demolition and excavation waste 4.b Accurate data records on waste arisings and waste management routes. 5 Meet or improve upon the benchmarks in Table 10.1 for non-hazardous construction waste, excluding demolition and excavation waste. BREEAM credits – Amount of waste generated per 100m2 (gross internal floor area) – m³ – tonnes One credit – ≤ 13.3 – ≤ 11.1 Two credits – ≤ 7.5 – ≤ 6.5 Three credits – ≤ 3.4 – ≤ 3.2 Exemplary Level – ≤ 1.6 – ≤ 1.9	A copy of the Resource Management plan Where relevant, pre-demolition audit.	3	3	3		Principal Contractor	
			Diversion of Resources from Landfill	6 Meet, where applicable, the diversion from landfill benchmarks in Table 10.2 for non-hazardous construction waste and demolition and excavation waste generated. 7 Sort waste materials into separate key waste groups as per Table 10.3 on page 265, either on-site or through a licensed contractor for recovery. Table 10.2 Diversion from landfill benchmarks BREEAM Credits – Type of Waste – Volume – Tonnage One Credit – Non demolition – 70% – 80% – Demolition – 80% – 90% – Excavation – N/A – N/A Exemplary Level – Non demolition – 85% – 90% – Demolition – 85% – 95% – Excavation – 95% – 95%	A copy of the Resource Management plan	1	1	1		Principal Contractor	
Wst	02	Use of recycled and sustainably sourced aggregates	**Project Sustainable Aggregate Points**	Prerequisite 1 If demolition occurs on site, to encourage the reuse of site-won material on site, complete a pre-demolition audit of any existing buildings, structures or hard surfaces in accordance with - Criterion 1 on page 260 and - Criterion 2 on page 260. 2 Identify all aggregate uses and types on the project 3 Determine the quantity in tonnes for each identified use and aggregate type. 4 Identify the region in which the aggregate source is located. 5 Calculate the distance in kilometres travelled by all aggregates by transport type. 6 Enter the information into the BREEAM Wst 02 calculator to calculate the Project Sustainable Aggregate points. The corresponding number of BREEAM credits will be awarded as shown in Table 10.4	Relevant section / clauses of the building specification or contract Project team calculations Documentation confirming the source of recycled / secondary aggregates and that the required amount can be produced	1	0	0		Principal Contractor	Not Targeted
Wst	03	Operational Waste	**Operational Waste**	1 Provide a dedicated space for the segregation and storage of operational recyclable waste generated. The space is: 1.a Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams 1.b Accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractors 1.c Of a capacity appropriate to the building type, size, number of units (if relevant) and predicted volumes of waste that will arise from daily or weekly operational activities and occupancy rates. 2 For consistent and large amounts of operational waste generated, provide: 2.a Static waste compactors or balers; situated in a service area or dedicated waste management space 2.b Vessels for composting suitable organic waste OR adequate spaces for storing segregated food waste and compostable organic material for collection and delivery to an alternative composting facility 2.c A water outlet provided adjacent to or within the facility for cleaning and hygiene purposes where organic waste is to be stored or composted on site. Additionally for healthcare buildings only 3 The specified or installed operational waste facilities are compliant with the relevant NHS guidelines for that part of the UK.	Design drawings and / or relevant section / clauses of the building specification or contract confirming provision and scope of dedicated facilities. Project team meeting minutes / letter confirming likely building waste streams and indicative volumes	1	1	1		Architect	The design team demonstrates that the provision of waste management facilities for the assessed building is adequate given the building type, occupier (if known), operational function and likely waste streams and volumes to be generated. Where it is not possible to determine what provision should be made, the following guide for minimum storage space provision should be used: 1.At least 2m² per 1000m² of net floor area for buildings < 5000m² 2.A minimum of 10m² for buildings ≥5000m² 3. An additional 2m² per 1000m² of net floor area where catering is provided (with an additional minimum of 10m² for buildings ≥ 5000m²). The net floor area should be rounded up to the nearest 1000m². 300
Wst	04	Speculative finishes (Offices only)	**Speculative floor and ceiling finishes**	1 For tenanted areas, where the future occupant is not known and carpets or other floor or ceiling finishes are installed, these must be limited to a show area only. 2 Only install floor and ceiling finishes selected by the known occupant of a development. Alternatively, where only ceiling finishes and no carpets are installed, the building owner confirms that the first tenants will not be permitted to make substantial alterations to the ceiling finishes.	Design drawings and / or relevant section / clauses of the building specification or contract A letter from the client, project team or building user where the future occupant is known	1	1	1	Technical Design	Architect	
Wst	05	Adaptation to Climate Change	**Resilience of structure, fabric, building services and renewables installation**	1 Conduct a climate change adaptation strategy appraisal using: 1.a A systematic risk assessment to identify the impact of expected extreme weather conditions arising from climate change on the building over its projected life cycle. The assessment covers the installation of building services and renewable systems, as well as structural and fabric resilience aspects and includes: 1.a.i Hazard identification 1.a.ii Hazard assessment 1.a.iii Risk estimation 1.a.iv Risk evaluation 1.a.v Risk management. 2 Develop recommendations or solutions based on the climate change adaptation strategy appraisal, before or during Concept Design, that aim to mitigate the identified impact. 3 Provide an update during Technical Design demonstrating how the recommendations or solutions proposed at Concept Design have been implemented where practical and cost effective. Omissions have been justified in writing by the assessor.	Hazard & Risk Assessment Mitigation Strategy Design/specification of incorporated measures identified by the risk assessment in the final design	1	1	1	Concept Design	Architect / Mechanical - Electrical Engineer	
Wst	06	Design for disassembly and adaptability	**Design for disassembly and functional adaptability - recommendations**	1 Conduct a study to explore the ease of disassembly and the functional adaptation potential of different design scenarios by the end of Concept Design. 2 Develop recommendations or solutions based on the study (criterion 1 above), during or prior to Concept Design, that aim to enable and facilitate disassembly and functional adaptation.	Functional Adaptation Study	1	1	1	Concept Design	Architect / Mechanical - Electrical Engineer	
			Disassembly and functional adaptability – implementation	3 Achieve criteria 1 and 2 4 Provide an update, during Technical Design, on: 4.a How the recommendations or solutions proposed by Concept Design have been implemented where practical and cost effective. Omissions have been justified in writing to the assessor. 4.b Changes to the recommendations and solutions during the development of the Technical Design. 5 Produce a building adaptability and disassembly guide to communicate the characteristics allowing functional adaptability and disassembly to prospective tenants.	Functional adaptation strategy Implementation plan report	1	1	1	Technical Design	Architect / Mechanical - Electrical Engineer	
						Available	**Target**	**Potential**			
						11	**10**	**10**			
							5.45%	**5.45%**			

