Falconhurst
Energy and Sustainability Statement

boom collective

Falconhurst Estate Energy & Sustainability Statement
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Contents

Executive Summary

This report has been prepared by BOOM Collective to support the planning application for the proposed Falconhurst Wedding Venue development at Markbeech, Kent.

The site, which falls within the Sevenoaks District Council, is in an area of 'outstanding natural beauty' and is currently occupied by a number of residential buildings as well as old dilapidated farm outhouses. The complex is often used as a Wedding Venue, with temporary marquees being erected as required.

This planning application is for the refurbishment of the Old Barn and the adjacent Stables. The proposals are to convert the Old Barn into the 'Wedding Venue' with the adjacent Stables converted into the 'Grooms Accommodation'.

This report has been developed in coordination with the Client and Architect, outlining the proposed Energy Strategy for the development as well as addressing the key Sustainability issues affected by the proposals.

The proposed new development is subject to Building Regulations 2013 Part L2B and In line with Sevenoaks District Council planning polices, is required to achieve a BREEAM Very Good rating as well as a minimum of 10% reduction in CO_2 via on-site renewables.

The energy strategy has been developed in line with the 'Be Lean, Be Clean, Be Green' energy hierarchy whilst the Sustainability strategy responds directly to the Sevenoaks District Councils initiatives and policies.

A renewable appraisal was undertaken at the early stages of design to establish the most appropriate solution considered in terms of technical, practical and economic viability.

A summary of our current proposals to reduce carbon emissions are;

- Improvement on Building Regulations U values
- Air permeability $5m^3/m^2.hr$ @50 Pa
- LED lighting and daylight linked lighting control
- Earth tubes feeding mechanical ventilation
- Mixed Mode ventilation with heat recovery
- Ground Source Heat Pump (GSHP)
- Solar thermal hot water (STHW)
- Best practice or M&E plant and equipment efficiencies
- Extensive sub- metering

A summary of the the key sustainability aspects are;

- Water Saving devices and low flow sanitary fittings
- Permeable paving car park areas allowing sustainable drainage
- Specification of low water use plants in landscaping
- Water-butts to collect rainwater for landscape irrigation
- Specification of A rated materials
- Dedicated recycling and waste storage area

A Sustainability Strategy framework will be maintained and developed through each stage of the design development and construction to ensure compliance with planning requirements and deliver as a minimum, a BREEAM Excellent rated development, in line with the new BREEAM 2014 Non-Domestic Refurbishment and Fit-out Scheme.

With the above energy strategy, combined with a comprehensive sustainability framework we are on track for achieving a;

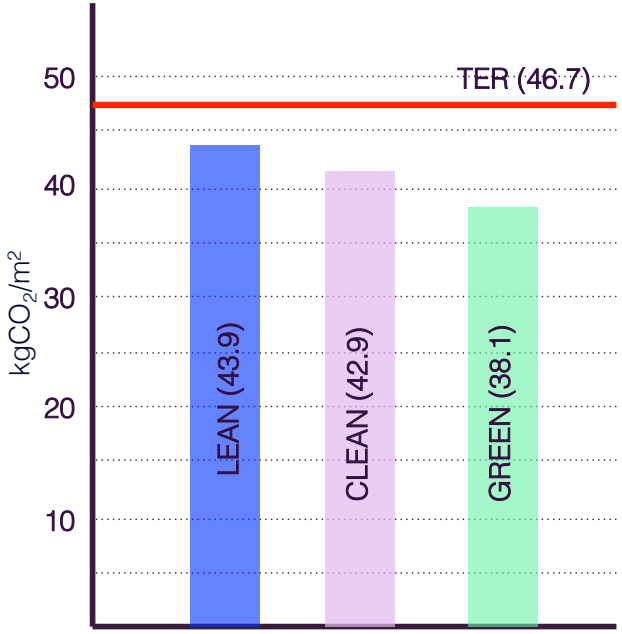
- BREEAM Excellent development
- EPC A rated development
- 10% reduction in CO_2 via on-site renewables
- 18.4% improvement on current Building Regulations (2013)

As well as this, we have allowed for the future adaptability of PV panels and a district heating network, should the client wish to aspire to a BREEAM outstanding building.

A summary of the current carbon savings in line with the Lean, Clean and Green hierarchy are presented in the graph below.

All calculations were undertaken using TAS 9.3.2 dynamic thermal modeling software written by EDSL Ltd.

GRAPH SHOWING $kgCO_2/m^2$
FOR LEAN, CLEAN, GREEN MEASURES



Introduction

This report has been prepared by BOOM Collective to support the planning application for the proposed Falconhurst Wedding Venue development at Markbeech, Kent.

The site is in an area of 'outstanding natural beauty' and is currently occupied by a number of residential buildings as well as old dilapidated farm outhouses. The complex is often used as a Wedding Venue, with temporary marquees being erected as required.

This planning application is for the refurbishment of the Old Barn and the adjacent Stables. The proposals are to convert the Old Barn into the 'Wedding Venue' with the adjacent Stables converted into the Grooms Accommodation.

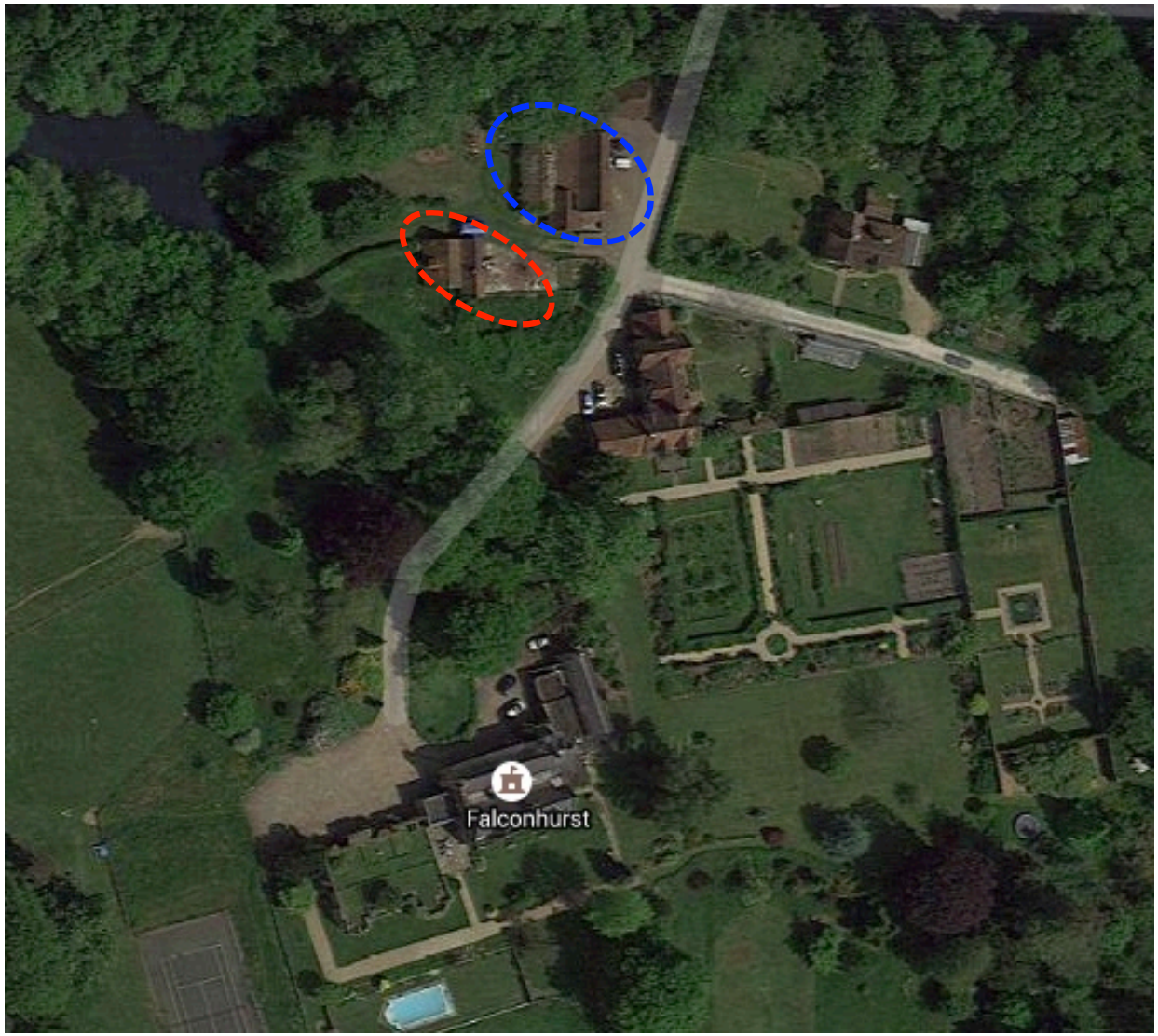
The Energy Strategy for the development has been developed in coordination with the Client and Design Teams led by the Talbot Family and Miller Architects respectively and will achieve compliance with the Sevenoaks District Council planning requirements.

This energy strategy has been developed in line with the London Mayor energy hierarchy for minimising carbon dioxide emissions;

- Be Lean : Use Less Energy
- Be Clean Supply Energy Efficiently
- Be Green Use Renewable Energy

The Old Barn –
to be converted into the Wedding Venue

The Stables –
to be converted into the Grooms Accommodation



Planning Policy Context

Policy SP 2: Sustainable Development

The District will contribute to reducing the causes and effects of climate change by promoting best practice in sustainable design and construction to improve the energy and water efficiency of all new development and contribute to the goal of achieving zero carbon development as soon as possible.

1. New homes will be required to achieve at least Level 3 of the Code for Sustainable Homes, progressing to Code Level 4 from 2013 and Level 6 by 2016.

2. All new commercial (A1-A5, B1-2, B8, C1, D1) and institutional (C2, D1) development, (including conversions) and conversions to residential use will be required to achieve BREEAM "Very Good" standards increasing to "Excellent" standards from 2013 and must include the incorporation of sustainable drainage systems (SUDS).

3. Achievement of the Code levels and BREEAM standards must include at least a 10% reduction in the total carbon emissions through the on-site installation and implementation of decentralised, renewable or low-carbon energy sources.

4. Applicants must submit evidence which demonstrates how the requirements have been met or which demonstrate that compliance is not technically or financially feasible.

5. The District will support and promote the incorporation of de-centralised energy sources including combined heat and power in new development and will support small scale and community-based renewable energy developments that, where relevant, where such development does not adversely affect the openness of the Green Belt and is consistent with AONB (Areas of Outstanding Beauty) policy

* Core Strategy Adopted February 2011

The Sevenoaks District Council Planning Officer has been consulted and has advised that the development should achieve BREEAM Very Good standards and Code level 3 standards, where relevant.

This planning application is for the refurbishment of the Old Barn and the adjacent Stables. The proposals are to convert the Old Barn into the 'Wedding Venue' with the adjacent Stables converted into the Grooms Accommodation.

The development is to be assessed under one environmental assessment, as confirmed by the BRE, and to comply with with the Sevenoaks District Council Policy.

The Wedding Venue and the Grooms accommodation will be assessed under the new BREEAM Non-Domestic Refurbishment and Fit-Out 2014.

