3 - 6 Spring Place

Spring Place Ltd

Sustainability & Energy Statement

MTT

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9 Kingsway
London WC2B 6XF

Telephone
+44(0)20 78361133

info@mtt-limited.com
www.mtt-limited.com

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Author:			
Name:	**Martin Lawless**	File reference:	**8081.003.005**
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Name:	**Jodi Willis**		
Signature:			
Position:	**Director**		

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OVERVIEW

This Sustainability and Energy Statement has been prepared by mTT/SUSTAIN Limited on behalf of Spring Place Limited ('the Applicant') in support of a full planning application for the redevelopment of the site known 3-6 Spring Place, Camden Town London, NW5 3BH.

The application is for the "demolition of existing buildings and structures and erection of a new (up to) six storey building (plus basement) to provide flexible office floorspace (Use Class B1) with ground floor flexible café, restaurant (Use Class A1 / A3) and event space (Sui Generis) and other associated works."

The development is situated in Kentish Town and the Local Planning Authority is the London Borough of Camden.

OBJECTIVE

This report is intended to provide a commentary on sustainability, energy performance and CO_2 emission reductions for the proposed redevelopment of 3-6 Spring Place, demonstrating how the application scheme addresses the London Borough of Camden's Planning Policies relevant to these issues, in a structured and comprehensive manner, alongside the requirements of the London Plan and the NPPF.

PROJECT BACKGROUND

The proposals are for flexible office space providing a number of benefits for local communities including flexible and modern employment space with co-working facilities for SMEs and start-ups, the potential to support around 600 new jobs and a new café/restaurant open to the public.

Architects Indicative CGI Image of the Proposed 3-6 Spring Place Redevelopment

SUMMARY STATEMENT

mTT/SUSTAIN have undertaken a review of sustainability and energy issues for the proposed redevelopment, demonstrating how principles incorporated in the design contribute to ensuring sustainability throughout construction and use.

Following appointment by Spring Place Limited, an initial review of national, regional and local policies and targets for sustainability and energy was undertaken. The proposed sustainability and energy measures for 3-6 Spring Place were then developed to reflect the requirements of relevant policies, primarily of the London Borough of Camden Core Strategy, Development Policies and in particular the Camden Planning Guidance 3 SPD.

Guidance has been taken where appropriate from the London Plan and in particular Chapter 5 'London's Response to Climate Change' and the Mayor's Sustainable Design and Construction SPG.

Throughout the design development to date mTT have developed the sustainability strategy for the scheme in conjunction with the Applicant, Architect (Piercy and Co.), Structural Engineers (Heyne Tillett Steel) and Building Services Engineers (mTT) and other members of the Design Team. The process has been informed by the project's Surface Water Management Plan.

This statement describes how the design of the project addresses the key sustainability themes of energy, water, materials, benchmarking, green roofs and walls, flooding, adapting to climate change, biodiversity and local food growing, and compares the proposals to qualitative good-practice benchmarks demonstrating the effectiveness of proposals where necessary.

Energy issues are reviewed in detail in the formal energy strategy which forms part of this document.

A number of sustainability and energy opportunities for the proposed development have been identified during the design development of the scheme. Specific measures to be adopted are summarised on the following pages.

This Statement demonstrates that the proposed development of 3-6 Spring Place will ensure that the highest levels of sustainability (in a social, economic and environmental sense) are attained within the commercial and site constraints imposed by redeveloping an existing site.

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SUSTAINABILITY STATEMENT

Methodology

MTT/SUSTAIN have undertaken a review of sustainability issues for the development, demonstrating how principles incorporated in the current design contribute to ensuring sustainability throughout construction and use.

This statement seeks to demonstrate that planning policies relevant to sustainability have been addressed in a structured and comprehensive manner by the proposals in the planning application. It is supported by the Energy Statement within this document.

The scheme responds to a number of sustainability drivers, including national and local planning policies. Planning Policy issues highlighted in the London Borough of Camden's Core Strategy and Development Policies and their supporting documents (in particular Camden Planning Guidance - Sustainability (CPG 3)) have led to the incorporation of the key design features discussed in this statement.

These key measures to be included as part of the 3-6 Spring Place redevelopment with respect to sustainability and mitigating environmental impact are described in **section 3.0 sustainability review** of this document, with relevant the policy drivers being reviewed in **appendix a**.

Sustainability Commentary

This statement addresses the relevant Planning Policy issues and accordingly follows the guidance in the London Borough of Camden's Core Strategy and Development Policies and their supporting documents which indicate the Council's development aspirations on the subject areas of sustainable design and construction and energy.

It describes how the design of the project addresses these aspirations and compares the proposals to qualitative good-practice benchmarks demonstrating the effectiveness of proposals where necessary.

Sustainability Benchmarking

A key consideration for the 3-6 Spring Place Sustainability Strategy has been on achieving a rating of 'Excellent' under the BREEAM New Construction 2014.

In order to evaluate the overall sustainability and measures included to mitigate the development's environmental impact, a pre-assessment has been undertaken and the building is to undergo a full assessment process to achieve formal certification at the Design Stage and Post Construction Stages. The assessment is currently at the Design Stage, with MTT/SUSTAIN acting as the licensed BREEAM Assessor.

Further Details

Sustainability issues are reviewed in **section 3.0 sustainability review** of this document, with relevant planning policy background being reviewed in **appendix a**.

The BREEAM process is reviewed in **section 4.0 sustainability benchmarking** of this document, with a full Credit Tracker for the assessment provided in **appendix b**.

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ENERGY STATEMENT

Methodology

A thorough review has been undertaken of the energy technology options for the site to ensure the most appropriate energy strategy is implemented. This energy strategy has been developed in accordance with the requirements of the London Plan and the 'GLA guidance on preparing energy assessments' (March 2016).

Accordingly, the Mayor's Energy Hierarchy ('Be lean': use less energy; 'Be clean': supply energy efficiently; 'Be green': use renewable energy) has been applied to energy considerations for the site, starting with a robust 'baseline' energy demand assessment.

Baseline Energy Demand Assessment

Before energy efficiency measures are investigated, it is important to establish the baseline energy consumption of the scheme, for comparison and evaluation of energy proposals for the proposed redevelopment.