Land Use and Ecology

BREEAM 2018 Issue List											
Design Stage			King Street, Blackpool			No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
LAND USE & ECOLOGY			Issue	Criterion	Evidence Required						
LE	01	Site Selection	**Previously Occupied Land**	At least 75% of the proposed development's footprint is on an area of land which has previously been occupied	Design drawings (including existing site plan), report or site photographs confirming: 1. Type and duration of previous land use; 2. Area (m2) of previous land use. Proposed site plan showing; 3. Location and footprint (m2) of proposed development and temporary works.	1	1	1		Architect	
LE	01	Site Selection	**Contaminated Land**	2 A contaminated land professional's site investigation, risk assessment and appraisal has deemed land within the site to be affected by contamination. The site investigation, risk assessment and appraisal have identified: 2.a The degree of contamination 2.b The contaminant sources or types 2.c The options for remediating sources of contamination which present an unacceptable risk. 3 The client or principal contractor confirms that remediation of the site will be carried out in accordance with the remediation strategy and its implementation plan as recommended by the contaminated land professional	A copy of the specialist's land contamination report. Design drawings (including existing site plan) showing contaminated areas and areas to be remediate in relation to any proposed development. A letter from the principal contractor or remediation contractor confirming: 1.The remediation strategy for the site; 2. Summary details of the implementation plan. If a contractor has not yet been appointed, a letter from the client, or their representative confirming that the appointed contractor will undertake necessary remediation works to mitigate the risks identified into he specialist report	1	0	0		Project Manager	
LE	02	Identifying and understanding the risks and opportunities for the project	**Prerequisite - Assessment route selection**	1 An assessment route for the project has been determined using BREEAM Guidance Note GN34 BREEAM Ecological Risk Evaluation Checklist. 2 The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site. Table 11.1 Credits awarded by ecological assessment route | | Project team member route (Route 1) | Ecologist route (Route 2) | | Survey and evaluation | 1 credit | 1 credit | | Determining the ecological outcomes for the site | | 1 credit | | Exemplary criteria | 1 credit | 1 credit |	BREEAM Ecological Risk Evaluation Checklist Compliance letter from Client	P	P	P		Client	
LE	02	Identifying and understanding the risks and opportunities for the project	**Survey and evaluation**	Route 1 3 Assessment route 1 can be used only when indicated by the results of the BREEAM Ecological Risk Evaluation Checklist (see Methodology on the facing page). Route 2 4 A Suitably Qualified Ecologist (SQE) is appointed at a project stage that ensures early involvement in site configuration and, where necessary, can influence strategic planning decisions. 5 Prior to the completion of the Preparation and Brief project stage, an appropriate level of survey and evaluation (see Assessment route 2: For sites where complex ecological systems are likely to be present on the facing page) has been carried out to determine the ecological baseline of the site, taking account of the zone of influence to establish: 5.a Current and potential ecological value and condition of the site, and related areas within the zone of influence. 5.b Direct and indirect risks to current ecological value 5.c Capacity and feasibility for enhancement of the ecological value of the site and, where relevant, areas within the zone of influence. 6 Data are collated and shared with project team to inform the site preparation, design and construction works.	Ecologist's report	1	1	1	Preparation & Brief	Ecologist	
LE	02	Identifying and understanding the risks and opportunities for the project	**Determining the ecological outcomes for the site (Routes 1 and 2)**	7 Survey and evaluation criteria relevant to the chosen route (criterion 3 or Criteria 4–6 on the previous page) have been achieved. 8 During Concept Design, the project team liaise and collaborate with representative stakeholders to identify the optimal ecological outcome for the site. (For Route 1 assessments, see GN35. For Route 2 assessments, see Methodology below). 9 The ecological outcome for the site is determined by identifying, appraising and selecting specific solutions and measures. The solutions and measures must be identified sufficiently early in the project to influence key project planning decisions and must be done in accordance with the following hierarchy of action. which is dependant on the route beinge used : | Route 1 | Route 2 | | 1. Avoidance 2. Protection | 1. Avoidance 2. Protection 3. Reduction or limitation of negative impacts 4. On site compensation and 5. Enhancement, considering the capacity and feasibility within the site, or where viable, off-site. | 10 The optimal ecological outcome for the site is selected after liaising with representative stakeholders and the project team.	Stakeholder Consultation Report Ecologist's report	1	1	1	Concept Design	Principal Contractor	
LE	03	Managing negative impacts on ecology	**Prerequisite – Identification and understanding the risks and opportunities for the site**	1 LE 02 has been achieved. Table 11.2 Credits awarded according to assessment route | | Project team member route (Route 1) | Ecologist Route (Route 2) | | Planning, liaison and implementation | 1 credit | 1 credit | | Managing negative impacts of the project (limitation or compensation) | 1 credit | 1 or 2 credits |	Achieve LE 02	P	P	P		Ecologist	
LE	03	Managing negative impacts on ecology	**Planning, liaison, implementation and data**	2 Roles and responsibilities for managing negative impacts on the ecology are clearly defined and allocated to support successful delivery of project outcomes at an early enough stage to influence the Preparation and Brief or Concept Design. 3 The potential impact of site preparation and construction works on ecology are identified at an early project stage to optimise benefits and outputs. 4 The project team, liaising and collaborating with representative stakeholders and, taking into consideration data collated and shared, have proposed solutions and selected measures to be implemented during site preparation and construction works.	Design drawings including proposed and existing (pre-development) site plan / survey Ecologist's report	1	1	1	Preparation & Brief	Project Manager	
LE	03	Managing negative impacts on ecology	**Managing negative impacts of the project**	Route 1 (one credit) 5 Criteria 2 and 3 have been achieved. 6 Negative impacts from site preparation and construction works have been managed according to the hierarchy (see Methodology on the facing page) and no overall loss of ecological value has occurred. Route 2 (up to two credits) 7 Criteria 2-4 have been achieved. 8 Negative impacts from site preparation and construction works have been managed according to the hierarchy (see Assessment route 2: For sites where complex ecological systems are likely to be present on the facing page) and, either: 8.a No overall loss of ecological value has occurred (2 credits) OR 8.b The loss of ecological value has been minimised (Minimising Loss) (1 credit)	Design drawings including proposed and existing (pre-development) site plan / survey Ecologist's report	2	2	2		Ecologist	
LE	04	Change and enhancement of ecological value	**Prerequisite - Managing negative impacts on ecology**	1 Criteria 2-3 in LE 03 have been achieved. 2 The client or contractor confirms compliance is monitored against all relevant UK, EU or international legislation relating to the ecology of the site.	Compliance letter from Client	P	P	P		Client	
LE	04	Change and enhancement of ecological value	**Change and enhancement of ecology**	Route 1 3 The project team, liaising and collaborating with representative stakeholders and taking into consideration data collated and shared, have implemented locally relevant ecological solutions and measures which enhance the site. The solutions and measures adopted are based on recommendations from recognised 'local' ecological expertise and specialist input and guidance.	Implementation plan / drawings / report	0	0	0		Architect / Landscape Architect	Not Targeted
LE	04	Change and enhancement of ecological value	**One credit - Liaison, implementation and data collation**	Route 2 4 The project team, liaising and collaborating with representative stakeholders, and taking into consideration data collated and shared, have implemented the solutions and measures selected in a way that enhances ecological value in the following order: 4.a On site, and where this is not feasible, 4.b Off site within the zone of influence. 5 Data collated are provided to the local environmental records centres nearest to, or relevant for, the site.	Implementation plan / drawings / report	1	1	1		Ecologist	