Summary of requirements

- BREEAM Very Good
- 10% reduction in CO_2 via on-site renewables

Our Commitment

10% reduction in CO_2 via on-site renewables

BREEAM Excellent

Our Aspirations

- BREEAM Outstanding
- 20% reduction in CO_2 via on-site renewables

Summary of the Energy Strategy

The Environmental Engineering strategy has been developed to provide a quality built environment, focusing on the comfort of the occupants as well as the Whole Life Cost (WLC) considerations of life cycle analysis, value for money, benefits to the environment, and their social impact.

The thermal performance of the building fabric will exceed the current Building Regulations Approval Document Part L2 (2013) and provides an air tightness improvement from 10 to 5 m3/hr/m^2 of building fabric.

A low energy lighting strategy has been adapted, using light emitting diode (LED) technology and low energy fluorescent fittings. Excellent daylight design will allow significant savings through daylight linking control in all spaces. Presence detection control will also contribute significantly in all areas.

A ground source heat pump (GSHP) with a horizontal ground collector array will provide heating and domestic hot water to the Wedding Venue and Grooms Accommodation. A development wide heating system similar to a mini 'district' heating scheme will distribute low temperature hot water (LTHW) from the ground collectors and heat pump, via under-floor heating to the Wedding Venue and the Grooms Accommodation. The main plant room will be located towards the rear of the Wedding Venue. This will form a district network, with a Heat Interface Unit located within the Grooms Accommodation, transferring heat as required.

The primary heating for the Wedding Venue is therefore generated by a Low Zero Carbon Technology (LZCT) source – Clean energy production. A secondary heat source is provided in the form of wood burning stoves located in the wedding ceremony space, the 'chill-out' room and the entrance space in the Wedding Venue, as well as the living space within the Grooms Accommodation.

A mixed mode Ventilation strategy with heat recovery has been adapted for the Wedding Venue.

Natural Ventilation is provided via acoustic louvers, open-able windows, doors and roof lights as required. While Mechanical ventilation is provided via earth-tubes, which then enters the wedding ceremony/dining space via floor trenches.

A Mechanical Ventilation Heat Recovery (MVHR) unit is located in the ceiling void of the Woman's WC space. Clean Fresh air is continuously drawn into the building via a mechanical ventilation grille, while stale air is continuously extracted from the wedding ceremony and moisture producing areas such as kitchen and bathrooms. Clean fresh air passes through the filter inside the MVHR unit and is pre-heated using the heat recovered from the extract. Pre-heated supply air is delivered continuously into the wedding ceremony via the floor trenches. The stale moisture laden contaminated air is extracted to the atmosphere via the exhaust grille located at the rear of the building.

The Entrance space and Chill-out room within the Wedding Venue, are natural ventilated via open-able windows and roof lights.

The Grooms Accommodation is ventilated via Mechanical Ventilation with heat Recovery also.

The ground source heat pump system is extended to provide the domestic hot water heat generation via VRV hyrdo-box heat exchangers. There is also the provision for roof mounted solar thermal panels to help with the domestic hot water load.

A provision has been made for the future adaptability of PV panels on the inward facing roof surfaces of the Wedding Venue. There is also a provision for extending the district network should they be required.

Be Lean – Passive Energy Savings

Although the Falconhurst complex does not fall within the London Borough Council, we have adapted the London Mayor's "Be Lean, Be Clean, Be Green" Energy Hierarchy approach to developing the Energy Strategy.

In keeping with the 'Be Lean' step, there are a number of passive energy saving measures being applied to the Wedding Venue complex , with the purpose of minimising energy use. These are sometimes referred to as 'Energy Efficiency Measures' (EEM).

Building Fabric

The thermal performance of the building fabric will exceed the current Building Regulations Approval Document Part L2 (2013) and provides an air tightness improvement from 10 to 5 $m^3/hr./m^2$ of building fabric.

Building Element	U-Value (W/m^2K)	G-value
External walls	0.28	
Roof	0.18	
Ground Floor	0.2	
Windows	1.6	0.45
Roof Lights	1.1	0.4
Window frames	1.6	

The above measures contribute to approximately 2 % reduction in carbon emissions of the Wedding Venue.

Day lighting and low energy lighting

A low energy lighting strategy has been adapted, using light emitting diode (LED) technology and low energy fluorescent fittings. Good levels of daylight will be targeted for a minimum of 80% of all occupied spaces in line with BREEAM requirements. This will allow significant saving in artificial lighting via daylight linking control; especially in the main ceremony/dining space. Presence detection control will also contribute to energy reduction through the complex.

The above measures contribute to approximately 3 % reduction in carbon emissions of the Wedding Venue.

Earth-tubes

Because the earth is at a constant temperature of around 10-12°C at greater than 5m depth, passing air underground provides free pre-warming of air in winter and pre-cooling during the summer, thereby reducing the need for active heating and cooling plant. In summer air can be cooled from 28°C down to around 24-25°C, while in winter air can be warmed from below zero to around 3°C.

Our strategy includes for 8nr. 24m ground tubes, buried at a minimum depth of 2m and separated by 1-2 m to allow heat dissipation. The tempered air then enters the Wedding venue ceremony space via floor trenches lining the perimeter of the space.

The above measures contribute to approximately 1 % reduction in carbon emissions of the Wedding Venue.

M & E plant Efficiencies

Mechanical and electrical plant and equipment will be specified to have 'best practice' or better energy efficiencies in keeping with the achievement of a BREEAM 'Excellent' development.

The Wedding Venue Complex will benefit from the extensive sub-metering of power and water distribution systems, allowing facilities and energy management personnel to monitor trends in use and take any necessary remedial action when uncontrolled energy use is detected.

Be Clean – Energy Recovery

Where energy is being used it is important to do so with optimal efficiencies. In keeping with the The 'Clean' step of the Mayor's Energy Hierarchy relates to recovering waste energy.

This is a wider approach than simply considering a CHP plant, but also covers areas where small amounts of energy are spent to recover waste heat or energy to form the 'Low Carbon' element of LZC Technology.

CHP was considered not viable for the site as there is no mains gas supply.

Heat Recovery Ventilation

Mechanical Ventilation Heat Recovery systems work by combining supply and extract in one unit. Moisture-laden, stale air is extracted from 'wet' areas, such as kitchens and bathrooms. The heat from this stale air is recovered via a heat exchanger (achieving approximately 70% heat recovery) , and this tempered air delivered into the ceremony/dining space.

The central fresh air supply and exhaust units are to be located in the ceiling void of the woman's WC within the Wedding venue and another in the Grooms Accommodation.

The above measures contribute to approximately 2 % reduction in carbon emissions of the Wedding Venue.

District Heating Network

A development wide heating system similar to a mini 'district' heating scheme will distribute low temperature hot water (LTHW) from the ground collectors and heat pump, via under-floor heating. The main plant room will be located towards the rear of the Wedding Venue. This will form a district network, with a Heat Interface Unit located within the Grooms Accommodation, transferring heat as required.
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Be Green – Renewable Energy

The utilisation of the Lean and Clean approach allows the project to minimise the reliance on the fossil fuelled energy infrastructure. Once the energy use has been minimised, the CO_2 emissions can be reduced further through de-carbonised supplies and onsite 'renewable energy' solutions – 'Being Green'.

Ground Source Heat Pump

Ground source heat pumps (GSHPs) use pipes which are buried in the ground to extract heat from the earth. This heat will then be used to provide low grade heat for under-floor heating and domestic hot water throughout the Wedding Venue complex.

A ground source heat pump (GSHP) combined with a horizontal ground collector array will be utilised as the primary heating source of the wedding venue.

It has been calculated that 20nr. trenches at 100m coils of 40mm diameter pipe, combined with a 90kW heat pump will be required to meet the heating load of the Wedding Venue Complex.

The trenches should have 5m centres and are approximately 1.8m deep. The total area required for the ground collectors is 2000m^2. The field adjacent to the wedding venue complex has been identified as suitable for the ground collectors.

The above measures contribute to approximately 9 % reduction in carbon emissions of the Wedding Venue.

Solar Thermal Collectors

Solar thermal systems use the energy from the sun to provide for the requirements of the hot water provision in the building.

Our strategy includes for approximately 14m^2 of solar thermal collectors. These are to be located on the inwards facing roof above the WC area of the Wedding Venue.

The above measures contribute to approximately 1 % reduction in carbon emissions of the Wedding Venue.

The technologies below are not currently included within the strategy. However a provision has been made for their future adaptability should the client wish to should the client wish to further the Complex' credentials and aspire for BREEAM Outstanding.

Polycrystalline Photo Voltaic (Pv) Cells

A provision has been made for Photo Voltaic (PV) cells to be located on the inward facing roof surfaces only of the Wedding Venue.

The extent of coverage on the roof will be a function of final engineering calculations to ensure the required energy and BREEAM targets are achieved.

District Heating Network

A provision has been made for further extending the heating network should the client wish to further the extent of refurbishment works on the Falconhurst site as a whole.

Energy Modelling Approach

The calculation methodology for presenting carbon emission reduction draws on the approach set out by the London Plan Policy 5.2 (Minimising Carbon Dioxide Emissions) of the London Plan.

It is a hierarchical approach with four sequential steps;

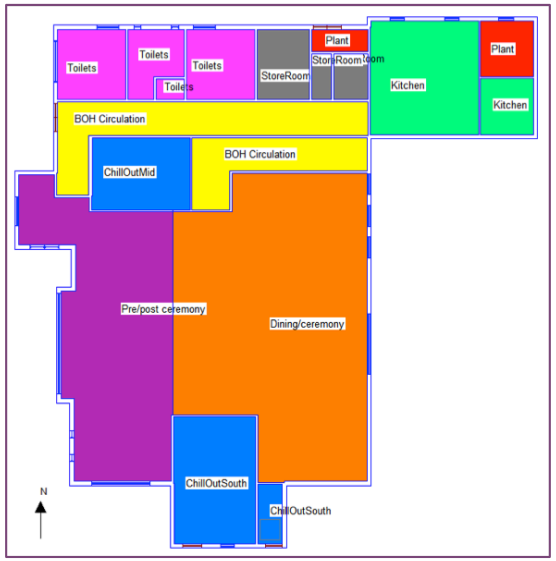
- Establish baseline (Part L compliance)
- Evaluate energy efficiency measures (Lean)
- Evaluate heating and cooling system (Clean)
- Evaluate renewable energy technologies (Green)