The development must comply with the requirements of the 'Building Regulations Part L2A 2013: Conservation of fuel and power in new buildings other than dwellings'.

The required case against which to assess potential carbon savings of the development is the Target Emission Rate (TER). This is based on a notional building that will form the Part L Building Regulations baseline.

Energy Hierarchy Step 1 - 'Be Lean' – Use Less Energy

The first step in pursuing an energy efficient and low-carbon design under the Energy Hierarchy is to minimise the development's energy demand. This is achieved both by passive measures and the introduction of more energy efficient plant and services.

The services strategy at 'be lean' stage for the development consists of local floor-by-floor air handling units, heating provided by gas boilers and cooling would be provided by a chiller., localised electric DHW and energy efficient lighting throughout, in accordance with the GLA Guidance Note sections 8.2 and 13.5 on the implementation of heat pumps as 'be green' measures within the Energy Hierarchy process.

Further details of the thermal model calculation parameters are given in **appendix c.**

Energy Hierarchy Step 2 - 'Be Clean' - Supply Energy Efficiently

In line with the London Plan requirements (policy 5.6) for decentralised energy, the opportunity to extend the scheme beyond the site boundary to adjacent areas has been considered. However, it was found that there are no available distribution networks near to the site.

From the results of the thermal modelling a very low domestic hot water load is required at 3-6 Spring Place and heating is only necessary for a proportion of the year. CHP systems only work efficiently when operated constantly for the majority of the year and therefore 3-6 Spring Place with its changing loads would not provide a year-round requirement for heat.

Energy Hierarchy Step 3 - 'Be Green' – Use Renewable Energy

The Renewables Toolkit published by the London Energy Partnership has been used to provide a robust methodology for the selection and sizing of renewable energy technologies, as shown in **appendix d**. The technologies reviewed were biomass heating, biomass CHP, combined heat and power, air and ground source heat pumps, photovoltaics, solar thermal panels and wind power.

For each viable technology, a review of its' performance with respect to payback, land use, local planning criteria, noise, feasibility of exporting heat/electricity from the system and life cycle cost/impact has been undertaken.

From the analysis set out in **appendix d**, it is clear that the most appropriate renewable energy technology for integration on the site is a combination of air source heat pumps in the form of Variable Refrigerant Flow (VRF) heating and cooling and photovoltaic (PV) panels.

The site layout and design does however restrict where PV panels can be situated. After consideration of essential plant space, access requirements and shading, it is possible to accommodate an array of 40 PV panels (with a total effective panel area of around 64 m^2).

The panels would be inclined and at 15° around the perimeter of the array and 30° at the centre of the array to maximise the yield from the system whilst ensuring it is not visible above the roofline of the building from the ground.

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SUMMARY TABLES

	Carbon dioxide emissions (tCO_2/year)		
	Regulated	**Unregulated**	**Total**
Part L 2013 Compliant Building	94.4	98.3	192.7
Be Lean	91.1	98.3	189.4
Be Clean	91.1	98.3	189.4
Be Green	78.8	98.3	177.1

Carbon Dioxide Emissions after Each Stage of the Energy Hierarchy

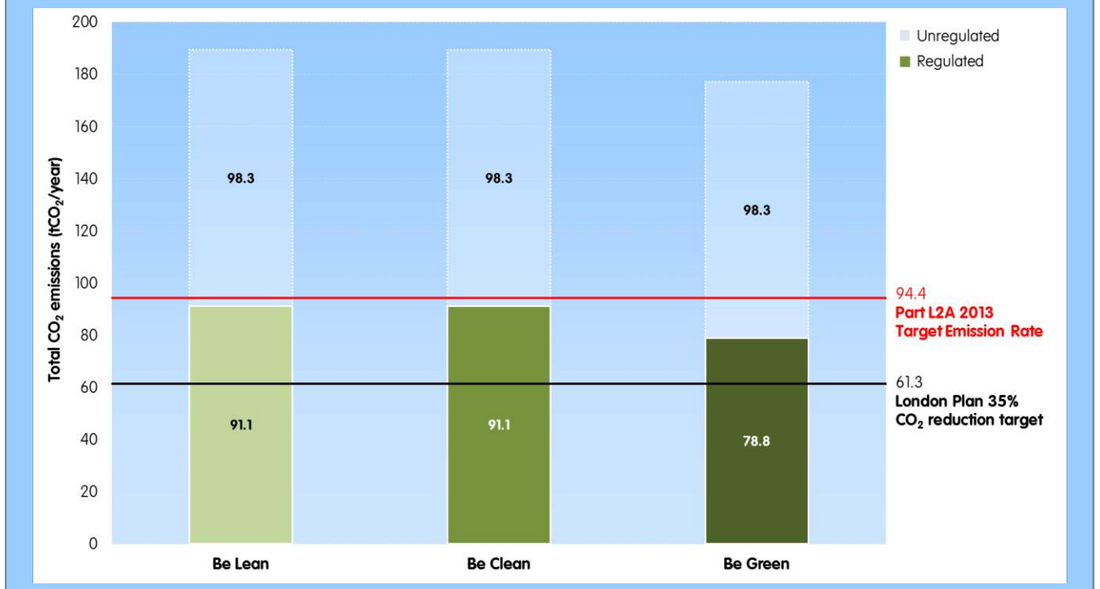
		Carbon dioxide savings			
		tCO_2/year		%	
		Regulated	**Total**	**Regulated**	**Total**
Be Lean	**Savings from Demand Reduction**	3.3	3.3	3.5%	1.7%
Be Clean	**Savings from Clean Energy**	0.0	0.0	0.0%	0.0%
Be Green	**Savings from Renewable Energy**	12.3	12.3	13.0%	6.4%
	Total Cumulative Savings	**15.6**	**15.6**	**16.5%**	**8.1%**

Carbon Dioxide Emissions savings from Each Stage of the Energy Hierarchy

The tables above show a total saving of **15.6 tCO_2/year** (**16.5%** of regulated emissions) under the Target Emission Rate (TER).

The graph opposite indicates the progressive reduction of carbon emissions at each stage of the Energy Hierarchy.