BREEAM 2018 Issue List						No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage				King Street, Blackpool							
LAND USE & ECOLOGY			Issue	Criterion	Evidence Required						
			Up to three credit - Change and enhancement of ecology	Route 2 6 Up to three credits are awarded based on the calculation of the change in ecological value occurring as a result of the project. This must be calculated in accordance with the process set out in GN36 - BREEAM, CEEQUAL and HQM Ecology Calculation Methodology – Route 2. Credits are awarded as follows: 6.a Minimising loss of ecological value (one credit - percentage score of 75-94) 6.b No net loss of ecological value (two credits - percentage score of 95-104) 6.c Net gain of ecological value (three credits - percentage score of 105-109)	Completed version of BREEAM Change in Ecological Value Calculator.	3	2	3		Ecologist / Landscape Architect	
LE	**05**	**Long term ecology management and maintenance**	**Prerequisite - Roles and responsibilities, implementation, statutory obligations**	1 The client or contractor has confirmed that compliance is being monitored against all relevant UK, EU and international standards relating to the ecology of the site. 2 The following must be achieved, according to the route being assessed: 2.a Route 1 - Criteria 2-3 in LE 03 have been achieved. 2.b Route 2 - Criteria 2-3 in LE 03 have been achieved, and at least one credit under LE 04 for 'Change and Enhancement of Ecology' has been awarded. Table 11.4 Credits awarded by ecological assessment route [ ] | Project team member route (Route 1) | Ecologist route (Route 2) Planning, liaison, data, monitoring and review management and maintenance | 1 credit | 1 credit Landscape and ecology management plan (or similar) development | | 1 credit	Compliance letter from Client	P	P	P			
			One credit - Planning, liaison, data, monitoring and review management and maintenance	3 The project team liaise and collaborate with representative stakeholders, taking into consideration data collated and shared, on solutions and measures implemented to: 3.a Monitor and review the effectiveness with which the plans for LE 03 & LE 04 are implemented 3.b develop and review management and maintenance solutions, actions or measures. 4 In support of the above and to help ensure their continued relevance over the period of the project the following should be considered: 4.a Monitoring and reporting of the ecological outcomes for site implemented at the design and construction stage 4.b Monitoring and reporting of outcomes and successes from the project 4.c Arrangements for the ongoing management of landscape and habitat connected to the project (on and, where relevant, off site) 4.d Maintaining the ecological value of the site and its relationship or connection to its zone of influence 4.e Maintaining the site in line with the any sustainability linked activities, e.g. ecosystems benefits (LE 02). 4.f Remedial or other management actions are carried out which relate to those identified in LE 02, LE 03 and LE 04. 5 As part of the tenant or building owner information supplied, include a section on Ecology and Biodiversity to inform the owner or occupant of local ecological features, value and biodiversity on or near the site.	develop and review management and maintenance solutions, actions or measures. O&M section: Ecology and Biodiversity	1	1	1			
			One credit - Landscape and ecology management plan (or similar) development	6 Landscape and ecology management plan, or equivalent, is developed in accordance with BS 42020:2013 Section 11.1 covering as a minimum the first five years after project completion and includes: 6.a Actions and responsibilities, prior to handover, to give to relevant individuals 6.b The ecological value and condition of the site over the development life. 6.c Identification of opportunities for ongoing alignment with activities external to the development project and which supports the aims of BREEAM's Strategic Ecology Framework 6.d Identification and guidance to trigger appropriate remedial actions to address previously unforeseen impacts 6.e Clearly defined and allocated roles and responsibilities. 7 The landscape and management plan or similar is updated as appropriate to support maintenance of the ecological value of the site.	Landscape and ecology management plan	1	1	1		Ecologist / Principal Contractor	

Available	Target	Potential
13	11	12
	11.00%	12.00%

Pollution

BREEAM 2018 Issue List						No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage				King Street, Blackpool							
POLLUTION			Issue	Criterion	Evidence Required						
Pol	01	Impact of Refrigerants	**Buildings that Use No Refrigerants (3 Credits)**	1. Where the building does not require the use of refrigerants within its installed plant/systems.	Documentary evidence confirming the absence of refrigerant in the development	0	0	0		Mechanical - Electrical Engineer	Not Targeted
Pol	01	Impact of Refrigerants	**Buildings that Use Refrigerants:** **Pre-requisite** **Impact of refrigerant (1 to 2 credits)**	Pre-requisite 2 All systems with electric compressors comply with the requirements of BS EN 378:2016(212) (parts 2 and 3). Refrigeration systems containing ammonia comply with the Institute of Refrigeration Ammonia Refrigeration Systems code of practice Impact of refrigerant Two credits 3 The direct effect life cycle CO_2 equivalent emissions (DELC) of ≤100 CO_2-eq/kW. For systems which provide cooling and heating, the worst performing output based on the lower of kW cooling output and kW heating output is used to complete the calculation. To calculate the DELC, refer to the relevant definitions in Methodology on the facing page and Additional information on page 326. OR 4 All refrigerants used have a global warming potential (GWP) ≤10. OR One credit 5 Systems using refrigerants have a DELC of ≤1000kgCO_2-eq/kW cooling and heating capacity.	A copy of the specification clause Letter from the M&E engineer/system manufacturer confirming relevant refrigeration type and system information. Completed copy of the Pol 01 Calculator tool	2	1	1	Developed & Technical Design	Mechanical - Electrical Engineer/MEP Sub Contractor	1no. Credit targeted for a system which uses a refrigerant of DELC <1000kg CO2 eq
Pol	01	Impact of Refrigerants	**Leak detection (1 credit)**	6 All systems are hermetically sealed or only use environmentally benign refrigerants. OR 7 Where the systems are not hermetically sealed: 7.a Systems have: 7.a.i A permanent automated refrigerant leak detection system, that is robust and tested, and capable of continuously monitoring for leaks. OR 7.a.ii An inbuilt automated diagnostic procedure for detecting leakage is enabled. 7.b In the event of a leak, the system must be capable of automatically responding and managing the remaining refrigerant charge to limit loss of refrigerant.	Letter from the M&E engineer/system manufacturer confirming relevant refrigeration type and system information. Manufacturer's product details.	1	0	0		Mechanical - Electrical Engineer	Not Targeted
Pol	02	Local air quality	**Local air quality**	1 All heating and hot water is supplied by non-combustion systems. For example, only powered by electricity. OR alternatively; 2 Emissions from all installed combustion plant that provide space heating and domestic hot water do not exceed the levels set in Table 12.4 and Table 12.5 below. Table 12.4 Maximum NO_x emission levels by appliance type, fuel and location	Relevant section/clauses of the building specification or contract. Manufacturer's product details. Calculations from the project team.	2	1	2	Developed & Technical Design	Mechanical - Electrical Engineer/MEP Sub Contractor	
Pol	03	Flood and surface water management	**Flood Resilience**	Two credits - Low flood risk 2 A site-specific flood risk assessment (FRA) confirms the development is in a flood zone that is defined as having a low annual probability of flooding. The FRA takes all current and future sources of flooding into consideration. One credit - Medium or high flood risk 3 A site-specific FRA confirms the development is in a flood zone that is defined as having a medium or high annual probability of flooding and is not in a functional floodplain. The FRA must take all current and future sources of flooding into consideration. For smaller sites refer to Level of detail required in the FRA for smaller sites on page 337, which overrides criterion 2 above. 4 To increase the resilience and resistance of the development to flooding, one of the following must be achieved: 4.a The ground level of the building and access to both the building and the site, are designed (or zoned) so they are at least 600 mm above the design flood level of the site's flood zone. 4.b The final design of the building and the wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach outlined in section 5 of BS 8533:2017	Flood risk assessment Design drawings Where appropriate, correspondence from the appropriate statutory body confirming reduced annual probability of flooding due to existing flood defences.	2	2	2		Drainage Engineer	Based on 2NB FRA - low flood risk is anticipated. A Site-specific flood risk report / note will still be required.
Pol	03	Flood and surface water management	**Surface Water Run-Off - Rate**	Prerequisite for surface water run-off credits 5 Surface water run-off design solutions must be bespoke, i.e. they must take account of the specific site requirements and natural or man-made environment of and surrounding the site. The priority levels detailed in the Methodology must be followed, with justification given by the appropriate consultant where water is allowed to leave the site. One credit - Surface Water Run-Off - Rate 6 For brownfield sites, drainage measures are specified so that the peak rate of run-off from the site to the watercourses (natural or municipal) shows a 30% improvement for the developed site compared with the predeveloped site. This should comply at the 1-year and 100-year return period events. 7 For Greenfield sites, drainage measures are specified so that the peak rate of run-off from the site to the watercourses (natural or municipal) is no greater for the developed site than it was for the pre-development site. This should comply at the 1-year and 100-year return period events. 8 Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified Sustainable Drainage Systems (SuDS) are in place. 9 Calculations include an allowance for climate change. This should be made in accordance with current best practice planning guidance.	Statement from the appropriate consultant confirming that they are qualified in line with the BREEAM definition. Consultants report containing all information necessary to demonstrate compliance including. 1. Type and storage volume (l) of the drainage measures 2. Total area of hard surfaces (m2) 3. Peak/Volume flow rates (l/s) pre and post development for the return period events 4. Additional allowance for climate change designed in to the system 5. Impact on the building of flooding from local drainage system failure	1	1	1		Drainage Engineer	
Pol	03	Flood and surface water management	**Surface Water Run-Off - Volume**	10 Flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance); AND EITHER 11 Drainage design measures are specified so that the post-development run-off volume, over the development lifetime, is no greater than it would have been prior to the assessed site's development. This must be for the 100-year 6-hour event, including an allowance for climate change. 12 Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other SuDS techniques. OR (only where criteria 11 and 12 cannot be achieved): 13 Justification from the appropriate consultant indicating why the above criteria cannot be achieved, i.e. where infiltration or other SuDS techniques are not technically viable options. 14 Drainage design measures are specified so that the post-development peak rate of run-off is reduced to the limiting discharge. The limiting discharge is defined as the highest flow rate from the following options: 14.a The pre-development one-year peak flow rate 14.b The mean annual flow rate (Qbar) 14.c 2L/s/ha. For the one-year peak flow rate, the one-year return period event criterion applies. 15 Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place. 16 For either option, above calculations must include an allowance for climate change; this should be made in accordance with current best practice planning guidance.	The consultants report detailing the design specifications, calculations and drawings to support the 5mm rainfall discharge criteria. Design drawings and/or relevant section/clauses of the building specification or contract indicating 1. High and low risk areas of the site 2. Specification of SUDS, source control systems, oil/petrol separators and shut-off valves as appropriate A letter or other formal correspondence from the project team: 1. Confirming water pollution prevention systems are designed in accordance with PPG3 and the SUDS manual (where appropriate) 2. Outlining indicative examples of compliance with PPG3 and the SUDS manual 3. Confirming a copy of the drainage plan will be produced and handed over to the building occupier. 4. Confirming design of all external storage and delivery areas is in compliance with relevant Pollution Prevention Guidance 5. Outlining indicative examples of compliance with the PPG.	1	0	1		Drainage Engineer	Credit highlighted as a potential item.
Pol	03	Flood and surface water management	**Minimising watercourse pollution**	17 There is no discharge from the developed site for rainfall up to 5 mm (confirmed by the appropriate consultant). 18 Areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques. 19 Areas with a high risk of contamination or spillage of substances, such as petrol and oil, have separators (or an equivalent system) are installed in surface water drainage systems. 20 Chemical or liquid gas storage areas have a means of containment fitted to the site drainage system (i.e. shut-off valves). This is to prevent the escape of chemicals to natural watercourses in the event of a spillage or bunding failure. 21 All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as the SuDS manual (220) and other relevant industry best practice. They must be bespoke solutions taking account of the specific site requirements and natural or man-made environment of and surrounding the site. 22 A comprehensive and up to date drainage plan of the site will be made available for the building or site occupiers. 23 Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place. 24 All external storage and delivery areas are designed and detailed in accordance with the current best practice planning guidance.	The consultants report detailing the design specifications, calculations and drawings to support the 5mm rainfall discharge criteria. Design drawings and/or relevant section/clauses of the building specification or contract indicating 1. High and low risk areas of the site 2. Specification of SUDS, source control systems, oil/petrol separators and shut-off valves as appropriate A letter or other formal correspondence from the project team: 1. Confirming water pollution prevention systems are designed in accordance with PPG3 and the SUDS manual (where appropriate) 2. Outlining indicative examples of compliance with PPG3 and the SUDS manual 3. Confirming a copy of the drainage plan will be produced and handed over to the building occupier. 4. Confirming design of all external storage and delivery areas is in compliance with relevant Pollution Prevention Guidance 5. Outlining indicative examples of compliance with the PPG.	1	0	0		Drainage Engineer	Not Targeted