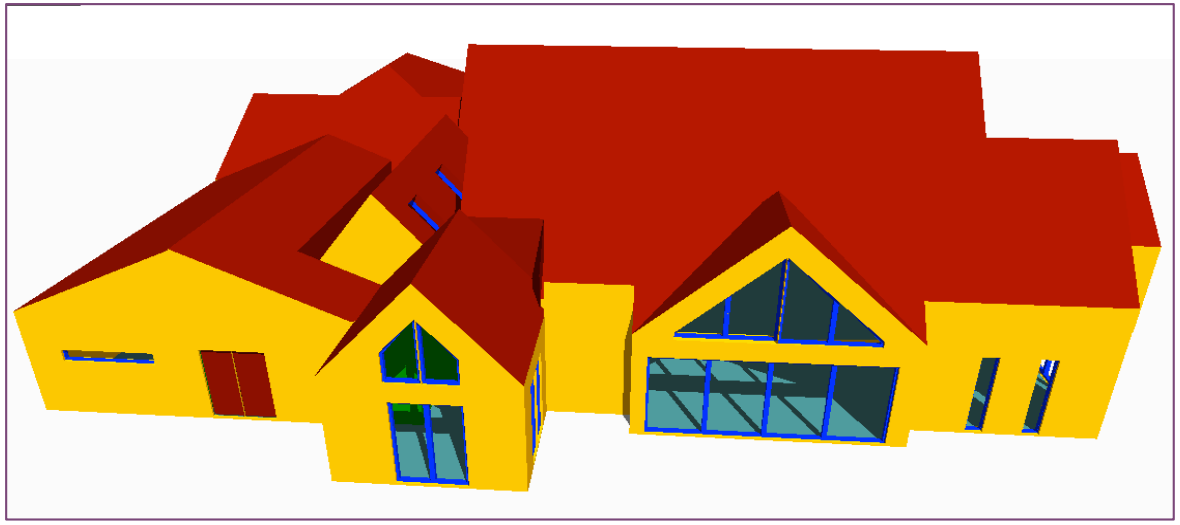
This energy strategy has been developed using TAS 9.3.2 dynamic thermal modeling software written by EDSL Ltd. A notional building is developed; this has the same size, shape and zoning arrangements as the actual building. The insulation levels and HVAC efficiencies in the notional building are identical to the Part L reference building

The model has been developed based on detailed consultation with the client on how the Wedding Venue is intended to operate, as well as industry standard best practice guidelines.

All results are based on the output from the computer modeling (unless otherwise stated) and should be taken as an indication of the likely final solution.

The following images are taken of the 3D model and attempt to show the full geometry. As with any modelling exercise, some approximations have to be made, but care has been taken to ensure the scale and internal dimensions of the model are as close as practicable to the design drawings, and that all glazing areas are accurately represented.





Energy Modelling Results

Energy Model Results

The outcome of this modelling confirms the following:

- The development has a notional building target energy rating (TER) of 46.7 $kgCO_2/m^2$ per annum.
- The actual building energy rating (BER) for the scheme proposed is 38.1 $kgCO_2/m2$

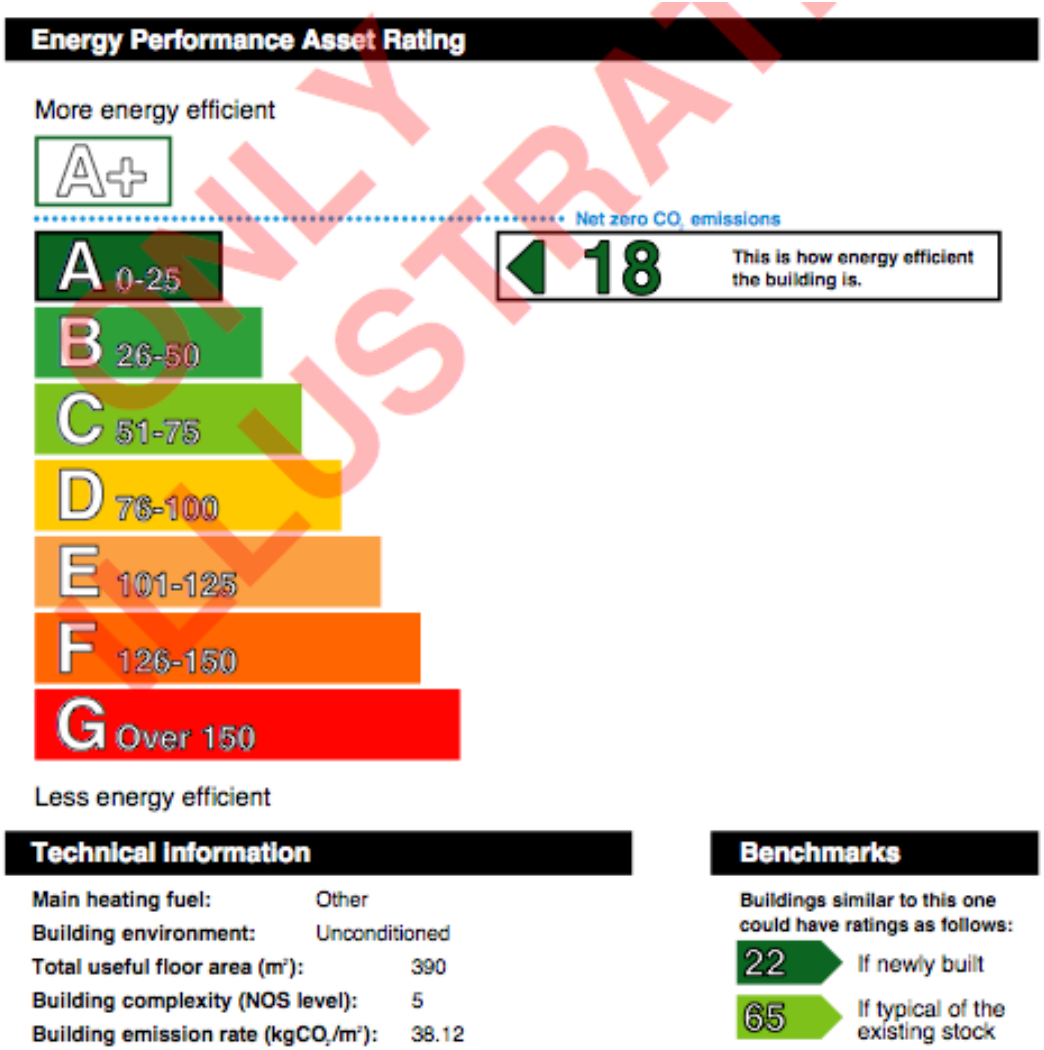
Energy Performance Certificate

The preliminary Energy Model Certificate (EPC) results, based on current targets, suggest the building will obtain an EPC A Rating with a Carbon Index of less than 25.

It is important to note that this A rating is based on current Building Regulations and current software. Should there be any changes in legislation and/or EPC registration, the criteria for meeting these levels of certification will change, together with the calculation methodology.

This means that a design that obtains a preliminary 'A' rating now, may only obtain a B or a C rating in the future, without undertaking any material changes – the benchmark level will have been moved to ensure the scheme keeps inline with 'Good Practice'.

EPC A rated



Energy Modelling Results

CO_2 emissions after each stage of the energy hierarchy

Following on from our 'Be Lean, Be Clean, Be Green' methodology, the table below indicates the % percentage reduction achieved for each step, when compared against the Building Regulations Part L Target Emission Rates.

	CO_2 emissions ($kgCO_2$/annum)
	Regulated Energy
Building Reg 2013 **(TER)**	**46.7**
Be Lean	43.85
Be Clean **(BER)**	**42.96**
Be Green	38.11

The above table describes the results of the energy modelling undertaken and shows that a 18% reduction in carbon emissions from 2013 Building Regulations is achieved by incorporating Lean and Clean measure combined with the Ground Source Heat Pump and Solar thermal Hot Water.

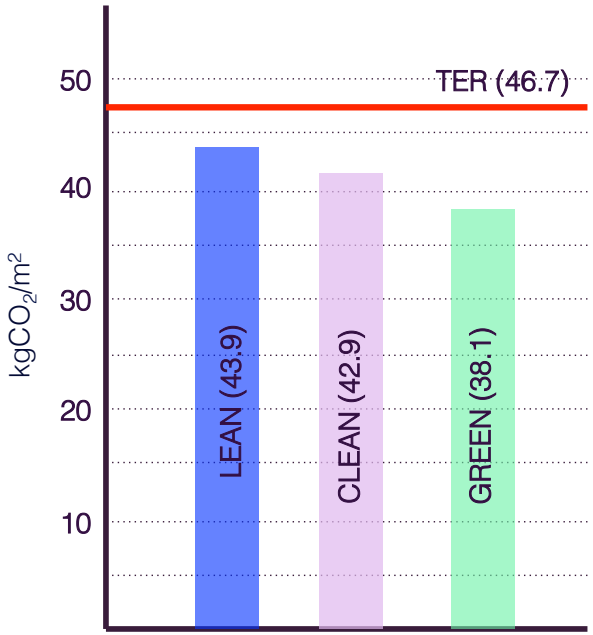
The provision for PV arrays has also been included for to allow for future adaptability of the Wedding Venue should the client wish to further the environmental credentials and achieve BREEAM Outstanding.

Regulated CO_2 savings from each stage of the energy hierarchy

	CO_2 emissions ($kgCO_2$/annum)	
	($kgCO_2$/ annum)	% Reduction
Savings from being Lean	2.85	6.1
Savings from being Clean	**0.89**	1.9
Savings from being Green	4.86	10.4

The below graph demonstrates the total CO2 emissions per annum saved through the Mayor's Energy Hierarchy approach.

GRAPH SHOWING $kgCO_2/m^2$ FOR LEAN, CLEAN, GREEN MEASURES



10.4 % reduction in CO_2 via on-site renewables

18.4 % improvement on current Building Regulations (2013)

Sustainability

The UK has a progressive vision to become a world leader in improving the environment locally and globally, taking the lead in tackling climate change, reducing pollution, developing a low carbon economy, consuming fewer resources and using them more effectively.

We are committed to closely adhering to this vision in the design of the project Falconhurst Wedding Venue development.

To deliver a truly sustainable project it is essential to meet its unique environmental, social and economic considerations.

The Falconhurst Wedding Venue complex Lane is situated in an area of Outstanding Natural Beauty. The basis of the redevelopment is the re-use of redundant agricultural barns using sustainable materials to create a venue for weddings ceremonies and receptions. The project therefore will endeavour to improve the buildings' contribution to community by finding a viable use – namely a Wedding Venue - thereby improving the local economy and employment potential.

Environmental improvements will endeavour to minimise the buildings' whole life use of energy, water, and materials and minimise the creation of waste. Other vital considerations are the incorporation of renewables and economic factors such as whole life costing, asset values and building flexibility for future needs.

The Wedding Complex will seek to deliver a more sustainable outcome; because minimising energy, water and waste, making occupants comfortable and happy in their built environment, investing in reduced operational costs through improved life cycle has all become more desirable to the customers/ visitor as well as the to create a legacy of sustainable operation for the life of the building makes clear business sense.

Summary of Sustainability Strategy

This Sustainability Strategy framework will be maintained and developed through each stage of the design development and construction to ensure compliance with planning requirements and deliver a BREEAM Excellent rated Wedding Venue development, in excess of the Sevenoaks District Council planning requirements.

The Sustainability Strategy that follows responds directly to the Sevenoaks District Planning initiatives and policies, setting out imaginative and innovative means of delivering the Wedding Venue Complex , within its strategic framework.

Materials and Waste

Materials

Current proposals include for retaining existing facades and structure. The outline specification for new build elements is largely timber, slate roof and sheep's wool for insulation. Initial analysis indicates Green Guide ratings between A and D will be achieved and the current target is 4/6 BREEAM credits for this issue. Recycled Aggregates will also be included where feasible.