SUMMARY GRAPH



The Energy Hierarchy applied at 3-6 Spring Place

COMMENTARY

The cumulative effect of the final measures implemented in accordance with the GLA's Energy Hierarchy achieve a total carbon emissions reduction of **16.5%** below the Target Emission Rate (TER) in accordance with Building Regulations Part L 2013, which compares well with similar office scheme approved in London.

This overall reduction demonstrates a significant commitment towards reducing the Carbon emissions of the development through the incorporation of passive measures, efficient services and PV.

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DETAIL OF MEASURES TO BE APPLIED AT 3-6 SPRING PLACE

Below is a summary of the main measures making up the Energy Strategy for the proposed development:

	Design Approach or Technology	Viable?	Commentary	Regulated CO_2 Reduction tCO_2/annum	Regulated CO_2 Reduction %
Be Lean	Orientation and Shading	YES	The orientation of the building favours good solar control with the main elevation of the building facing approximately east and west, allowing solar control through high performance solar glazing without the need for complex external shading features and providing good daylighting.	3.3	3.5%
	Building Fabric Improvements	YES	High performance building fabric with high performance solar double glazing, low U-values and low air permeability rates, which exceed the Part L 2013 requirements, will minimise uncontrolled heat losses and gains.		
	Ventilation Efficiency	YES	Air Handling Plant - Office AHUs shall achieve a specific fan power (SFP) of 1.75 W/l/s or lower. Heat Recovery – High efficiency heat recovery devices shall be specified.		
	Heating Efficiency	YES	The proposed heating system (at the 'be lean' stage) shall be gas boilers, in accordance with the GLA Guidance Note section 8.2.		
	Cooling Efficiency	YES	The proposed cooling system (at the 'be lean' stage) shall be 'electrically powered equipment', i.e. a conventional chiller, in accordance with the GLA Guidance Note section 8.2.		
	Building Management System	YES	A full Building Management System shall be installed to monitor and control the building's energy consumption.		
	Metering	YES	The services strategy will include full sub-metering of energy usage on all floors, and per tenancy.		
Be Clean	Waste Heat	NO	No local source of waste heat from building or industrial processes has been identified for the site.	N/A	N/A
	Community Heating	NO	There is no appropriate local Community Heating system either currently available or proposed.	N/A	N/A
	Combined Heat and Power (CHP)	NO	There is a limited and seasonal heating demand due to the office use of the building, with no year-round base load. The low load profile and relatively dense occupation also indicate that Combined Heat and Power would not be viable.	N/A	N/A
	Combined Cooling Heat and Power (CCHP)	NO	The considerations above for CHP also apply for CCHP. A CCHP system would also not be capable of responding appropriately to the anticipated variation in loads in the building.	N/A	N/A
Be Green	Fuel Cells	NO	Given the novelty and expense of the technology and since no existing hydrogen network exists near the site, fuel cells would not be an appropriate technology for the proposed development. They are suited to applications where a gas fired CHP unit might be considered and tend to be unfavourable in cost and carbon savings terms where these could be applied.	N/A	N/A
	Ground Source Heating and/or Cooling	NO	Since the site is landlocked and has a relatively small footprint, there is insufficient separation distance for a horizontal ground loop and insufficient capacity from vertical ground loop serving a ground source heat pump, with Air Source Heating and/or Cooling (see below) being a more easily implemented technology.	N/A	N/A
	Air Source Heating and/or Cooling	YES	In accordance with Section 13.5 of the GLA Guidance Note on Preparing Energy Assessments, the proposed VRF system (as a heat pump system) has been categorised under this element of the Energy Hierarchy for 3-6 Spring Place. It is a good fit for the envisaged operating conditions and patterns for the building. The proposed system shall be high efficiency VRF heat pump with a heating CoP of 3.9, and a cooling EER of 3.7. The system will be designed to achieve a specific fan power (SFP) lower than the Part L limiting SFP.	7.4	7.8%
	Biomass/Biofuel Heating	NO	Issues relating to fuel delivery and storage and the proposed development's limited heating demand (and maintenance requirements) resulting in biomass/biofuels being a relatively complex and expensive technology to implement. Local sourcing of fuel and ensuring local air quality is not adversely affected would also be challenging in the site context.	N/A	N/A
	Photovoltaic Panels	YES	After consideration of essential plant space, access requirements, overshading from neighbouring buildings and the desire to avoid visibility from the street, a reasonably sized PV array could be provided on the main roof of the building.	4.9	5.2%
	Solar Thermal Hot Water Heating	NO	Since domestic hot water will be generated in an energy efficient manner (without the need for distribution pipework and pumps) via the proposed building services strategy, and as PV panels are being proposed for the limited suitable roof space, solar thermal hot water is not considered viable for implementation.	N/A	N/A
	Wind Power	NO	Since there are a the number of obstructions in the dense urban context of the site, likely to worsen the already low predicted wind speeds, the yield of a wind turbine system is likely to be poor and intermittent. Significant integration issues also exist, such as structural vibration and the acceptability of the visual and noise impact of wind turbines to local residents and Network Rail.	N/A	N/A
	Micro Hydro	NO	There are no records of watercourses crossing the site and so micro-hydro generation is not appropriate due to a lack of hydro resource and is not recommended for 3-6 Spring Place.	N/A	N/A
	TOTAL			**15.6**	**16.5%**

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SITE BACKGROUND

This document has been prepared to review sustainability and energy issues associated with the proposed redevelopment of the site known as 3-6 Spring Place, Camden Town London, NW5 3BH.

The local planning authority is the London Borough of Camden.