BREEAM 2018 Issue List						No. Credits Available	Credit Targeted	Credit Potential	Timeframe / Urgency	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage				King Street, Blackpool							
POLLUTION			Issue	Criterion	Evidence Required						
Pol	04	Reduction of Night Time Light Pollution	**Reduction of Night Time Light Pollution**	1 External lighting pollution has been eliminated through effective design that removes the need for external lighting. This does not adversely affect the safety and security of the site and its users. OR alternatively, where the building does have external lighting, one credit can be awarded as follows: 2 The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, 2011(226). 3 All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00. 4 If safety or security lighting is provided and will be used between 23:00 and 07:00, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP guidance notes. 5 Illuminated advertisements are designed in compliance with ILP PLG05 The Brightness of Illuminated Advertisements	Design drawings Relevant section/clauses of the building specification or contract or external lighting design data/calculations In the case of the external lighting design, the M&E engineer or lighting designer must provide indicative examples of where and how the strategy complies with the assessment criteria.	1	1	1	Developed & Technical Design	Electrical Engineer/MEP Sub Contractor	
Pol	05	Reduction of Noise Pollution	**Reduction of Noise Pollution**	1 There are no noise-sensitive areas within the assessed building or within 800 m radius of the assessed site. OR 2 Where there are noise-sensitive areas within the assessed building or noise-sensitive areas within 800 m radius of the assessed site, a noise impact assessment compliant with BS 4142:2014(228) is commissioned. Noise levels must be measured or determined for: 2.a Existing background noise levels: 2.a.i at the nearest or most exposed noise-sensitive development to the proposed assessed site 2.a.ii including existing plant on a building, where the assessed development is an extension to the building 2.b Noise rating level from the assessed building. 3 The noise impact assessment must be carried out by a suitably qualified acoustic consultant. 4 The noise level from the assessed building, as measured in the locality of the nearest or most exposed noise sensitive development, must be at least 5dB lower than the background noise throughout the day and night. 5 If the noise sources from the assessed building are greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with the criterion.	Design drawings highlighting: 1. All existing and proposed noise-sensitive buildings local to, and within, the site boundary 2. Proposed sources of noise from the new development 3. Distance (m) from these buildings to the assessed development. The acoustician's report, acoustician's qualifications and professional status. OR Relevant section/clauses of the building specification or contract requiring a noise assessment by a suitably qualified acoustician in compliance with BS 7445:1991. OR A letter from the client or design team confirming that they will appoint an acoustician to carry out a noise assessment in compliance with BS 7445:1991 Acoustician's report with recommendations for noise attenuation measures. AND EITHER A marked-up design plan highlighting the specification of the acoustician's attenuation measures OR A formal letter from the client or design team confirming where relevant, that attenuation measures recommended by an appointed suitably qualified acoustician will be installed.	1	1	1		Acoustician	