All materials will be selected with environmental impact considered alongside functionality, aesthetics and durability. The procurement of materials will be sourced in a responsible way and have a low embodied impact over their life.

Waste Self-sufficiency

The development, with its kitchen facility will inevitably produce biodegradable waste and has plans to dispose of it appropriately, avoiding landfill. Recycling will be integral to the Wedding Venue with special containers and sorting facilities to make waste management simple and quick.

Waste Capacity

On completion of the development, recycling will be encouraged through the provision of adequate storage for recyclable materials in line with the BREEAM requirements and Sevenoaks District Planning requirements.

The Grooms accommodation will also have a dedicated internal waste and recycling area to encourage waste conscious behaviour.

Site Waste Management

The appointed contractor will be responsible for producing a Site Waste Management Plan to include;

- A target benchmark for resource efficiency;
- Procedures and commitments for minimising non-hazardous construction waste;
- Waste minimisation actions relating to at least 3 key waste groups and recording decisions taken;
- Procedures for minimising hazardous waste;
- Procedures for sorting, reusing and recycling construction and demolition waste either on site or using a licensed external contractor;
- Procedures for measuring the amount of construction and demolition waste diverted from landfill;
- License details for the waste carrier, and permit details for the site the waste is taken to, if waste is removed offsite; and
- The name or job title of the individual responsible for implementing the above.

The appointed demolition contractor will produce a pre-demolition audit and demonstrate how at least 85% of materials by weight can be reused and recycled units.

Waste will be reduced and diverted from landfill where possible, considering any waste arising from refurbishment work and from the operation of the completed development.

The proposed development will be procured using best practice in sustainable procurement. This includes providing adequate training to the end owner on handover to ensure efficient and effective operation of the building from day one.

Energy and water consumption data will be recorded over the first 12 months of occupation in order to help optimise the operation of the building during initial occupation.

Water and Drainage

Water use and Supplies

To achieve a low environmental impact, water systems will be designed, used and managed efficiently, saving water and reducing associated energy and CO_2 emissions.

Risk of water borne contamination in the building services will be minute while providing a continuously supply of clean, fresh water throughout the Wedding Venue Complex.

The Complex will benefit from the extensive sub- metering of water distribution systems, allowing facilities management personnel to monitor trends in use and take any necessary remedial action when uncontrolled use is detected.

Low flow sanitary fittings, e.g.. Dual flush toilets and low flow showers, will be fitted throughout the complex, in line with achieving 3/5 credits under BREEAM Wat 1.

Grey water recycling is not considered viable for the development, while rainwater will be harvested in the water butts and then used for plant irrigation.

Flood Risk Management

There are no watercourses in close proximity to the site, which is located on the ridge of a hill, therefore the site is considered to be at low risk of flooding. A detailed Flood Risk Assessment (FRA) can be undertaken at the next stage of design if required.

Sustainable Drainage

Surface water drainage management will be designed into the scheme since such techniques can mitigate many of the adverse effects of urban storm water runoff, reduce runoff volumes and rates and improve run off quality. Techniques that will be implemented for the Falconhurst Complex are:

- Source control techniques
- Pre-treatment systems
- Permeable paving for car parks
- Rainwater harvesting systems via water butts

No materials will be used in the proposed refurbishment that could cause pollution to surface run-off, groundwater, watercourses or areas of open water.

Water Course Pollution

All surface water will be directed into existing connections with the main sewer. The car parking area will have permeable pavement which can also act as a storage system but will require lining to prevent groundwater contamination.

Pollution

Air Pollution

A ground source heat pump (GSHP) is to be utilised as the primary heating energy source, eliminating flue gas emissions associated with the building's heating and therefore indirectly improving the local air quality.

All air intakes have been carefully positioned in line with BREEAM requirements, at least 20m from the kitchen extract chimney and at least 10m form the all general extract, so to prevent cross contamination of air. As well as this, the kitchen extract chimney has been located at least 1m above any open able roof lights and other air intakes.

An Environmental Management Plan will be prepared and implemented during the demolition and construction phase of . This will contain site specific measures to minimise the risk of dust causing a nuisance at nearby properties. Additionally, the appointed Contractor will be required to sign up to the national Considerate Constructors Scheme.

A proactive approach to the minimisation of dust during the construction phase will be implemented. Appropriate methodologies will be employed to limit the levels of dust emitted from site activities. This will include damping down structures during demolition; sheeting lorries before they leave the Site; and using construction solutions that avoid working methods that could generate excessive dust.

The number of car parking spaces have been limited so to help reduce the increase in disturbance, air pollution and noise pollution from traffic.

Noise Pollution

The proposed development at Falconhurst Wedding Complex will be designed so that its activities and building services plant and equipment do not in any way increase the noise environment of the immediate surrounding areas.

An initial assessment has been made of the noise emissions from proposed M&E plant installations. Target noise criteria have been proposed based on the measured ambient noise levels, guidelines by the World Health Organisation and BREEAM.

The assessment confirms that it will be possible to comply with the noise emissions limits with the incorporation of standard mitigation measures such as attenuators and acoustic screens.

The venue proposes to use a fixed install sound system which will be optimised and designed to provide even sound coverage throughout the venue and allow limiting of the system if necessary.

Further detail can be found with in the Noise Assessment Report.

Light Pollution

All external lighting will be specified with low energy fittings and dusk to dawn sensors and / or timers to reduce energy use. The design and installation of all light fittings will be in line with best practice and relevant guidance documents, including, but not limited to:

- ILE Guidance Notes for the Reduction of Obtrusive Light 2005;
- ILE Technical Report 5 – Brightness of Advertising Signs; and
- BS5489 Part 1 – 2003 Code of Practice for the Design of Road Lighting (and associated documents). Non-essential external lighting will be automatically switched off between 23:00 and 07:00

Land and Ecology

Local surroundings and Character

The Falconhurst site is located in an area of 'Outstanding Natural Beauty' and therefore all of the proposed works will be in line with Sevenoaks District Council Conservation area policies. All new materials will be selected in keeping with those existing on site and any new technologies will be discrete and not impose on the existing surroundings.

Habitats and Wildlife

All existing features of ecological value within and surrounding the refurbishment and site boundary area will be adequately protected from damage during clearance, site preparation and refurbishment activities.

The appointed contractor will be required to appoint a Biodiversity champion and adhere to any ecological protection measures recommended by the relevant specialist

All measures will be taken to encourage bat roasting and minimise disturbance to existing bats during the proposed works.

A bat survey was undertaken on all the farm buildings across the complex, to identify evidence of use by and the potential for use by bats. The survey revealed that as well as most of the buildings having good potential to support bat roasts, there was some evidence of bats in a number of the farm buildings, including the proposed Wedding Venue. The ecologist has proposed detailed information on roast provision by way of mitigation and timing of the proposed works. Full details can be found in the Bat Survey report.

The ecologist has also provided a detailed mitigation strategy to minimise impact to any reptiles and great crested newts. Full details can be found in the Reptile and Great Crested Newt report.

Landscaping

There is no potential to incorporate green roofs within the scheme, however all landscaping will be of low maintenance and low water use. Rainwater will be harvested via water butts located within the landscaping and used for irrigation.

BREEAM

BREEAM Non-Domestic Scheme

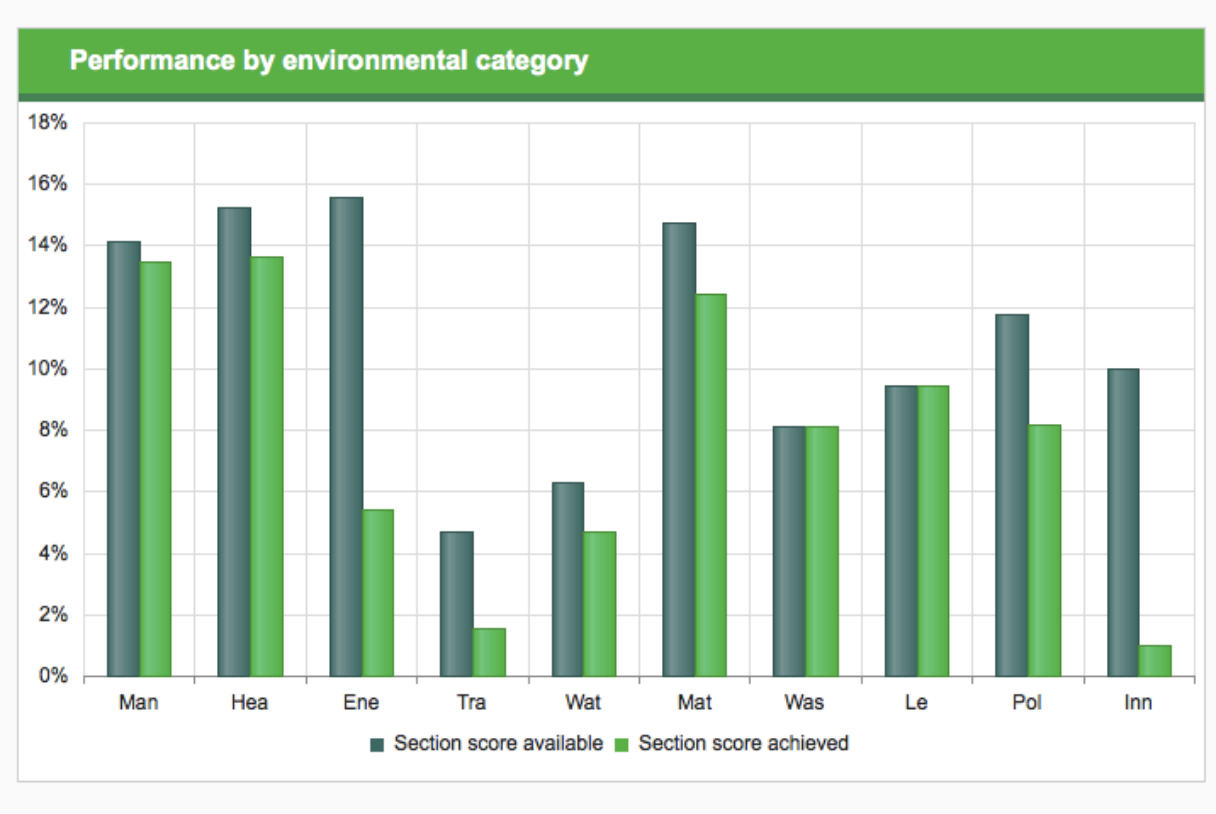
The Falconhurst Wedding Venue Complex is to be assessed under the new BREEAM 2014 UK Non-domestic Refurbishment and Fit-out scheme.

The new BREEAM Non-domestic scheme has been tailored to take account of the challenges of improving existing buildings ensuring projects are assessed against the issues that each project can reasonably be expected to influence and not on factors outside of their control.

The scheme's flexibility derives from a new four part modular approach, giving a range of certification options.

Part One deals with the building fabric and structure, Part Two is concerned with core services (e.g. centralised M&E plant), Part Three deals with local services and Part Four with interior design. Refurbishment and fit-out projects can be assessed against one or all of the four parts, or any combination, depending on which are relevant to a particular project.