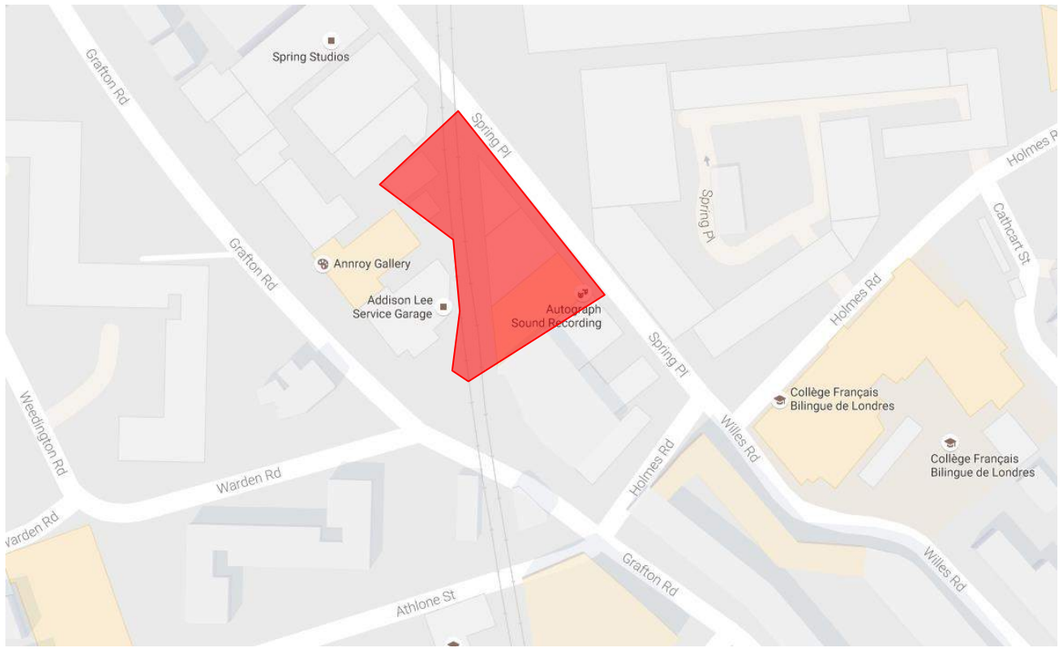
LOCATION

The existing building is located at 3-6 Spring Place and has a site area of 0.222 ha. Spring Place is named as such because it is where small tributaries of the now culverted River Fleet converged.

The immediate context is now characterised by a mix of light industrial, other commercial and residential buildings and railway infrastructure. Situated to the north of the site is the area known as Kentish Town Industrial Estate. There are also a number of Victorian buildings associated with the historic steam-powered Colour Works including Spring House built for Windsor & Newton, now occupied by Spring Studios (providing rentable studio space).

The site has a PTAL rating of 5. It is served primarily by Kentish Town Overground and Underground stations which are approximately 8 minutes walk away. Gospel Oak Overground station is located approximately 12 minutes walk to the north. The site is also served by the 46 and 393 bus routes.

Aerial View of the Existing Site – Site Boundary (Indicative)



Site Location Map–Site Boundary (Indicative)

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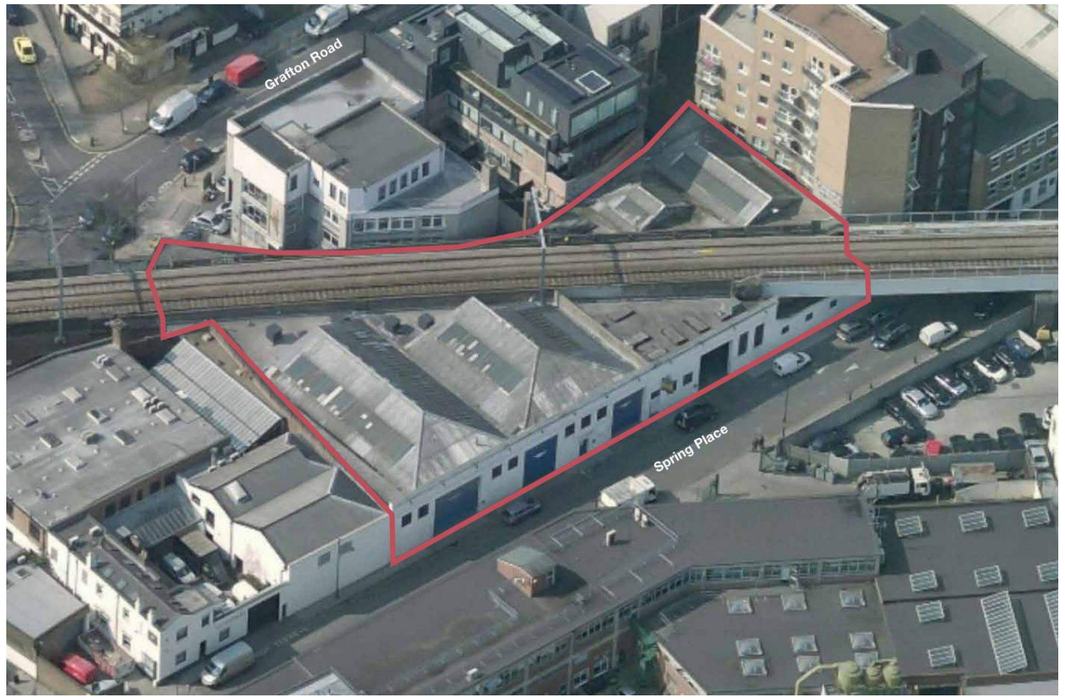
EXISTING 3-6 SPRING PLACE SITE DESCRIPTION

The application site comprises an existing single storey (equivalent to 2 storey residential height) brick building, constructed around and beneath the railway arches of the London Overground Line. The building is currently used as a car repair and servicing garage.

The existing building fabric is of poor quality and presents visible signs of wearing and decay. The roof structure and walls are in a poor state of repair, and the arches show significant water ingress and resulting damp issues.



Aerials Photograph of the Existing 3-6 Spring Place

PROPOSED 3-6 SPRING PLACE DEVELOPMENT DESCRIPTION

The application is formally for the "demolition of existing buildings and structures and erection of a new (up to) six storey building (plus basement) to provide flexible office floorspace (Use Class B1) with ground floor flexible café, restaurant (Use Class A1 / A3) and event space (Sui Generis) and other associated works."

Architects Indicative CGI View of the Proposed 3-6 Spring Place Redevelopment

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OBJECTIVE

The following section of this document provides background and commentary on the national, regional and local planning policy issues relevant to this project with respect to energy and sustainability.

Review of Policy and Good Practice Guidance

Please refer to **appendix a** for a detailed review of National, Regional and Local (London Borough of Camden) policy related to sustainability, energy efficiency and low carbon design and other sources of good practice guidance.

Sustainable Development may be defined as 'achievement of a better quality of life through the efficient use of resources, which realise continued social progress while maintaining stable economic growth and caring for the environment.'