Available	Target	Potential
12	7	9
	4.67%	6.00%

Innovation

BREEAM 2018 Issue List						No. Credits Available	Credit Targeted	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage				King Street, Blackpool					
INNOVATION			Issue	Criterion	Evidence Required				
MAN	03	Responsible Construction Practices	Responsible Construction Practices		See Full Credit Issue	1	1	Principal Contractor	Contractor commits to achieving all items within responsible management matrix
HEA	01	Visual comfort	Visual Comfort	To achieve an exemplary performance credit for daylighting: 14 Daylighting criteria have been met using either of the following options: 14.a Relevant building areas meet exemplary daylight factors and the relevant criteria in Table 5.8 below. 14.b Relevant building areas meet exemplary average and minimum point daylight illuminance criteria in Table 5.9 on the next page. Exemplary level criteria - Internal and external lighting levels, zoning and control To achieve an exemplary performance credit for Internal and external lighting levels, zoning and control: 15 Lighting in each zone can be manually dimmed by occupants down to 20% of the maximum light output using dimmer switches positioned in accessible locations. Dimming and control gear should avoid flicker and noise.	See Full Credit Issue	1	0	Architect	Not Targeted
HEA	02	Indoor air quality	Minimising sources of air pollution - volatile organic compound (VOC) emission levels (products)		See Full Credit Issue	0	0	Architect	Not Targeted
			Minimising sources of air pollution - volatile organic compound (VOC) emission levels (products)		See Full Credit Issue	0	0	Architect	Not Targeted
HEA	06	Security							
ENE	01	Reduction of energy use and carbon emissions	Energy Consumption		See Full Credit Issue	5	0	Mechanical Engineer	Not Targeted
WAT	01	Water consumption	Water Consumption (Litres / person / day)		See Full Credit Issue	1	0	Mechanical Engineer	Not Targeted
MAT	01	Life cycle impacts	Life Cycle Impacts		IMPACT (Integrated Material Profile And Costing Tool) Life Cycle Assessment (LCA) and Life Cycle Costing (LCC).	2	0	Principal Contractor	Not Targeted
MAT	03	Responsible sourcing of materials	Responsible sourcing of materials (RSM)		See Full Credit Issue	1	0	Architect	Not Targeted

BREEAM 2018 Issue List						No. Credits Available	Credit Targeted	Evidence Responsibility	BREEAM Assessor Comments / Requirements
Design Stage			King Street, Blackpool						
INNOVATION			Issue	Criterion	Evidence Required				
WST	01	Construction-site waste management	Construction resource efficiency	Exemplary Level: ≤ 1.6 / ≤ 1.9	See Full Credit Issue	1	1	Principal Contractor	
			Diversion of resources from landfill	Exemplary Level: Non demolition 85% / 90%; Demolition 85% / 95%; Excavation 95% / 95%	See Full Credit Issue			Principal Contractor	Exemplar credit for the diversion of non- hazardous waste has been targeted.
WST	02	Recycled Aggregates	Recycled Aggregates		See Full Credit Issue	1	0	Principal Contractor	Not Targeted
WST	05	Adaptation to Climate Change	Responding to adaptation to climate change		See Full Credit Issue	1	0	Architect	Not Targeted
LE	02		Ecological risks and opportunities		See Full Credit Issue				Not Targeted
LE	04		Ecological change and enhancement		See Full Credit Issue				

Available	Target
14	2
	2.00%

6.2 Appendix B – BRUKL Output Document & Draft EPC

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

GPA Blackpool

As designed

Date: Tue May 18 10:38:53 2021

Administrative information

Building Details

Address: King Street, Blackpool, FY1 1AU

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

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

Certifier details

Name: Jack Hopper

Telephone number:

Address: Beta House, Alpha Gate Drive, Denton, Manchester, M34 3SH

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

CO_2 emission rate from the notional building, $kgCO_2/m^2$.annum	21.6
Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	21.6
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	11.1
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

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

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

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.15	0.15	L000003E:Surf[2]
Floor	0.25	0.1	0.1	L00000F4:Surf[0]
Roof	0.25	0.1	0.1	L000026C:Surf[2]
Windows***, roof windows, and rooflights	2.2	1.45	2.2	L00000F2:Surf[1]
Personnel doors	2.2	2.2	2.2	L000003E:Surf[1]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

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

* There might be more than one surface where the maximum U-value occurs.
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
*** Display windows and similar glazing are excluded from the U-value check.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
m³/(h.m²) at 50 Pa	10	2

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- B. All Air System

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.36	3.51	0	1.6	0.75
Standard value	2.5*	2.55	N/A	1.6^	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

2- E. LTHW via ASHP, Nat

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.36	-	0.2	0	-
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. For types <=12 kW output, refer to EN 14825 for limiting standards.

3- A3. 4PFC, 4PFC, Nat

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.36	3.51	0	1.6	0.75
Standard value	2.5*	3.2	N/A	1.1^	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. For types <=12 kW output, refer to EN 14825 for limiting standards.

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

4- D1. DX, DX, Central HR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	6.1	-	0	0.75
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.

5- A, A1, A2, C. 4PFC, 4PFC, Central HR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.36	3.51	0	1.6	0.75
Standard value	2.5*	3.2	N/A	1.6^	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

6- D2. DX, DX, Nat

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	6.1	-	0	0.65
Standard value	2.5*	2.6	N/A	N/A	N/A

Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system	YES

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

7- H. 4PFC, 4PFC, Local HR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.36	3.51	0	1.6	0.65
Standard value	2.5*	3.2	N/A	1.6^	0.65

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. For types <=12 kW output, refer to EN 14825 for limiting standards.

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

8- F, F1. LTHW via ASHP, Central HR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.36	-	0.2	0	0.75
Standard value	2.5*	N/A	N/A	N/A	0.5

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. For types <=12 kW output, refer to EN 14825 for limiting standards.

9- G. Local HR Only

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	-	0.2	0	0.65
Standard value	2.5*	N/A	N/A	N/A	0.5

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. For types <=12 kW output, refer to EN 14825 for limiting standards.

10- D. DX, DX, Local HR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	6.1	0	0	0.65
Standard value	2.5*	2.6	N/A	N/A	0.65

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. For types <=12 kW output, refer to EN 14825 for limiting standards.

11- E1. LTHW via ASHP, Central Extract

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.36	-	0.2	0	-
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. For types <=12 kW output, refer to EN 14825 for limiting standards.

"No HWS in project, or hot water is provided by HVAC system"