A route to achieving the BREEAM Excellent with a score of 74.09% has been identified for the Wedding Venue Complex, while all pre-requisites and minimum standards for BREEAM Excellent have been addressed and are considered achievable on site. As well as this, a route to achieve BREEAM Outstanding has also been identified.



BREEAM

Minimum Standards

To achieve a particular level of performance the majority of BREEAM credits can be traded, i.e. non-compliance in one area can be off-set through compliance in another to achieve the target BREEAM rating.

However, to ensure that performance against fundamental environmental issues is not overlooked in pursuit of a particular rating, BREEAM sets minimum standards of performance in key areas, e.g. energy, water, waste etc. It is important to bear in mind that these are minimum acceptable levels of performance and in that respect they should not necessarily be viewed as levels that are representative of best practice for a BREEAM rating level.

To achieve a particular BREEAM rating, the minimum overall percentage score must be achieved and the minimum standards, detailed in the table across, applicable to that rating level complied with. The required minimum standards also vary depending upon the applicable assessment parts, in order to reflect the potential influence a project may have over achievement of the minimum standards, given a project types scope of works.

BREEAM Targets

The following framework outlines our route to achieving the BREEAM Excellent. The framework also outlines a route to achieving BREEAM outstanding should the Client wish to further the green credentials of the Wedding Complex.

BREEAM Excellent

BREEAM issue Minimum standards by BREEAM rating level					
	Pass	**Good**	**Very Good**	**Excellent**	**Outstanding**
Man 03: Responsible construction practices	None	None	None	One credit (Considerate construction)	Two credits (Considerate construction)
Man 04: Commissioning and handover	None	None	None	Criterion 9 (Building User Guide)	Criterion 9 (Building User Guide)
Man 5: Aftercare	None	None	None	One credit (Seasonal commissioning	One credit (Seasonal commissioning)
Ene 01: Reduction of energy use and carbon emissions	None	None	None	Five credits	Eight credits
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 materials	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
LE 03: Minimising impact on existing site ecology	None	None	One credit	One credit	One credit

Appendix A

BREEAM 2014 Non-Domestic Refurbishment
Falconhurst Wedding Complex

BREEAM Very Good ≥ 55%

BREEAM Excellent ≥ 70%

Outstanding	Excellent	Very Good
86.67	74.09	59.33
Credits on-top of Excellent	Credits on-top of Very Good	

Credit Ref.	Credit Title	Evid. Ref.	Evidence Description	Credits available	Route to Outstanding	Route to Excellent	Route to Very Good	Credit requirements	Responsibility
Management									
Man 1	**Project Brief and Design**	**Man 1.1**	**Stakeholder Consultation (Project Directory)**	1	1	1	1	**One credit – Stakeholder consultation (project delivery)** A clear sustainability brief is developed prior to Concept Design which sets out: Client requirements e.g. internal environmental conditions required Sustainability objectives and targets including target BREEAM rating, business objectives etc. Timescales and budget List of consultees and professional appointments that may be required e.g. Suitably Qualified Acoustician etc. Constraints for the project e.g. technical, legal, physical, environmental. **One credit - Stakeholder consultation (third party)** Prior to completion of the Concept Design stage, all relevant third party stakeholders have been consulted by the design team and this covers the minimum consultation content (see compliance note CN3). The project must demonstrate how the stakeholder contributions and outcomes of the consultation exercise have influenced or changed the Initial Project Brief and Concept Design. Prior to completion of the detailed design (RIBA Stage 4, Technical Design or equivalent), consultation feedback has been given to, and received by, all relevant parties. **One credit - Sustainability Champion (design)** A Sustainability Champion has been appointed to facilitate the setting and achievement of BREEAM performance targets for the project. The design stage Sustainability Champion is appointed to perform this role during the feasibility stage (Stage 1, Preparation and Brief stage, as defined by the RIBA Plan of Work 2013 or equivalent). **One credit - Sustainability Champion (monitoring progress)** The Sustainability Champion criteria 9, 10 and 11 have been achieved. A Sustainability Champion is appointed to monitor progress against the agreed BREEAM performance target(s) throughout the design process and formally report progress to the client and design team.	**Project Manager**
		Man1.2:	**Stakeholder Consultation (third Party)**	1	1	1	0		
		Man1.3:	**Sustainability Champion (design)**	1	1	1	0		
		Man1.4:	**Sustainability Champion (Construction)**	1	1	1	0		

BREEAM 2014 Non-Domestic Refurbishment
Falconhurst Wedding Complex

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Man 2	**Life Cycle Cost and Service Planning**	**Man 2**	**Elemental Life Cycle Cost (LCC)**	4	4	2	0	**Two credits - Elemental life cycle cost (LCC)** An elemental life cycle cost (LCC) analysis has been carried out at Process Stage 2 (equivalent to Concept Design - RIBA Stage 2) together with any design option appraisals in line with 'Standardised method of life cycle costing for construction procurement' PD 156865:20081. The LCC analysis shows: An outline LCC plan has been undertaken for the project based on the building's basic structure and envelope, appraising a range of options and based on the life expectancy of the refurbished building, e.g. 20, 30, 50+ years. The servicing strategy for the project outlining services component over a 15 - year period, in the form of an 'elemental LCC Plan'. A fit-out strategy is developed outlining fit-out options over a 10-year period. **One credit - Component level LCC Plan** A component level LCC plan has been developed by the end of Process Stage 4 (equivalent to Technical Design – RIBA Stage 4) in line with PD 156865:2008 and includes the relevant component types. Where carrying out a major refurbishment covering all parts of the scheme, a component level LCC plan shall be developed as above. Demonstrate, using appropriate examples provided by the design team, how the component level LCC plan has been used to influence building and systems design/specification to minimise life cycle costs and maximise critical value. **One credit - Capital cost reporting** Report the capital cost for the refurbishment/fit-out works in pounds per square metre (£k/m2 via the BREEAM Assessment Scoring and Reporting tool.	**Specialist**

BREEAM 2014 Non-Domestic Refurbishment
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Man 3	**Responsible Constructions Practices**	**Preq.**	**All timber legally sourced**		YES	YES	YES	The principal contractor operates an environmental management system (EMS) covering their main operations. - The principal contractor implements best practice pollution prevention policies and procedures on-site in accordance with Pollution Prevention Guidelines, Working at construction and demolition-sites: PPG61. - A Sustainability Champion is appointed to monitor the project to ensure ongoing compliance with the relevant sustainability performance/process criteria - the contractor significantly exceeds 'compliance' with the CCS - Monitor and record data on principal constructor's and subcontractors' 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. - . Monitor and record data on principal constructor's and subcontractors' potable water consumption (m3) arising from the use of construction plant, equipment (mobile and fixed) and site accommodation. **Exemplary level criteria** Achieve more than 35/50 in CCS.	**Contractor**
		Man 3.1	**Environmental Management Plan**	1	1	1	1		
		Man 3.2	**Constructions Site sustainability Champion**	1	1	1	1		
		Man 3.3	**Considerate Constructions**	2	2	2	2		
		EXEMPLAR	**Considerate Construction**	1	1	0	0		
		Preq.	**Monitoring of Constructions Site Impact (Criterion 7)**		YES	YES	YES		
		Man 3.5	**Utility Consumption (water and energy)**	1	1	1	1		
		Man 3.6	**Transport of Construction materials and Waste**	1	1	1	0		

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Man 4	**Commissioning and Handover**	**Man 4.1**	**Commissioning and testing schedule and responsibilities**	1	1	1	1	**One credit - Commissioning and testing schedule and responsibilities** 1. A schedule of commissioning and testing that identifies and includes a suitable timescale for commissioning and re- commissioning of all complex and non-complex building services and control systems and testing and inspecting building fabric. 2. all in accordance as current Building Regulations, BSRIA1 and CIBSE2 guidelines and/or other appropriate standards, where applicable. 3. An appropriate project team member(s) is appointed to monitor and programme pre-commissioning, commissioning, testing and, where necessary, re-commissioning activities on behalf of the client. 4. The principal contractor accounts for the commissioning and testing programme, responsibilities and criteria within their budget and main programme of works, allowing for the required time to complete all commissioning and testing activities prior to handover. **One credit - Commissioning building services** 5. The commissioning and testing schedule and responsibilities credit is achieved. 6. For buildings with complex building services and systems, a specialist commissioning manager is appointed during the design stage (by either the client or the principal contractor) with responsibility for: a. Undertaking design reviews and giving advice on suitability for ease of commissioning. b. Providing commissioning management input to construction programming and during installation stages. c. Management of commissioning, performance testing and handover/post-handover stages. Where there are simple building services, this role can be carried out by an appropriate project team member (see criterion 3), provided they are not involved in the general installation works for the building services system(s). **One credit - Testing and inspecting building fabric** Projects where the fabric of the building is being upgraded, the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths is quality assured through completion of a thermographic survey as well as airtightness testing and visual inspection at appropriate times during the refurbishment. The survey/testing is undertaken by a Suitably Qualified Professional in accordance with the appropriate standard, with visual inspection	**Client / Building Services Engineer**
		Man 4.2	**Commissioning Building services**	1	1	1	1		
		Man 4.3	**Testing and inspecting building fabric**	1	1	0	0		

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		Man 4.4	**Handover**	*1*	1	1	0	conducted by a representative of the main contractor or by an independent inspector such as a clerk of works. Any defects identified in the site inspection, thermographic survey and the airtightness testing reports are rectified prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building/element **One credit - Handover** 10. A Building User Guide (BUG) is developed prior to handover, for distribution to the building occupiers and premises managers 11. A training schedule is prepared for building occupiers/premises managers, timed appropriately around handover and proposed occupation plans, which includes the following content as a minimum: a. The building's design intent b. The available aftercare provision and aftercare team main contact(s), including any scheduled seasonal commissioning and post occupancy evaluation c. Introduction to, and demonstration of, installed systems and key features, particularly building management systems, controls and their interfaces d. Introduction to the Building User Guide and other relevant building documentation, e.g. design data, technical guides, maintenance strategy, operations and maintenance (O&M) manual, commissioning records, log book etc. e. Maintenance requirements, including any maintenance contracts and regimes in place.	