Key Guidance for 3-6 Spring Place

The development is situated in Kentish Town and the Local Planning Authority is the London Borough of Camden.

The Development Plan comprises of the London Plan (March 2015 version); Camden Core Strategy (November 2010); Camden Development Policies DPD (November 2010); and Camden Site Allocations DPD (September 2014). For full details of the Development Plan and planning policy context please see the Planning Statement.

In addition to the Development Plan, the most important policies and guidance for 3-6 Spring Place with respect to sustainability and energy are:

- National Planning Policy Framework and National Planning Policy Guidance- Department for Communities and Local Government
- The Sustainable Design and Construction SPG May 2006 and Sustainable Design and Construction SPG April 2014
- London Borough of Camden Camden's Core Strategy (in particular CS 13), Development Policies (in particular DP 22) and Planning Guidance CPG 3 Sustainability.

In addition to the standards, targets and policies discussed above, the relevant British Standards; and CIBSE Guidelines have used to assist in determining the most appropriate building services strategy for the development.

All aspects of the development have been designed to exceed the requirements of the Building Regulations Part L 2013.

KEY POLICIES

National - National Planning Policy Framework (Paragraph 14) and National Planning Practice Guidance

The National Planning Policy Framework (NPPF) states at Paragraph 14 that 'there is a presumption in favour of sustainable development, which should be seen as a golden thread running through plan making and decision taking.'

In determining planning applications, Paragraph 96 of the NPPF states that 'new development should comply with adopted Local Plan policies and requirements for decentralised energy supplies and to take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.'

The NPPF is supported by the National Planning Practice Guidance (NPPG), which was launched on 6th March 2014 as a resource replacing most previous national planning guidance documents.

Regional – Greater London Authority

This Sustainability and Energy Statement has been compiled in accordance with the guidance set out in The Mayor of London's Sustainable Design and Construction SPG May 2006 and Sustainable Design and Construction SPG July 2013, and with reference to all appropriate national and regional planning policies.

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Local – London Borough of Camden Core Strategy, Development Policies and Related Documents

CAMDEN'S CORE STRATEGY 2010

Camden Core strategy is the key Development Plan Document in the LDF. This document sets out the vision for Camden up to and beyond 2025, and putting in place a policy framework to deliver that vision.

The key strategic policies from the Core Strategy applicable to 3-6 Spring Place are:

- Policy CS11. Promoting Sustainable and Efficient Travel
- Policy CS13. Tackling Climate Change through Promoting Higher Environmental Standards
- Policy CS14. Promoting High Quality Places and Conserving Our Heritage
- Policy CS16. Improving Camden's Health and Well-Being
- Policy CS18. Dealing with Our Waste and Encouraging Recycling

Of these, Policy CS13. Tackling Climate Change through Promoting Higher Environmental Standards is the most important in terms of sustainability and energy considerations.

CAMDEN DEVELOPMENT POLICIES 2010

The Camden Development Policies document contributes towards delivering the Core Strategy by setting out detailed planning policies that the Council will use when determining applications for planning permission in the borough to achieve the vision and objectives of the Core Strategy.

The key policies applicable to 3-6 Spring Place are:

- Policy DP17 - Walking, Cycling and Public Transport
- Policy DP18 - Parking Standards and Limiting the Availability Of Car Parking
- Policy DP22 – Promoting Sustainable Design and Construction
- Policy DP23 – Water
- Policy DP24 - Securing High Quality Design
- Policy DP26 – Managing the Impact Of Development On Occupiers And Neighbours
- Policy DP28 - Noise and Vibration
- Policy DP32 - Air Quality and Camden's Clear Zone

Of these, Policy Policy DP22 – Promoting Sustainable Design and Construction is the most important in terms of sustainability and energy considerations.

CAMDEN PLANNING GUIDANCE 3 - SUSTAINABILITY 2015 (CPG 3)

Camden Planning Guidance supports policies in Camden's Local Development Framework and are consistent with the Core Strategy and the Development Policies. CPG 3 forms a Supplementary Planning Document (SPD) which is an additional 'material consideration' in planning decisions.

The document was updated on 17th July 2015.

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OVERVIEW

Objective

The purpose of this section of the Sustainability and Energy Report is to review the key sustainability considerations for the redevelopment of 3-6 Spring Place, which have been used to inform design decisions for the proposed scheme.

Sustainable development may be defined as 'the achievement of a better quality of life through the efficient use of resources, which realise continued social progress while maintaining stable economic growth and caring for the environment.'

Sustainability issues are addressed at 3-6 Spring Place through the consideration of the relevant sustainability policies in Camden's Core Strategy and Development Policies document, which has led to the incorporation of the key design features discussed in this section of the document.

Methodology

This section considers the environmental impact and sustainability of the proposed development's design, construction and occupation. It identifies measures proposed to prevent, reduce, and where possible, offset any significant adverse effects on the environment.

Sustainability issues are addressed at 3-6 Spring Place through the consideration of the relevant sustainability policies reviewed in **section 2.0 policy background**, which has led to the incorporation of the key design features discussed in this section of the document.

This section identifies in detail how the proposed scheme responds to all relevant and specific sustainability policy requirements from the above planning documents. This is provided in tabular format for clarity, in order to cross-reference each policy requirement. Relevant policies and targets are grouped together using the headings from the Camden Planning Guidance 3 – Sustainability (CPG 3) document in order to demonstrate an integrated design response.

Sustainability Benchmarking

Verifying the sustainability performance of the scheme against an independent third party benchmark, a BREEAM UK New Construction 2014 (BREEAM NC 2014) pre-assessment has been carried out for the development which demonstrates how an 'Excellent' rating could be achieved.

Summary of the pre-assessment exercise is given in **section 4.0 sustainability benchmarking.** Details of each BREEAM Credit selected for the Design Stage assessment provided in **appendix b.**

SUSTAINABILITY DRIVERS

Background

mTT/SUSTAIN have undertaken a review of sustainability issues for the development, demonstrating how principles incorporated in the current design contribute to ensuring sustainability throughout construction and use.

The scheme responds to a number of sustainability drivers, including national and local planning policies but also encompassing the applicant's own Sustainability Strategy and other guidance listed in **appendix a**. The key guidance however is Camden's CPG 3 - Sustainability.