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
L00 Lift Lobby	-	-	-	-	-	0.3	-	0.3	-	-	N/A
L00 Fire Control	-	-	-	-	-	-	-	0.3	-	-	N/A
L00 Post Room	-	-	-	-	-	-	-	0.3	-	-	N/A
L00 Male Changing WC	-	-	-	1.6	-	-	-	-	-	-	N/A
L00 Female Changing WC	-	-	-	1.6	-	-	-	-	-	-	N/A
L00 Female Changing	-	-	-	1.6	-	-	-	-	-	-	N/A
L00 Drying	-	-	-	1.6	-	-	-	-	-	-	N/A
L00 Acc Shower	-	-	-	1.6	-	-	-	-	-	-	N/A
L00 GN Shower	-	-	-	1.6	-	-	-	-	-	-	N/A
L00 Security	-	-	-	1.6	-	-	-	-	-	-	N/A
L01 Office	-	-	-	-	-	-	-	0.3	-	-	N/A
L01 Office Perim South	-	-	-	-	-	-	-	0.3	-	-	N/A
L01 Office Perim West	-	-	-	-	-	-	-	0.3	-	-	N/A
L00 Office	-	-	-	-	-	-	-	0.3	-	-	N/A
L00 Office Perim	-	-	-	-	-	-	-	0.3	-	-	N/A
L00 Health Centre	-	-	-	-	-	-	-	0.3	-	-	N/A
L00 Health Centre Perim East	-	-	-	-	-	-	-	0.3	-	-	N/A
L00 Health Centre Perim South	-	-	-	-	-	-	-	0.3	-	-	N/A
L00 Health Centre Perim West	-	-	-	-	-	-	-	0.3	-	-	N/A
L02 Office	-	-	-	-	-	-	-	0.3	-	-	N/A
L02 Office Perim South	-	-	-	-	-	-	-	0.3	-	-	N/A
L02 Office Perim West	-	-	-	-	-	-	-	0.3	-	-	N/A
L02 Office	-	-	-	-	-	-	-	0.3	-	-	N/A
L02 Office Perim East	-	-	-	-	-	-	-	0.3	-	-	N/A
L02 Office Perim North	-	-	-	-	-	-	-	0.3	-	-	N/A
L01 Office	-	-	-	-	-	-	-	0.3	-	-	N/A
L01 Office Perim East	-	-	-	-	-	-	-	0.3	-	-	N/A
L01 Office Perim North	-	-	-	-	-	-	-	0.3	-	-	N/A
L03 Office	-	-	-	-	-	-	-	0.3	-	-	N/A
L03 Office Perim South	-	-	-	-	-	-	-	0.3	-	-	N/A
L03 Office Perim West	-	-	-	-	-	-	-	0.3	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
L03 Office	-	-	-	-	-	-	-	0.3	-	-	N/A
L03 Office Perim East	-	-	-	-	-	-	-	0.3	-	-	N/A
L03 Office Perim North	-	-	-	-	-	-	-	0.3	-	-	N/A
L04 Office	-	-	-	-	-	-	-	0.3	-	-	N/A
L04 Office Perim South	-	-	-	-	-	-	-	0.3	-	-	N/A
L04 Office Perim West	-	-	-	-	-	-	-	0.3	-	-	N/A
L04 Office	-	-	-	-	-	-	-	0.3	-	-	N/A
L04 Office Perim East	-	-	-	-	-	-	-	0.3	-	-	N/A
L04 Office Perim North	-	-	-	-	-	-	-	0.3	-	-	N/A
L05 Office	-	-	-	-	-	-	-	0.3	-	-	N/A
L05 Office Perim South	-	-	-	-	-	-	-	0.3	-	-	N/A
L05 Office Perim West	-	-	-	-	-	-	-	0.3	-	-	N/A
L05 Office	-	-	-	-	-	-	-	0.3	-	-	N/A
L05 Office Perim East	-	-	-	-	-	-	-	0.3	-	-	N/A
L05 Office Perim North	-	-	-	-	-	-	-	0.3	-	-	N/A
L06 Office	-	-	-	-	-	-	-	0.3	-	-	N/A
L06 Office Perim South	-	-	-	-	-	-	-	0.3	-	-	N/A
L06 Office Perim West	-	-	-	-	-	-	-	0.3	-	-	N/A
L06 Office	-	-	-	-	-	-	-	0.3	-	-	N/A
L06 Office Perim East	-	-	-	-	-	-	-	0.3	-	-	N/A
L06 Office Perim North	-	-	-	-	-	-	-	0.3	-	-	N/A
L00 Reception (Desk)	-	-	-	-	-	-	-	0.3	-	-	N/A
L00 Acc WC nr Stair 03	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 Reception (Circulation)	-	-	-	-	-	-	-	0.3	-	-	N/A
L01 Acc WC nr Stair 03	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 Male Changing	-	-	-	1.6	-	-	-	-	-	-	N/A
L02 Acc WC nr Stair 03	-	-	0.5	-	-	-	-	-	-	-	N/A
L03 Acc WC nr Stair 03	-	-	0.5	-	-	-	-	-	-	-	N/A
L04 Acc WC nr Stair 03	-	-	0.5	-	-	-	-	-	-	-	N/A
L05 Acc WC nr Stair 03	-	-	0.5	-	-	-	-	-	-	-	N/A
L06 Acc WC nr Stair 03	-	-	0.5	-	-	-	-	-	-	-	N/A

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
L00 Acc WC	-	103	-	29
L00 Circulation	-	173	-	155
L00 Circulation	-	409	-	22
L00 Circulation	-	247	-	28
L00 Circulation	-	232	-	130
L00 Circulation	-	367	-	19
L00 Circulation	-	235	-	182
L00 Circulation	-	203	-	24

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
L00 Circulation	-	212	-	135
L00 Circulation	-	294	-	15
L00 Lift Lobby	-	92	-	239
L00 Circulation - Plant	-	212	-	101
L00 Cleaners	77	-	-	14
L00 Comms	98	-	-	106
L00 Fire Control	100	-	-	107
L00 Fuel Store	105	-	-	123
L00 GN WC	-	136	-	14
L00 GN WC	-	134	-	15
L00 GN WC	-	138	-	14
L00 GN WC	-	136	-	14
L00 GN WC	-	134	-	15
L00 Intake	180	-	-	34
L00 Intake	156	-	-	45
L00 Intake HV	126	-	-	68
L00 Intake HV	125	-	-	70
L00 PAVA	112	-	-	56
L00 Plant	91	-	-	198
L00 Plant	105	-	-	88
L00 Cold Water Tank	94	-	-	244
L00 Plant	105	-	-	89
L00 Post Room	89	-	-	177
L00 Stair 01	-	94	-	65
L00 Stair 02	-	89	-	89
L00 Stair 03	-	95	-	64
L00 Store	113	-	-	20
L00 Male Changing WC	-	149	-	12
L00 Female Changing WC	-	144	-	13
L00 Female Changing	-	79	-	220
L00 Cycle Store	79	-	-	545
L00 Gym	-	83	-	301
L00 Cleaners	73	-	-	17
L00 Drying	70	-	-	73
L00 Circulation	-	204	-	23
L00 Store	77	-	-	35
L00 Acc WC	-	106	-	27
L00 Acc Shower	-	96	-	40
L00 GN Shower	-	109	-	25
L00 Circulation	-	178	-	74
L00 Wheelchair	80	-	-	138
L00 Security	104	-	-	162
L00 BOH Reception	77	-	-	135

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
L00 DR	226	-	-	4
L00 FFC	226	-	-	6
L01 Acc WC	-	103	-	29
L01 Circulation	-	203	-	24
L01 Circulation	-	189	-	160
L01 Lift Lobby	-	84	-	239
L01 GN WC	-	136	-	14
L01 GN WC	-	134	-	15
L01 GN WC	-	138	-	14
L01 GN WC	-	136	-	14
L01 GN WC	-	134	-	15
L01 Stair 01	-	77	-	65
L01 Store	77	-	-	20
L00 Circulation	-	198	-	95
L00 Circulation	-	195	-	65
L01 Stair 02	-	76	-	69
L01 Male WC	-	79	-	137
L01 Female WC	-	79	-	137
L01 Office	182	-	-	1114
L01 Office Perim South	184	-	-	398
L01 Office Perim West	183	-	-	1567
L00 Office	186	-	-	731
L00 Office Perim	187	-	-	519
L00 Health Centre	183	-	-	458
L00 Health Centre Perim East	189	-	-	245
L00 Health Centre Perim South	186	-	-	398
L00 Health Centre Perim West	189	-	-	292
L02 Acc WC	-	103	-	29
L02 Circulation	-	203	-	24
L02 Circulation	-	189	-	160
L02 Lift Lobby	-	84	-	239
L02 GN WC	-	136	-	14
L02 GN WC	-	134	-	15
L02 GN WC	-	138	-	14
L02 GN WC	-	136	-	14
L02 GN WC	-	134	-	15
L02 Stair 01	-	77	-	65
L02 Store	77	-	-	20
L02 Stair 02	-	76	-	69
L02 Office	182	-	-	1114
L02 Office Perim South	184	-	-	398
L02 Office Perim West	183	-	-	1567
L02 Office	182	-	-	2460