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Man 05	**Aftercare**	**Man 5.1**	**Aftercare Support**	1	1	1	1	**One credit - Aftercare support** 1. There is (or will be) operational infrastructure and resources in place to provide aftercare support to the building occupier(s), which includes the following as a minimum: a. A meeting programmed to occur between the aftercare team/individual and the building occupier/management (prior to initial occupation, or as soon as possible thereafter) to: i. Introduce the aftercare team or individual to the aftercare support available, including the Building User Guide (where existing) and training schedule/content. ii. Present key information about the building including the design intent and how to use the building to ensure it operates as efficiently and effectively as possible. b. On-site facilities management training, to include a walkabout of the building and introduction to and familiarisation with the building systems, their controls and how to operate them in accordance with the design intent and operational demands. c. Initial aftercare support provision for at least the first month of building occupation, e.g. on-site attendance on a weekly basis to support building users and management (this could be more or less frequent depending on the complexity of the building and building operations). d. Longer term aftercare support provision for occupants for at least the first 12 months from occupation, e.g. a helpline, nominated individual or other appropriate system to support building users/management. **One credit - Seasonal commissioning**	
		EXEMPLAR	**Aftercare support**	0	0	0	0		

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		Man 5. 2	**Seasonal Commissioning**	1	1	1	0	3. The following seasonal commissioning activities will be completed over a minimum 12-month period, once the building becomes substantially occupied: a. Complex systems - Specialist Commissioning Manager: i. Testing of all building services under full load conditions, i.e. heating equipment in mid-winter, cooling/ventilation equipment in mid-summer, and under part load conditions (spring/autumn). ii. Where applicable, testing should also be carried out during periods of extreme (high or low) occupancy. iii. Interviews with building occupants (where they are affected by the complex services) to identify problems orconcerns regarding the effectiveness of the systems. iv. Re-commissioning of systems (following any work needed to serve revised loads), and incorporating any revisions in operating procedures into the operations and maintenance (O&M) manuals. b. Simple systems (naturally ventilated) - external consultant/aftercare team/facilities manager: i. Review thermal comfort, ventilation, and lighting, at three, six and nine month intervals after initial occupation, either by measurement or occupant feedback. ii. Take all reasonable steps to re-commission systems following the review to take account of deficiencies identified and incorporate any relevant revisions in operating procedures into the O&M manuals. **One credit - Post occupancy evaluation** The client or building occupier makes a commitment to carry out a post	**Client**

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		Man 5. 3	**Post Occupancy Evaluation**	1	1	1	0	The client or building occupier makes a commitment to carry out a post occupancy evaluation (POE) exercise one year after initial building occupation . This is done to gain in-use performance feedback from building users to inform operational processes, including re-commissioning activities, and maintain or improve productivity, health, safety and comfort. The POE is carried out by an independent party **Exemplary level criteria** The following outlines the exemplary level criteria to achieve one innovation credit for this BREEAM issue: There are, or will be, operational infrastructure and resources in place to coordinate the following activities at quarterly intervals for the first three years of building occupation: Collection of occupant satisfaction, energy consumption and (where available) water consumption data. Analysis of the data to check the building is performing as expected and make any necessary adjustments to systems controls or to inform building user behaviours. Setting targets and/or appropriate actions for reducing water and energy consumption and monitor progress towards these. Feedback any 'lessons learned' to the design team and developer for use in future projects. Provision of the actual annual building energy, water consumption (where available and accessible) and occupant satisfaction data to BRE for the purpose of future BREEAM performance benchmarking.	

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Health and Well being

Hea 1	**Visual Cofort**	**Hea 1.1**	**Glare Control**	1	1	1	1	**One credit - 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 **One credit - Internal and External Lighting** **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. **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 g. Auditoria: zoning of seating areas, circulation space and lectern area h. Dining, restaurant, café areas: separate zoning of servery and seating/dining areas j. Bar areas: separate zoning of bar and seating areas **Up to three credits - Daylighting** Up to three credits are awarded on a sliding scale depending on the percentage of relevant building areas that comply with one of the following daylighting criteria: All occupied areas achieve 2% daylight factor in 40% of the area - 1 Credit 60% of the area - 2 Credit 80% of the area - 3 Credit **Exemplary level criteria**	**Architect / Building Services Engineer**
		Hea 1.2	**Day lighting (Building Type dependent)**	3	2	1	0		
		EXEMPLAR	**daylighitng**	1	0	0	0		
		Hea 1.3	**View Out**	2	2	2	2		
		Hea 1.4	**Internal and External lighting**						

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				1	1	1	1	The following outlines the exemplary level criteria to achieve an innovation credit for daylighting: 1. Daylighting criteria have been met using either of the following options: a. Relevant building areas meet exemplary daylight factor(s) and the relevant criteria in Table - 17 OR b. Relevant building areas meet exemplary average and minimum point daylight illuminance criteria in Table - 18	

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Hea 2	**Indoor Air Quality**	**Indoor Air Quality**	**Indoor Air Quality**	1	1	0	0	**One credit - Indoor air quality (IAQ) plan** An indoor air quality plan has been produced and implemented, with the objective of facilitating a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during the design, construction and occupation of the building. **One credit- Ventilation** Refurbishment and fit-out works include measures to minimise the concentration and recirculation of pollutants in the building as follows: Provide fresh air into the building in accordance with the criteria of the relevant standard for ventilation. Design ventilation pathways to minimise the build-up of air pollutants in the building, as follows: In air conditioned and mixed mode buildings/spaces: The building's air intakes and exhausts are over 10m apart and intakes are over 20m from sources of external pollution; In naturally ventilated buildings/spaces: openable windows/ventilators are over 10m from sources of external pollution. **One credit - Volatile organic compound (VOC) emission levels (products)** 6. All decorative paints and varnishes specified meet the criteria in Table - 18 7. At least five of the seven remaining product categories listed in Table - 18 meet the testing requirements and emission levels criteria for volatile organic compound (VOC) emissions (listed in the table). **One credit - Volatile organic compound (VOC) emission levels (post construction)** The formaldehyde concentration level is measured post construction (but pre-occupancy) and is found to be less than or equal to 100µg/averaged over 30 minutes (WHO guidelines for indoor air quality: Selected pollutants, 20102). The total volatile organic compound (TVOC) concentration level is measured post construction (but pre-occupancy) and found to be less than 300µg/over 8 hours, in line with the Building Regulation requirements. **One Credit - Adaptability - Potential for natural ventilation** The building ventilation strategy is designed to be flexible and adaptable to potential building occupant needs and climatic scenarios. This can be demonstrated as follows: Occupied spaces of the building are designed to be capable of providing fresh air entirely via a natural ventilation strategy. The following are methods deemed to satisfy this criterion dependent upon the complexity of the proposed system: Room depths are designed in accordance with CIBSE AM10 (section 2.4) to ensure effectiveness of any natural ventilation system. The openable window area in each occupied space is equivalent to 5% of the gross internal floor area of that room/floor plate;	**Architect / Contractor**
		Hea 2.2	**Ventilation**	1	1	1	1		
		Hea 2.3	**VOC emissions levels**	1	1	1	1		
		EXEMPLAR	**VOC emissions levels**	2	0	0	0		
		hea 2.4	**VOC emissions levels (Post Construction)**	1	1	1	0		

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		Hea 2.5	**Adaptability - potential for Nat Vent.**	1	1	0	0	**Exemplary level criteria** Minimising sources of air pollution - volatile organic compound (VOC) emission levels (products) The following outlines the exemplary level criteria to achieve innovation credits for this BREEAM issue: **One credit** 15. Criterion 6 has been achieved. 16. All seven remaining product categories listed in Table - 20 meet the testing requirements and emission levels criteria for Volatile Organic Compound (VOC) emissions (listed in the table). 17. For products B – F listed in Table - 20, the formaldehyde emission levels have been measured and found to be less than or equal to 0.06mg/m3 air in accordance with the approved testing standards in Table - 20. **Two credits** 18. Criterion 6 has been achieved. 19. All seven remaining products categories listed in Table - 20 meet the testing requirements and emission levels criteria for Volatile Organic Compound (VOC) emissions (listed in the table). 20. For products B to F listed in Table - 20, the formaldehyde emission levels have been measured and found to be less than or equal to 0.01mg/m3 air, in accordance with the approved testing standards in Table - 20.	

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Hea 4	**Thermal Comfort**	**Hea 4.1**	**Thermal Modeling**	1	1	1	1	**One credit - Thermal modelling** Thermal modelling has been carried out using software in accordance with CIBSE AM111 Building Energy and Environmental Modelling. **One credit - Adaptability - for a projected climate change scenario** Criteria 1 to 4 are achieved. The thermal modelling demonstrates that the relevant requirements set out in criterion 3 are achieved for a projected climate change environment One credit - Thermal zoning and controls	**Building Services Engineer**
		Hea 4.2	**Adaptability - for a projected climate change scenario**	1	1	1	1		
		Hea 4. 3	**Thermall Zoning and Controls**	1	1	1	1		
Hea 5	**Acoustic Performance**	**Hea 5.1**	**Acoustic Performance Requirements**	4	4	3	3	1. Indoor ambient noise levels comply with the design ranges given in BS 8233: 2014 unless otherwise stated below. Where the room types below are present, the appropriate criteria for ambient noise levels, sound insulation and acoustic privacy must also be achieved. 2. A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the acoustic testing and measurement procedures outlined in the Additional information section of this BREEAM issue.	**Acoustician**

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Hea 6	**Safety and Security**	**Hea 6.2**	**Security of site and Building**	1	1	1	1	**One credit - Security of site and building** 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), see compliance note where the refurbishment or fit-out zone comprises part of a larger building. The SQSS develops a set of recommendations or solutions during or prior to Concept Design (RIBA Stage 2 or equivalent). These recommendations or solutions aim to ensure that the design of buildings, public and private car parks and public or amenity space are planned, designed and specified to address the issues identified in the preceding SNA. The recommendations or solutions proposed by the SQSS are implemented (see CN7. Any deviation from those recommendations or solutions will need to be justified, documented and agreed in advance with a suitably qualified security specialist.	**Architect**

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Energy									
Ene 1	**Reduction of Energy use and CO2**	**Ene 1.1**	**Reduction of Energy use**	15	9	8	6	Up to twelve credits - Energy performance 1. Calculate an Energy Performance Ratio for New Constructions (EPR NC). Compare the EPR NC achieved with the benchmarks in Table - 25 and award the corresponding number of BREEAM credits. Exemplary level criteria	**Specialist**
Ene 2	**Energy Monitoring**	**Ene 2.1**	**Sub-metering of major energy consuming systems**	1	1	1	1	**One credit - Sub-metering of major energy consuming systems** 1. Energy metering systems are installed that enable at least 90% of the estimated annual energy consumption of each fuel to be assigned to the various end-use categories of energy consuming systems (see Methodology). 2. The energy consuming systems in buildings with a total useful floor area greater than 1,000m2 are metered using an appropriate energy monitoring and management system. 3. The systems in smaller buildings are metered either with an energy monitoring and management system or with separate accessible energy sub-meters with pulsed or other open protocol communication outputs, to enable future connection to an energy monitoring and management system (see Relevant definitions). 4. The end energy consuming uses are identifiable to the building users, for example through labelling or data outputs. **One credit - Sub-metering of high energy load and tenancy areas** An accessible energy monitoring and management system or separate accessible energy sub-meters with pulsed or other open protocol communication outputs to enable future connection to an energy monitoring and management system are provided, covering a significant majority of the energy supply to tenanted areas or, in the case of single occupancy buildings, relevant function areas or departments within the building/unit.	**Building Services Engineer**
		Ene 2.2	**Sub-metering of high energy load and tenancy areas**	1	1	1	1		
Ene 3	**External Lighting**	**Ene 3.1**	**External lighting Specification**	1	1	1	1	**One credit** 1. The building has been designed to operate without the need for external lighting (which includes on the building, signs and at entrances). OR alternatively, where the building does have external lighting, one credit can be awarded as follows: 2. The average initial luminous efficacy of the external light fittings within the construction zone is not less than 60 luminaire lumens per circuit Watt. 3. All external light fittings are automatically controlled for prevention of operation during daylight hours and presence detection in areas of intermittent pedestrian traffic.	**Building Services Engineer**