CPG 3 Requirements as Reviewed In This Document

CPG 3 Chapter	CPG Chapter	Section of Sustainability and Energy Statement
2	The Energy Hierarchy	**section 5.0 energy review** to **section 11.0 carbon offsetting**
3	Energy Efficiency: New Buildings	**section 6.0 'baseline' energy use** and **section 7.0 'be lean' energy use**
4	Energy Efficiency: Existing Buildings	Not Applicable - demolition proposed
5	Decentralised Energy Networks and Combined Heat and Power	**section 8.0 'be clean' energy use**
6	Renewable Energy'	**section 9.0 'be green' energy use**
7	Water Efficiency	**section 3.0 sustainability review**
8	Sustainable Use of Materials	**section 3.0 sustainability review**
9	Sustainability Assessment Tools	**section 3.0 sustainability review**
10	Brown Roofs, Green Roofs and Green Walls	**section 3.0 sustainability review**
11	Flooding	**section 3.0 sustainability review**
12	Adapting to Climate Change	**section 3.0 sustainability review**
13	Biodiversity	**section 3.0 sustainability review**
14	Local Food Growing	**section 3.0 sustainability review**

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KEY MEASURES

Purpose and Structure

This section presents a commentary on the proposed sustainable design and construction and energy measures for the scheme.

It is structured around the chapter headings of the 'CPG 3 - Sustainability' document, and addresses the requirements of the NPPF, London Plan and Camden Core Strategy and Development Plan policies.

Energy – please see sections 5.0 to 11.0 for details

The following commentary summarises the response of the scheme to the issues in the 'Energy Hierarchy', 'Energy Efficiency: New Buildings', 'Decentralised Energy Networks and Combined Heat and Power', and 'Renewable Energy' chapters of CPG 3.

- The scheme will robustly apply the Mayor's Energy Hierarchy and target achieving the London Plan CO_2 emissions targets in order to reduce energy consumption and CO_2 emissions, using dynamic thermal modelling to demonstrate compliance with, and exceedance of, the standards set by Part L2A 2013.
- The building fabric will be specified to meet or exceed the requirements within the applicable sections of the Building Regulations Part L 2013.
- Passive 'Be Lean' measures will include high performance solar glazing design, optimised for daylight. A balance has been struck between the need for effective daylighting and the desire to minimise excessive solar gains into the building.
- Active 'Be Lean' measures will include high performance plant, including boilers and vapour compression chillers, along with heat recovery ventilation measures. Low energy, high performance lighting systems will be used in order to meet the design and operational requirements in the most efficient way and all services will be designed to meet or exceed the CIBSE and BSRIA guidelines and the Non-Domestic Building Services Compliance Guides.
- Appropriate 'Be Clean' technologies have been reviewed, but there are no viable current or proposed community heating or cooling distribution networks near to the site and the use of CHP and CCHP has been discounted since it not technically feasible due to low demand and incompatibility with a VRF system.
- 'Be Green' measures have also been reviewed, with all zero carbon (renewable) technologies having been reviewed for viability under the proposed scheme. A combination of air source heat pump (VRF) and PV has been found appropriate for implementation.
- Using the above approach, thermal modelling analysis has indicated a current CO_2 emissions reduction performance of the proposed scheme of at least 16.5% better than the standard set by Part L2A 2013.

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Water Efficiency

POLICY AND SPD REQUIREMENTS

CPG 3 states that all developments are to be water efficient.

PROPOSED APPROACH

Water consumption shall be reduced in line with best practice identified within BREEAM and other guidance. At least 60% of the Credits within the Water Category of BREEAM NC 2014 will be achieved, as detailed within the BREEAM Design Stage Credit Tracker in **appendix b**.

Specific measures proposed include:

- A water meter shall be installed for the main office area and sub-meters to all areas of high water use (food and beverage outlet, showers, kitchenettes and irrigation systems where specified.
- All meters will be connected to and monitored by the Building Management System, (BMS) allowing monitoring and management of operational water use.
- The most significant use of water is likely to be within the office toilets and the showers and water efficient fittings are proposed throughout, including the installation of dual flush WCs, reduced flow basin taps and low flow showers.
- Typical sanitaryware specifications are likely to include:
    - Basin taps with flow restrictors or other measures to reduce the flow to ≤4 l/min.
    - Dual flush WC with 4.5L full flush, 2L half flush.
    - Kitchen taps with single lever and break-point, to reduce the flow to ≤6 l/min.
    - Low flow showers, with a flow rate of ≤6 litres/min.
    - Urinals, if installed, will have automatic flushing installed and be limited to 2 flushes per hour and ≤4.5 l/bowl.

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Sustainable Use of Materials

POLICY AND SPD REQUIREMENTS

CPG 3 states that developers should reduce waste by firstly re-using your building, where this is not possible implementing the waste hierarchy, which prioritises the reduction, re-use and recycling of materials. Materials should also be sourced responsibly and safe to health.

PROPOSED APPROACH

Building Reuse

The proposed development comprises comprehensive development of the site. In any event, the existing building quality is poor and in need of substantial redevelopment of the site and performs poorly in terms of sustainability. Opportunities to re-use existing elements of the existing built form have been explored but are not possible from a design point of view.

Construction Waste

The detailed design process will also adopt a formal materials efficiency assessment methodology in order to identify opportunities to optimise demolition materials recovery and reuse (via the waste hierarchy) and materials efficiency

A Resource Management Plan (RMP – formerly Site Waste Management Plan) shall be produced to optimise materials resource efficiency in line with the Waste Hierarchy (Reduce, Reuse, Recycle). The RMP will detail the design measures towards optimum use of materials, set specific targets for construction and demolition waste generation and appropriate mechanisms/protocols for segregating waste on-site and monitoring overall waste management.

In accordance with BREEAM targets, the development will achieve more than 80% by weight of construction waste to be diverted from landfill.

Sustainable and Responsibly Sourced Materials - Using the BRE Green Guide to Specification

Materials shall be specified in line with best practice for materials selection (environmental impact, and responsible sourcing) and resource efficiency (design for waste reduction, materials efficiency and recycled aggregates) as identified within BREEAM and other guidance.