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
L02 Office Perim East	183	-	-	1464
L02 Office Perim North	183	-	-	662
L01 Office	182	-	-	2262
L01 Office Perim East	183	-	-	1276
L01 Office Perim North	183	-	-	461
L03 Acc WC	-	103	-	29
L03 Circulation	-	203	-	24
L03 Circulation	-	189	-	160
L03 Lift Lobby	-	84	-	239
L03 GN WC	-	136	-	14
L03 GN WC	-	134	-	15
L03 GN WC	-	138	-	14
L03 GN WC	-	136	-	14
L03 GN WC	-	134	-	15
L03 Stair 01	-	77	-	65
L03 Store	77	-	-	20
L03 Stair 02	-	76	-	69
L03 Office	182	-	-	1114
L03 Office Perim South	184	-	-	398
L03 Office Perim West	183	-	-	1567
L03 Office	182	-	-	2460
L03 Office Perim East	183	-	-	1464
L03 Office Perim North	183	-	-	662
L04 Acc WC	-	103	-	29
L04 Circulation	-	203	-	24
L04 Circulation	-	189	-	160
L04 Lift Lobby	-	84	-	239
L04 GN WC	-	136	-	14
L04 GN WC	-	134	-	15
L04 GN WC	-	138	-	14
L04 GN WC	-	136	-	14
L04 GN WC	-	134	-	15
L04 Stair 01	-	77	-	65
L04 Store	77	-	-	20
L04 Stair 02	-	76	-	69
L04 Office	182	-	-	1114
L04 Office Perim South	184	-	-	398
L04 Office Perim West	183	-	-	1567
L04 Office	182	-	-	2460
L04 Office Perim East	183	-	-	1464
L04 Office Perim North	183	-	-	662
L05 Acc WC	-	103	-	29
L05 Circulation	-	203	-	24

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
L05 Circulation	-	189	-	160
L05 Lift Lobby	-	84	-	239
L05 GN WC	-	136	-	14
L05 GN WC	-	134	-	15
L05 GN WC	-	138	-	14
L05 GN WC	-	136	-	14
L05 GN WC	-	134	-	15
L05 Stair 01	-	77	-	65
L05 Store	77	-	-	20
L05 Stair 02	-	76	-	69
L05 Office	182	-	-	1114
L05 Office Perim South	184	-	-	398
L05 Office Perim West	183	-	-	1567
L05 Office	182	-	-	2460
L05 Office Perim East	183	-	-	1464
L05 Office Perim North	183	-	-	662
L06 Acc WC	-	103	-	29
L06 Circulation	-	203	-	24
L06 Circulation	-	189	-	160
L06 Lift Lobby	-	84	-	239
L06 GN WC	-	136	-	14
L06 GN WC	-	134	-	15
L06 GN WC	-	138	-	14
L06 GN WC	-	136	-	14
L06 GN WC	-	134	-	15
L06 Stair 01	-	83	-	65
L06 Store	77	-	-	20
L06 Stair 02	-	82	-	69
L06 Office	182	-	-	1114
L06 Office Perim South	184	-	-	398
L06 Office Perim West	183	-	-	1567
L06 Office	182	-	-	2460
L06 Office Perim East	183	-	-	1464
L06 Office Perim North	183	-	-	662
R1 Circulation	-	208	-	24
R1 Stair 01	-	61	-	65
R1 LV Switch	83	-	-	97
R1 LV Switch	83	-	-	101
R1 Roof Comms	76	-	-	54
R1 CAT B/C Internal Plant	91	-	-	55
R1 Circulation	-	173	-	164
L00 Sprinkler Tank	81	-	-	603
L00 Reception (Desk)	-	90	22	30

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
L00 Refuse	82	-	-	198
L00 Acc WC nr Stair 03	-	113	-	23
L00 Reception (Circulation)	-	80	22	1194
L00 Circulation	-	206	-	39
L01 Stair 03	-	77	-	64
L01 Acc WC nr Stair 03	-	113	-	23
L01 Circulation	-	206	-	39
L00 Male Changing	-	79	-	211
L01 Cleaners	112	-	-	10
L02 Male WC	-	79	-	137
L02 Female WC	-	79	-	137
L02 Stair 03	-	77	-	64
L02 Acc WC nr Stair 03	-	113	-	23
L02 Circulation	-	206	-	39
L02 Cleaners	112	-	-	10
L03 Male WC	-	79	-	137
L03 Female WC	-	79	-	137
L03 Stair 03	-	77	-	64
L03 Acc WC nr Stair 03	-	113	-	23
L03 Circulation	-	206	-	39
L03 Cleaners	112	-	-	10
L04 Male WC	-	79	-	137
L04 Female WC	-	79	-	137
L04 Stair 03	-	77	-	64
L04 Acc WC nr Stair 03	-	113	-	23
L04 Circulation	-	206	-	39
L04 Cleaners	112	-	-	10
L05 Male WC	-	79	-	137
L05 Female WC	-	79	-	137
L05 Stair 03	-	77	-	64
L05 Acc WC nr Stair 03	-	113	-	23
L05 Circulation	-	206	-	39
L05 Cleaners	112	-	-	10
L06 Male WC	-	79	-	137
L06 Female WC	-	79	-	137
L06 Stair 03	-	83	-	64
L06 Acc WC nr Stair 03	-	113	-	23
L06 Circulation	-	206	-	39
L06 Cleaners	112	-	-	10
R1 Htg and Clg Plant	75	-	-	690

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L00 Acc WC	N/A	N/A
L00 Lift Lobby	N/A	N/A
L00 Comms	N/A	N/A
L00 Fire Control	N/A	N/A
L00 GN WC	N/A	N/A
L00 GN WC	N/A	N/A
L00 GN WC	N/A	N/A
L00 GN WC	N/A	N/A
L00 GN WC	N/A	N/A
L00 PAVA	N/A	N/A
L00 Post Room	N/A	N/A
L00 Gym	N/A	N/A
L00 Security	NO (-68.4%)	YES
L01 Acc WC	N/A	N/A
L01 GN WC	N/A	N/A
L01 GN WC	N/A	N/A
L01 GN WC	N/A	N/A
L01 GN WC	N/A	N/A
L01 GN WC	N/A	N/A
L01 Male WC	N/A	N/A
L01 Female WC	N/A	N/A
L01 Office	NO (-92.2%)	NO
L01 Office Perim South	NO (-71.6%)	YES
L01 Office Perim West	NO (-70.4%)	YES
L00 Office	NO (-93.2%)	NO
L00 Office Perim	NO (-70.3%)	YES
L00 Health Centre	NO (-85%)	NO
L00 Health Centre Perim East	NO (-55.2%)	YES
L00 Health Centre Perim South	NO (-66.6%)	YES
L00 Health Centre Perim West	NO (-61.8%)	YES
L02 Acc WC	N/A	N/A
L02 GN WC	N/A	N/A
L02 GN WC	N/A	N/A
L02 GN WC	N/A	N/A
L02 GN WC	N/A	N/A
L02 GN WC	N/A	N/A
L02 Office	NO (-92%)	NO
L02 Office Perim South	NO (-71.2%)	YES
L02 Office Perim West	NO (-69.9%)	YES
L02 Office	NO (-93.5%)	NO
L02 Office Perim East	NO (-71.2%)	YES
L02 Office Perim North	NO (-84%)	YES
L01 Office	NO (-93.6%)	NO
L01 Office Perim East	NO (-73.2%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L01 Office Perim North	NO (-87.2%)	YES
L03 Acc WC	N/A	N/A
L03 GN WC	N/A	N/A
L03 GN WC	N/A	N/A
L03 GN WC	N/A	N/A
L03 GN WC	N/A	N/A
L03 GN WC	N/A	N/A
L03 Office	NO (-92%)	NO
L03 Office Perim South	NO (-71.3%)	YES
L03 Office Perim West	NO (-70%)	YES
L03 Office	NO (-93.4%)	NO
L03 Office Perim East	NO (-70.8%)	YES
L03 Office Perim North	NO (-82.7%)	YES
L04 Acc WC	N/A	N/A
L04 GN WC	N/A	N/A
L04 GN WC	N/A	N/A
L04 GN WC	N/A	N/A
L04 GN WC	N/A	N/A
L04 GN WC	N/A	N/A
L04 Office	NO (-91.9%)	NO
L04 Office Perim South	NO (-70.5%)	YES
L04 Office Perim West	NO (-69.8%)	YES
L04 Office	NO (-93.3%)	NO
L04 Office Perim East	NO (-70.7%)	YES
L04 Office Perim North	NO (-81.4%)	YES
L05 Acc WC	N/A	N/A
L05 GN WC	N/A	N/A
L05 GN WC	N/A	N/A
L05 GN WC	N/A	N/A
L05 GN WC	N/A	N/A
L05 GN WC	N/A	N/A
L05 Office	NO (-91.8%)	NO
L05 Office Perim South	NO (-70.8%)	YES
L05 Office Perim West	NO (-69.8%)	YES
L05 Office	NO (-93.2%)	NO
L05 Office Perim East	NO (-70.7%)	YES
L05 Office Perim North	NO (-79.2%)	YES
L06 Acc WC	N/A	N/A
L06 GN WC	N/A	N/A
L06 GN WC	N/A	N/A
L06 GN WC	N/A	N/A
L06 GN WC	N/A	N/A
L06 GN WC	N/A	N/A
L06 Office	NO (-91.7%)	NO
L06 Office Perim South	NO (-70.4%)	YES
L06 Office Perim West	NO (-69.9%)	YES
L06 Office	NO (-93%)	NO
L06 Office Perim East	NO (-70.4%)	YES
L06 Office Perim North	NO (-76.7%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L00 Reception (Desk)	NO (-47.3%)	NO
L00 Reception (Circulation)	NO (-8%)	YES
L02 Male WC	N/A	N/A
L02 Female WC	N/A	N/A
L03 Male WC	N/A	N/A
L03 Female WC	N/A	N/A
L04 Male WC	N/A	N/A
L04 Female WC	N/A	N/A
L05 Male WC	N/A	N/A
L05 Female WC	N/A	N/A
L06 Male WC	N/A	N/A
L06 Female WC	N/A	N/A