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Ene 4	**Low Carbon Design**	**Ene 4.1**	**Passive Design Analysis**	1	1	1	0	**One credit - Passive design analysis** The first credit within issue Hea 04 Thermal comfort has been achieved to demonstrate the building design can deliver appropriate thermal comfort levels in occupied spaces. **One credit - Free cooling** The passive design analysis credit is achieved. The passive design analysis carried out under criterion 2 includes an analysis of free cooling and identifies opportunities for the implementation of free cooling solutions. The building uses ANY of the free cooling strategies listed in compliance note CN8 to reduce the cooling energy demand, i.e. it does not use active cooling. **One credit - Low zero carbon feasibility study** A feasibility study has been carried out by the completion of the Concept Design stage (RIBA Stage 2 or equivalent) by an energy specialis	**Building Services Engineer**
		Ene 4.2	**Free Cooling**	1	1	1	0		
		Ene 4.3	**Low and zero carbon technologies**	1	1	1	1		
Ene 5	**Energy efficient cold storage**	**Ene 5.1**	**Refrigeration energy consumption**	**1**	**1**	**1**	**1**	**One credit - Refrigeration energy consumption** 1. The refrigeration system, its controls and components have been designed, installed and commissioned as follows: a. In accordance with the Code of Conduct for carbon reduction in the refrigeration retail sector1 (see Other information) and BS EN 378-2 Refrigeration systems and heat pumps - Safety and environmental requirements. b. Using robust and tested refrigeration systems/components, normally defined as those included on the Enhanced Capital Allowance (ECA) Energy Technology Product List (ETPL)2 or an equivalent list (see CN8 for a list of components). 2. The refrigeration plant has been commissioned to comply with the criteria for commissioning outlined in BREEAM issue Man 04 Commissioning and handover. **One credit - Indirect greenhouse gas emissions** 3. Criteria 1 and 2 are achieved. 4. The installed refrigeration system demonstrates a saving in indirect greenhouse gas emissions (CO_2 eq.) over the course of its operational life.	**Specialist**
		Ene 5.2	**Indirect greenhouse gas emissions**	**1**	**1**	**1**	**1**		

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Transport									
Tra 1	**Public Transport Accessibility**	**Tra 1.1**	**Public Transport Accessibility (Building Type Dependent)**	2	0	0	0	Up to two credits - Accessibility Index The public transport Accessibility Index (AI) for the assessed building is calculated and BREEAM credits awarded according to the building type	**BREEAM Assessor**
Tra 2	**Proximity to Amenities**	**Tra 2.1**	**Close proximity and accessibility**	1	0	0	0	**One credit** Where a building is located within close proximity of, and accessible to, local amenities which are likely to be frequently required and used by building occupants	**BREEAM Assessor**
Tra 3	**Cyclist Facilities**	**Tra 3.1**	**Cycle storage spaces**	2	2	1	1	Compliant cycle storage spaces that meet the minimum levels set out in Table - 38 (see Checklists and tables) are installed. Number required = 1 / 10 staff. 50% reduction applied fo rural location. Criterion 1 has been achieved. At least two of the following types of compliant cyclist facilities have been provided for all building users (including pupils where appropriate to the building type) - see Relevant definitions for the scope of each compliant cyclist facility: Showers Changing facilities Lockers Drying spaces .	**Architect**
Tra 5	**Travel Plan**	**Tra 5.1**	**Transport based travel plan**	1	1	1	1	**One credit** A travel plan has been developed as part of the feasibility and design stages. A site specific travel assessment/statement has been undertaken to ensure the travel plan is structured to meet the needs of the particular site and covers the following (as a minimum): Where relevant, existing travel patterns and opinions of existing building or site users towards cycling and walking so that constraints and opportunities can be identified. Travel patterns and transport impact of future building users. Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children). Disabled access (accounting for varying levels of disability and visual impairment). Public transport links serving the site. Current facilities for cyclists.	**Architect / Specialist**

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Water

Wat 1		**Wat 1.1**	**Water Consumption**	5	5	3	3	Up to five credits 1. The water consumption (L/person/day) for the assessed building is compared against a baseline performance and BREEAM credits awarded based upon Table - 35. 2. The efficiency of the following 'domestic scale' water-consuming components must be included in the assessment (where specified): a. WCs b. Urinals c. Taps (wash hand basins and where specified kitchen taps and waste disposal unit) d. Showers e. Baths f. Dishwashers (domestic and commercial sized) g. Washing machines (domestic and commercial or industrial sized). The BREEAM Wat 01 calculator defines the building types and activity areas for which the above components must be assessed. 4. Where a greywater and/or rainwater system is specified, its yield (l/person/day) is used to off-set non potable water demand from components that would otherwise be supplied using potable water. 5. Any greywater systems must be specified and installed in compliance with BS 8525-1:2010 Greywater Systems - Part 1 Code of Practice1. Any rainwater systems must be specified and installed in compliance with BS 8515:2009 Rainwater Harvesting Systems - Code of practice2. 6. Healthcare and prison buildings: refer to the relevant Compliance note for additional criteria regarding the specification of particular water-consuming component controls.	**Architect**
Wat 2	**Water Monitoring**	**Wat 2.1**	**Water Meter on Mains supply**	1	1	1	1	1. The specification of a water meter on the mains water supply to each building 2. Each meter (main and sub) has a pulsed or other open protocol communication output to enable connection to an appropriate utility monitoring and management system	**Building Services Engineer**

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Wat 3	**Major Leak Detection**	**Wat 3.1**	**Leak Detection on buildings water mains**	1	1	1	1	**One credit - leak detection** 1. A leak detection system which is capable of detecting a major water leak on the mains water supply within the building and between the building and the utilities water meter is installed. The leak detection system must be: a. A permanent automated water leak detection system that alerts the building occupants to the leak b. Activated when the flow of water passing through the water meter/data logger is at a flow rate above a pre-set maximum for a pre-set period of time. c. Able to identify different flow and therefore leakage rates d. Programmable to suit the owner/occupiers' water consumption criteria. e. Where applicable, designed to avoid false alarms caused by normal operation of large water-consuming plant such as chillers.	**Building Services Engineer**
		Wat 3.2	**Flow control devices**	1	1	1	1	**One credit - Flow control devices** 2. Flow control devices that regulate the supply of water to each WC area/facility according to demand are installed (and therefore minimise water leaks and wastage from sanitary fittings).	
Material									
Mat 1	**Life Cycle Impacts**	**Mat 1.1**	**Material Specification**	6	6	4	4	BREEAM awards credits on the basis of the building's quantified environmental life cycle impact through assessment of the main building elements: - external walls - windows - roof - upper floor slab - internal walls - floor finsihes **Exemplary Level** Up to 85% of all materials are A - D rated as per the Green Guide specification.	**Contractor/Architect**

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Mat 3	**Responsible Sourcing**	**Preq.**	**All timber legally sourced**		YES	YES	YES	1. The principal contractor sources materials for the project in accordance with a documented sustainable procurement plan 2. All building materials are responsibly sourced in accordance with the BREEAM methodology, **Exemplary level criteria** The following outlines the exemplary level criteria to achieve one innovation credit for this BREEAM issue: 3. Where at least 70% of the available RSM points are achieved.	**Contractor/Architect**
		Mat 3.1	**Documented sustainable Procurement plan**	1	1	1	1		
		Mat 3.2	**% of available sourcing of materials points achieved**	3	3	2	2		
Mat 4	**Insulation**	**Mat 4.1**	**Embodied Impact**	1	1	1	1	Any new insulation specified for use within the following building elements must be assessed: a. External walls b. Ground floor c. Roof d. Building services. 2. The Insulation Index for the building fabric and services insulation is the same as or greater than 2.5.	**Contractor/Architect**

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Mat 5	**Designing for Durability and resilience**	**Mat 5.1**	**Protecting Vulnerable Parts of building from damage**	1	1	1	0	**Protecting vulnerable parts of the building from damage** The building incorporates suitable durability and protection measures or designed features/solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements. This must include, but is not necessarily limited to: Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc.). Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas. Protection against, or prevention from, any potential vehicular collision where vehicular parking and manoeuvring occurs within 1m of the external building façade for all car parking areas and within 2m for all delivery areas. **Protecting exposed parts of the building from material degradation** Environmental factors have been identified that are relevant to the site location (see Table - 58) Existing applicable building elements that are exposed to any relevant environmental factors have been identified (see Table - 58)	**Contractor/Architect**
		Mat 5.2	**Protecting exposed parts of the building from material degradation**						
Mat 6	**Material Efficiency**	**Mat 6.1**	**Material Optimization measures investigated and implemented at relevant stages**	1	1	1	0	**One credit** Opportunities have been identified, and appropriate measures investigated and implemented within the scope of refurbishment or fit-out works, to optimise the use of materials through building design, procurement, refurbishment, maintenance and end of life (see examples in Table - 59 and Table - 60, in the Additional information section) The above is carried out by the design/construction team in consultation with the relevant parties (see CN3) at each of the following RIBA stages: Preparation and Brief Concept Design Developed Design Technical Design Construction.	**Contractor/Architect**

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Waste

Was 1	**Construction Waste Management**	**Was 1.1**	**Pre-refurbihsment audit**	1	1	1	1	1. Where a Resource Management Plan (RMP) has been developed covering the non-hazardous waste related to on-site construction and dedicated off-site manufacture or fabrication (including demolition and excavation waste) generated by the building's design and construction). 2. Where construction waste related to on-site construction and dedicated off-site manufacture/fabrication (excluding demolition and excavation waste) meets or is lower than 7.5m3 per 100m2	**Contractor**
		Was 1.2	**Re-use and direct recycling of materials**	2	2	2	2	The following percentages of non-hazardous construction (on-site and off-site manufacture/fabrication in a dedicated facility), demolition and excavation waste (where applicable) generated by the project have been diverted from landfill: 70% by volume - NON DEMOLITION, 80% by volume DEMOLITION,	
		Was 1.3	**Resource Efficiency**	3	3	2	1		
		Was 1 4	**Diversion of waste from landfill**	1	1	1	1	**Exemplary level criteria** The following outlines the exemplary level criteria to achieve an innovation credit for this BREEAM issue: 1. Non-hazardous construction waste generated by the building's design and refurbishment or fit-out is no greater than the exemplary level resource efficiency benchmark (outlined in Table - 62 and Table - 61). 2. The percentage of non-hazardous construction, demolition (if relevant) waste diverted from landfill meets or exceeds the exemplary level percentage benchmark (outlined inTable - 63) 3. Waste materials will be sorted into separate key waste groups (according to the waste streams generated by the scope of the works, the List of Wastes/European Waste Catalogue code should be referenced) either on-site or off-site through a licensed contractor for recovery. 4. 75% of difficult to manage wastes have been reused on or off-site rather than recycled, in accordance with Table - 64.	

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Was 2	**Recycle Aggregates**	**Was 2.1**	**Recycled Aggregate**	1	1	1	1	1. The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the following minimum % levels (by weight or volume) to contribute to the total amount of recycled or secondary aggregate, as specified in . ***BOUND*** Structural Frame 15% Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads - 30% Building Foundations - 20% Concrete road surfaces - 15% ***UNBOUND*** Pipe bedding - 100% Granular Fill - 100% **Exemplary level criteria** The following outlines the exemplary level criteria to achieve an innovation credit for this BREEAM issue. 4. The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the exemplary minimum levels (by weight or volume), as defined in the table above. Where this minimum level is not met, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified. 5. Where the total amount of recycled or secondary aggregate specified is greater than 35% (by weight or volume) of the total high grade aggregate specified for the project. Where the minimum level in criterion 1 is not met for an application, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified. 6. The contributing recycled or secondary aggregate must not be transported more than 30 km by road transport.	**Contractor**

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Was 3	**Operational Waste**	**Was 3.1**	**Segregation and Storage of operational waste**	1	1	1	1	1. Dedicated space(s) is provided for the segregation and storage of operational recyclable waste volumes generated by the assessed building/unit, its occupant(s) and activities. This space must be: a. Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams b. Accessible to building occupants or facilities operators for the deposit of materials and collections by wastevmanagement contractors 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/weekly operational activities and occupancy rates.	**Architect**

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Was 5	**Adaption to Climate Change**	**Was 5.1**	**Adaption to climate change - structural and fabric resilience**	1	1	1	0	**One credit - Adaptation to climate change – structural and fabric resilience** Conduct a climate change adaptation strategy appraisal for structural and fabric resilience by the end of Concept Design (RIBA Stage 2 or equivalent), in accordance with the following approach: Carry out a systematic (structural and fabric resilience specific) risk assessment to identify and evaluate the impact on the building over its projected life cycle from expected extreme weather conditions arising from climate change and, where feasible, mitigate against these impacts. The assessment should cover the following stages: Hazard identification Hazard assessment Risk estimation Risk evaluation Risk management. **Exemplary credit** – Responding to adaptation to climate change A holistic approach to the design and refurbishment or fit-out of the current building's life cycle, to mitigate against the impacts of climate change, is represented by the achievement of these criteria. The following outlines the exemplary level criteria to achieve an innovation credit for this BREEAM issue: 2. Achievement of Criterion 1, the Structural and fabric resilience criterion in this issue and the following criteria points or credits: Hea 04 Thermal comfort (Link to Wst 05 issue:- to preventing increasing risks of overheating) Criterion 6 in the second credit of the Hea 04 issue has been achieved. Ene 01 Reduction of energy use and carbon emissions (Link to Wst 05 issue: to maximise energy efficiency contributing to low carbon emissions resulting from increasing energy demands)At least eight credits in this issue have been achieved. Ene 04 Low carbon design (Link to Wst 05 issue: to maximise opportunities to avoid unecessary carbon emissions) The Passive design analysis credit in this issue has been achieved. Wat 01 Water consumption (Link to Wst 05: to minimise water demands in periods of drought) A minimum of	**Architect**

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Was 6	**Functional Adaptability**	**Was 6.1**	**Functional Adaptability**	1	1	1	0	One credit - Functional adaptability A building-specific functional adaptation strategy study has been undertaken by the client and design team by Concept Design (RIBA Stage 2 or equivalent), which includes recommendations for measures to be incorporated to facilitate future adaptation. Functional adaptation measureshave been adopted in the design by Technical Design stage (RIBA Stage 4 or equivalent) in accordance with the functional adaptation strategy recommendations, where practical and cost effective. Omissions have been justified in writing to the assessor.	**Architect**

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Land Use and Ecology									
Le 2	**Protection of Ecological features**	**Le 2.1**	**Protection of Ecological Features**	1	1	1	1	**One credit - Protection of ecological features** All existing features of ecological value (see Relevant definitions) within and surrounding the refurbishment or fit-out zone and site boundary area are adequately protected from damage during clearance, site preparation and refurbishment or fit-out activities in line with BS42020: 20131. In all cases, the principal contractor is required to construct ecological protection recommended by the Suitably Qualified Ecologist (SQE), prior to any preliminary site refurbishment or fit-out or preparation works (e.g. erection of temporary site facilities).	**Specialist**
Le 4	**Enhancing Site Ecology**	**Le 4.1**	**Suitably Qualified ecologist**	1	1	1	1	**One credit - Ecologist's report and recommendations** A suitably qualified ecologist (SQE) has been appointed by the client or their project representative by the end of the Preparation and Brief stage (RIBA Stage 1 or equivalent) to advise on enhancing the ecology of the site at an early stage. The SQE has provided an Ecology Report with appropriate recommendations for the enhancement of the site's ecology at Concept Design stage (RIBA Stage 2 or equivalent). The report is based on a site visit/survey by the SQE (see also CN6). The early stage advice and recommendations of the Ecology Report for the enhancement of site ecology have been, or will be, implemented in the refurbishment or fit-out.	**Specialist**
Le 5	**Long Term Impact on Biodiversity**	**Le 5.1**	**Suitably Qualified ecologist**	2	2	2	2	**Up to 2 credits;** Credit can only be achieved with appointment of an Ecologist Where a Suitably Qualified Ecologist (SQE) is appointed prior to commencement of activities on-site and they confirm that all relevant UK and EU legislation relating to the protection and enhancement of ecology has been complied with during the refurbishment or fit-out process. Where a landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion in accordance with BS 42020:20131 Section 11.1. This is to be handed over to the building owner/occupants for use by the grounds maintenance staff. Where additional measures to improve the assessed site's long term biodiversity are adopted	**Specialist**
Pollution									

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Pol 1	**Impact of refriegrants**	**Preq.**	**Refrigeration systems BS**		YES	YES	YES	**Pre-requisite** All systems (with electric compressors) must comply with the requirements of BS EN 378:2008 (parts 2 and 3) and where refrigeration systems containing ammonia are installed, the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice	**Buidling Services Engineer**
		Pol 1.1	**Impact of refrigerant**	2	2	2	2	**Two credits - Impact of refrigerant** Rrefrigeration systems installed the refrigerants used have a Global Warming Potential (GWP)≤10. OR	
		Pol 1.2	**Leak Detection**	1	1	1	0	**One credit - Impact of refrigerant** 5. Where the systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELC CO2e) of ≤ 1000 kgCO2e/kW cooling/heating capacity. **One credit - Leak detection** Where systems using refrigerants have a permanent automated refrigerant leak detection system installed; OR where an inbuilt automated diagnostic procedure for detecting leakage is installed. In all instances a robust and tested refrigerant leak detection system must be installed and must be capable of continuously monitoring for leaks.	

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Pol 2	**NOx emissions**	**Pol 2.1**	**Nox emissions**	3	0	0	0	**Up to three credits (all building types except Industrial)** Where the plant installed to meet the building's delivered heating and hot water demand has, under normal operating conditions, a NOxemission level (measured on a dry basis at 0% excessO2) as follows NOx Emission levels for heating and hot water (mg/kWh) Credits ≤ 100 mg/kWh 1 credit ≤ 70 mg/kWh 2 credits ≤ 40 mg/kWh 3 credits	**Building Services Engineer**
Pol 3	**Surface Water Run off**	**Pol 3.1**	**Low probability of flooding**	2	2	2	2	**Pre-requisite** 4. An Appropriate Consultant is appointed to carry out, demonstrate and/or confirm the development's compliance with the following criteria: **2 Credits** Where flood maps from the appropriate statutory body (see Relevant definitions)confirm the refurbishment or fit-out is situated in a flood zone that is defined as having a low annual probability of flooding; OR The project meets the requirements for avoidance of flooding in accordance with Checklist 1, (see Checklists and tables), e.g. where the refurbishment or fit-out zone is of a floor level that is 0.3m higher than the obtained/estimated flood level and safe access/escape routes are available/present **One credit** 5. Where drainage measures are specified to ensure 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. **One credit** 8. Where 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 9. Drainage design measures are specified to ensure 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 for the 100-year 6-hour event	
		Pol 3.2	**Flood Risk Assessment**						
		Pol 3.3	**Surface Water Run off - peak rate**	1	1	1	1		
		Pol 3.4	**Surface Water Run off - volume, attenuation and discharge**	1	1	1	1		

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		Pol 3.5	**Minimizing Watercourse Pollution**	1	1	1	0	been prior to the assessed site's development for the 100-year 6-hour event, including an allowance for climate change **One Credit** There is no discharge from the developed site for rainfall up to 5mm (confirmed by the Appropriate Consultant). 16. In areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques. **Exemplary level requirements** The following outlines the exemplary level requirements to achieve an innovation credit for surface water runoff: 15. Where all run-off from the developed site is managed on-site using source control. The following must be achieved to confirm compliance: a. The peak rate of run-off as a result of the refurbishment for the 1 in 1 year event is reduced to zero. b. The peak rate of run-off as a result of the refurbishment for the 1 in 100 year event is reduced to zero. c. There is no volume of run-off discharged into the watercourses and sewers as a result of the refurbishment, for a 1 in 100 year event of 6 hour duration. d. An allowance for climate change must be included for all of the above calculations, in accordance with current best practice national planning guidance. e. Where an appropriately qualified professional has been employed to provide the above calculations and design an appropriate drainage strategy for the site, ensuring all above criteria are achieved.	**Drainage Specialist**

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Pol 4	**Reduction of Night time light pollution**	**Pol 4.1**	**External Lighting Specification**	1	1	1	1	1. The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the ILP Guidance notes for the reduction of obtrusive light, 20111. 2. The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the ILP Guidance notes for the reduction of obtrusive light, 20113. 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's Guidance notes. 5. Illuminated advertisements, where specified, must be designed in compliance with ILE Technical Report 5 – The Brightness of Illuminated Advertisements4.	**Building Services Engineer**

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Pol 5	**Reduction of Noise Pollution**	**Pol 5.1**	**Reduction of Noise Pollution**	1	1	1	1	**One credit** 1. Where there are, or will be, no noise-sensitive areas or buildings within 800m radius of the assessed site. OR 2. Alternatively, where the building does have noise-sensitive areas or buildings within 800m radius of the site, one credit can be awarded as follows: a. Where a noise impact assessment in compliance with BS 74451 has been carried out and the following noise levels measured/determined: i. Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development or at a location where background conditions can be argued to be similar. ii. The rating noise level resulting from the new noise source (see CN4). 3. The noise impact assessment must be carried out by a suitably qualified acoustic consultant holding a recognised acoustic qualification and membership of an appropriate professional body (see Relevant definitions in the Additional information section). 4. The noise level from the proposed site/building, as measured in the locality of the nearest or most exposed noise- sensitive development, is a difference no greater than +5dB during the day (07:00 to 23:00) and +3dB at night (23:00 to 07:00) compared to the background noise level. 5. Where the noise source(s) from the proposed site/building is 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 criterion 4.	**Specialist**

Appendix B

Appendix B

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

As designed

Date: Mon Jul 06 14:21:15 2015

Administrative information

Building Details

Address: ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.3"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.3

BRUKL compliance check version: v5.2.d.2

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name:

Telephone number:

Address: , ,

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	46.7
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	46.7
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	38.1
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

boom collective