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

Separate submission

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

Separate submission

EPBD (Recast): Consideration of alternative energy systems

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

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	19082.3	19082.3
External area [m²]	13488.6	13488.6
Weather	MAN	MAN
Infiltration [m³/hm²@ 50Pa]	2	3
Average conductance [W/K]	4733.15	5795.23
Average U-value [W/m²K]	0.35	0.43
Alpha value* [%]	13.12	10

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

Building Use

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	0.84	0.88
Cooling	3.3	6.58
Auxiliary	10.38	11.01
Lighting	6.99	20.63
Hot water	1.95	3.53
Equipment*	45.38	45.38
TOTAL**	**23.46**	**42.63**

* 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	1.57	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	64.47	97.76
Primary energy* [kWh/m²]	70.22	127.6
Total emissions [kg/m²]	11.1	21.6

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

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	10	66.2	0.8	4	11.8	3.36	4.59	3.36	5.76
	Notional	7	110.9	0.8	8.1	13	2.56	3.79	----	----
[ST] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	0.2	65.9	0	4	10.6	3.36	4.59	3.36	5.76
	Notional	18.9	15.4	2.1	1.1	8.8	2.56	3.79	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	106.1	37.7	7.4	2.3	6	4	4.56	4	6.1
	Notional	90.9	65.3	9.9	4.8	2.1	2.56	3.79	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	0	0	0	0	0	4	4.56	4	6.1
	Notional	0	0	0	0	0	2.56	3.79	----	----
[ST] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	5.3	95.6	0.4	5.8	11.3	3.36	4.59	3.36	5.76
	Notional	33.7	86.2	3.7	6.3	15.8	2.56	3.79	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	0	0	0	0	0	4	4.56	4	6.1
	Notional	0	0	0	0	0	2.56	3.79	----	----
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	22.3	0	1.8	0	7.2	3.36	0	3.36	0
	Notional	45.3	0	4.9	0	3.3	2.56	0	----	----
[ST] Constant volume system (fixed fresh air rate), [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	0.2	21.6	0	1.9	15.2	3.36	3.17	3.36	5.76
	Notional	0.3	13.1	0	1	10.1	2.56	3.79	----	----
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	14.8	0	1.2	0	7.7	3.36	0	3.36	0
	Notional	4.1	0	0.4	0	9.1	2.56	0	----	----
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	18.8	0	1.6	0	1	3.36	0	3.36	0
	Notional	16.2	0	1.8	0	1	2.56	0	----	----
[ST] Other local room heater - unfanned, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	37.2	0	2.6	0	0	4	0	4	0
	Notional	74.3	0	8.1	0	0	2.56	0	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

Key Features

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

Building fabric

Element	U_{i-Typ}	U_{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.15	L000003E:Surf[2]
Floor	0.2	0.1	L0000038:Surf[0]
Roof	0.15	0.1	L000026C:Surf[2]
Windows, roof windows, and rooflights	1.5	1.4	L0000075:Surf[1]
Personnel doors	1.5	2.2	L000003E:Surf[1]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building

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

* There might be more than one surface where the minimum U-value occurs.

Air Permeability	Typical value	This building
$m^3/(h.m^2)$ at 50 Pa	5	2

Energy Performance Certificate

Non-Domestic Building

HM Government

King Street
Blackpool
FY1 1AU

Certificate Reference Number:
4374-2062-9064-0313-1429

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government's website at www.gov.uk/government/collections/energy-performance-certificates.

Energy Performance Asset Rating

More energy efficient

A+

Net zero CO_2 emissions

- A 0-25
- B 26-50
- C 51-75
- D 76-100
- E 101-125
- F 126-150
- G Over 150

Less energy efficient

22 — This is how energy efficient the building is.

Technical information

Main heating fuel:	Grid Supplied Electricity
Building environment:	Air Conditioning
Total useful floor area (m^2):	19082.264
Building complexity:	Level 5
Building emission rate ($kgCO_2/m^2$ per year):	11.06
Primary energy use (kWh/m^2 per year):	70.22

Benchmarks

Buildings similar to this one could have ratings as follows:

43	If newly built
115	If typical of the existing stock

Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

Assessment Software:	Virtual Environment v7.0.13 using calculation engine ApacheSim v7.0.13
Property Reference:	UPRN-000000000000
Assessor Name:	Jack Hopper
Assessor Number:	ABCD123456
Accreditation Scheme:	Information not available
Assessor Qualifications:	NOS5
Employer/Trading Name:	Hannan Associates
Employer/Trading Address:	Beta House, Alpha Gate Drive, Denton, Manchester, M34 3SH
Issue Date:	18 May 2021
Valid Until:	17 May 2031 (unless superseded by a later certificate)
Related Party Disclosure:	Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 0635-5480-9952-9893-1837

About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by Information not available. You can obtain contact details of the Accreditation Scheme at Information not available.

A copy of this certificate has been lodged on a national register as a requirement under the Energy Performance of Buildings Regulations 2012 as amended. It will be made available via the online search function at www.ndepcregister.com. The certificate (including the building address) and other data about the building collected during the energy assessment but not shown on the certificate, for instance heating system data, will be made publicly available at www.opendatacommunities.org.

This certificate and other data about the building may be shared with other bodies (including government departments and enforcement agencies) for research, statistical and enforcement purposes. For further information about how data about the property are used, please visit www.ndepcregister.com. To opt out of having information about your building made publicly available, please visit www.ndepcregister.com/optout.

There is more information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government website at: www.gov.uk/government/collections/energy-performance-certificates. It explains the content and use of this document and advises on how to identify the authenticity of a certificate and how to make a complaint.

Opportunity to benefit from a Green Deal on this property

The Green Deal can help you cut your energy bills by making energy efficiency improvements at no upfront costs. Use the Green Deal to find trusted advisors who will come to your property, recommend measures that are right for you and help you access a range of accredited installers. Responsibility for repayments stays with the property - whoever pays the energy bills benefits so they are responsible for the payments.

To find out how you could use Green Deal finance to improve your property please call 0300 123 1234.