Specific measures proposed include:

- The majority of building materials shall be specified to have an 'A' or 'A+' rating in the Green Guide to Specification, as a reflection of their lower environmental impact.
- Insulating materials used on site shall be specified to have a global warming potential (GWP) of less than 5 and an ozone depleting potential (ODP) of zero.
- Responsible sourcing of materials shall be pursued throughout the scheme; in particular all timber shall be certified as being responsibly sourced through a scheme such as FSC or PEFC and all timber shall be certified sustainable in line with the UK Government's Timber Procurement Policy.

At least 40% of the Credits within the Materials Category of BREEAM NC 2014 will be achieved, as detailed within the BREEAM pre-assessment Credit Tracker in **appendix b**.

The availability of locally sourced materials shall be investigated during the detailed design stage and these materials specified where possible to reduce site related transport emissions.

The robustness and resilience of specified materials shall be a key consideration during the design process, to optimise building element longevity in the light of anticipated wear and tear and weather/environmental impacts.

Recycling

Opportunities for the reclamation and reuse of aggregates on site shall be investigated during the detailed design stage and maximised through careful specification and construction management. This is considered to be achievable.

3.0 sustainability review…

…sustainable building services solutions

Sustainability Assessment Tools – Please refer to section 4.0 Sustainability and appendix b.

POLICY AND SPD REQUIREMENTS

CPG 3 states that Developments of 500 m^2 or more of non-residential floorspace will need to be designed in line with BREEAM.

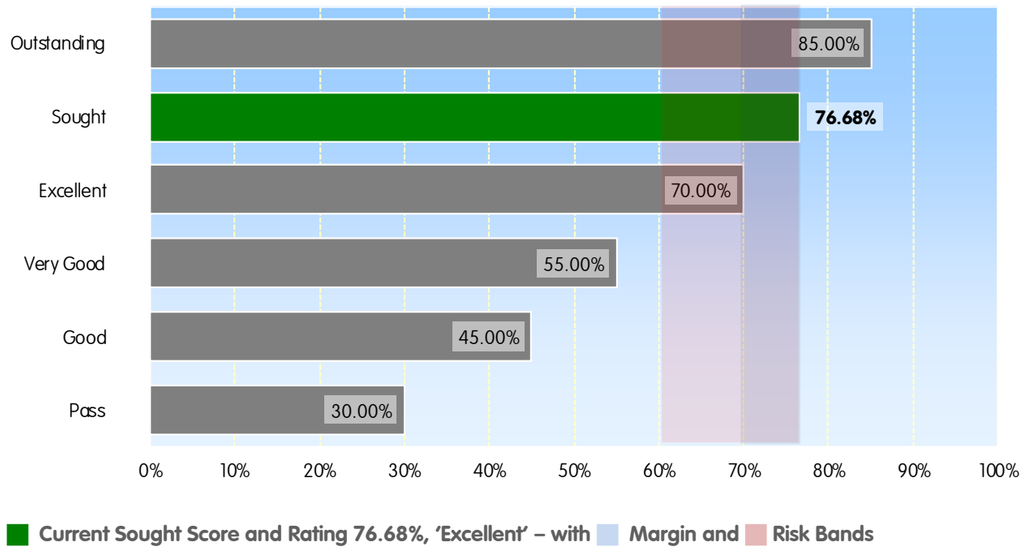
PROPOSED APPROACH

In line with CPG 3 and Policy DP22 and in order to evaluate the overall sustainability and measures included to mitigate the development's environmental impact, the building is to undergo a full sustainability assessment process under BREEAM New Construction 2014 and achieve formal certification.

The assessment is currently at the Design Stage, with mTT/SUSTAIN acting as the licensed BREEAM Assessor and BREEAM Accredited Professional.

The assessment demonstrates that an 'Excellent' rating is achievable for the scheme, with an overall Credit score of 76.78% being sought.

The London Borough of Camden requirement that at least 60% of the available Credits are achieved in the Energy category, 40% in the Materials category and 60% in the Water category has been addressed and satisfied.



Brown Roofs, Green Roofs and Green Walls

POLICY AND SPD REQUIREMENTS

CPG 3 states that all developments should incorporate green and brown roofs, depending on the nature of the development, its location and other factors.

PROPOSED APPROACH

At 3-6 Spring Place the roof space will be either sloping or used to accommodate plant or PV panels. Roof access will also be restricted due to the proximity of the railway. As a result the provision of green roofs is not considered possible or appropriate.

Feedback has been provided during pre-application engagement that a green wall on the southern elevation (a party wall adjacent to a future development site) is not appropriate from a design point of view. There would also be upkeep and management difficulties with this.

The proximity of the railway also precludes the provision of a green wall on the western elevation.

Planting on the perimeter of the roof areas and other building-integrated planting (in addition to the planters within the courtyard areas) will be provided as shown indicatively on the following image and the application design documents:

Architects Indicative CGI Image of the Proposed 3-6 Spring Place Redevelopment

3.0 sustainability review…

…sustainable building services solutions

Flooding

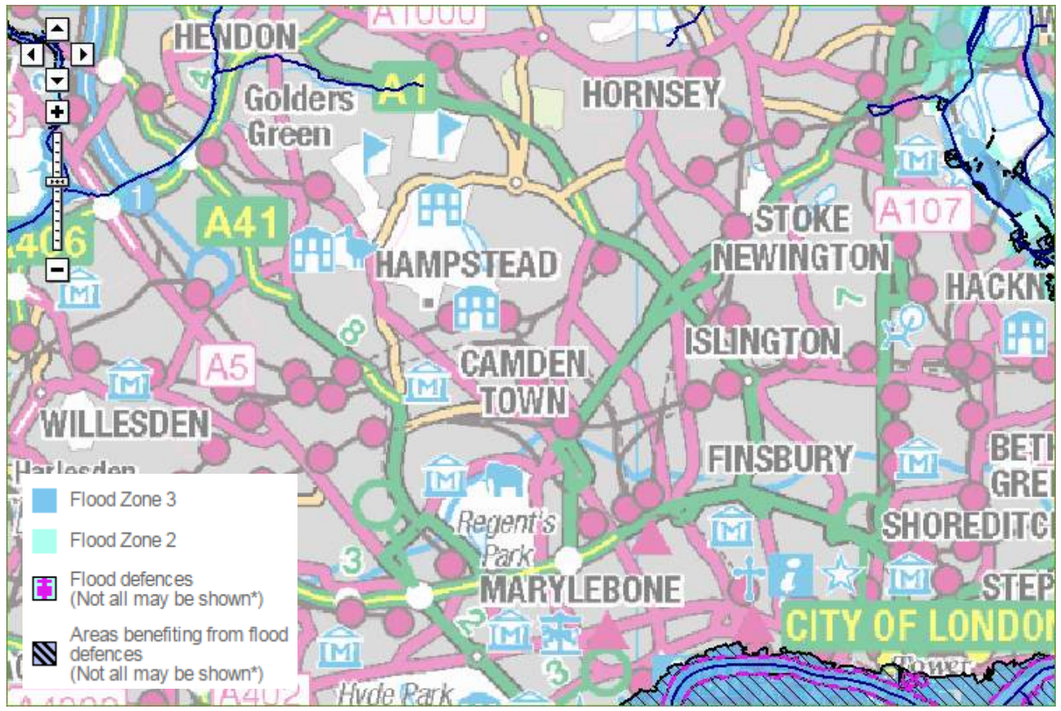
POLICY AND SPD REQUIREMENTS

CPG 3 states that all developments should prevent or mitigate against flooding and manage drainage and surface water.

PROPOSED APPROACH

Flood Risk

According to the Environment Agency's indicative flood mapping, the site is located within a Flood Risk Zone 1 area. The site is considered to be at a low probability of flooding from tidal and fluvial sources.



Borough-Wide Flood Risk Map from Environment Agency, showing the Site is within Flood Risk Zone 1

Drainage and Surface Water

A full formal assessment of potential Sustainable Urban Drainage System (SUDS) approaches for the proposed redevelopment has been undertaken by Heyne Tillett Steel. This is documented in the Surface Water Management Plan report which forms part of this planning application.

All SuDS methods have been assessed to establish whether they are feasible for the development in order to reduce the surface water run-off rate.

The report has identified that due to the size and nature of the site, and as well as the ground conditions, the most appropriate means of run-off reduction is a control diameter no smaller than 100mm (to conform to CIRIA guidance, and Thames Water approval).

This achieves a 10 l/s discharge rate, a 67% betterment of the pre development peak 1 in 1-year rate, an 86% betterment of the pre development peak 1 in 30-year rate, and an 89% betterment of the pre development peak 1 in 100-year rate.

As the surface water is restricted, attenuation will be provided in the form of below ground cellular storage for all storm events up to and including the 1 in 100-year (Inc. climate change), with a required attenuation volume of 70m.

The surface water management of the post development site will reduce the flood risk for the site and areas within the vicinity of the site.

3.0 sustainability review…

Adapting to Climate Change

POLICY AND SPD REQUIREMENTS

CPG3 notes that all developments should consider how it can be occupied in the future when the weather will be different, with Policy CS13 expecting developments to be designed to consider the anticipated changes to the climate, especially developments vulnerable to heat and in those locations susceptible to surface water flooding and Policy DP22 requiring development to be resilient to climate change by ensuring schemes include appropriate adaptation measures.

Key considerations include summer shading and planting, limiting run-off, reducing water consumption, reducing air pollution; and avoiding vulnerable uses in basements in flood-prone areas.

KEY ISSUES

At the detailed design stage a formal climate change adaptation strategy appraisal will be undertaken for structural and fabric resilience in accordance with the recommended approach for BREEAM NC 2014 Credit WST 6 Adaptation to Climate Change.

Accordingly, a systematic structural and fabric resilience specific risk assessment will be used to identify and evaluate climate change impacts on the building over its projected life cycle from extreme and altered weather conditions arising from climate change specifically identified for Camden. Leading from this process, site specific mitigation measures for these potential impacts will be proposed.

CPG3 notes that the changing climate is likely to mean that Camden will experience warmer, wetter winters with more intense rainfall/local flooding events and hotter drier summers with especially poor air quality and changing ground conditions (affecting structural stability and foundation design).

This study will include input for the Architect, Structural Engineer and Building Services Engineer and take into account specific pressures/hazards including solar radiation, temperature variation, water/moisture, wind, precipitation e.g. rain and snow, extreme weather conditions: high wind speeds, flooding, driving rain, snow, rainwater ponding and subsidence/ground movement.

PROPOSED APPROACH

As noted in the section on biodiversity, building-integrated planting and free standing planters will be incorporated into the scheme, which will yield some evaporative cooling benefit. These will be selected to use drought resistant or low water use plants to reduce or remove the water demand for irrigation. The external courtyard and open railway arch will provide a European style shaded square and seating area setting which will provide useful covered amenity for occupants and visitors.

View Through to External Courtyard

In terms of building fabric and services design, the scheme has been designed to incorporate an appropriate level of glazing to provide natural daylighting to the occupied spaces without yielding excessive overheating.

Consideration of thermal mass, orientation and natural ventilation for the proposed building are reviewed in the Energy Statement as part of the overall overheating mitigation strategy.

Opaque and glazed materials shall be specified to prevent penetration of heat into these spaces. The VRF-based services strategy will avoid the generation of nitrous oxide (NOx) emissions from boiler at the site, maintaining local air quality.

The proposed Sustainable Drainage Systems (SUDS) system described in the Flooding commentary above will limit both the volume and rate of runoff during heavy rainfall and storms and have been designed to accommodate a 1 in 100 year storm event taking into account climate change effects. The site has not been identified as a flood-prone area, and here will be no vulnerable uses in the basements.

As previously noted in the Water Consumption commentary, water efficient fixtures and fittings are proposed throughout the development to reduce demand for water.

3.0 sustainability review…

…sustainable building services solutions

Biodiversity

POLICY AND SPD REQUIREMENTS

CPG3 notes proposals should demonstrate how biodiversity considerations have been incorporated into the development, whether any mitigation measures will be included; and what positive measures for enhancing biodiversity are planned.

PROPOSED APPROACH

Biodiversity shall be promoted and protected within the development recognising the habitat corridor running through the site. Peak Ecology have undertaken an Ecological Appraisal (including bat survey) providing recommendations which have informed the final scheme.

The existing site is defined as land of low ecological value, comprising hard standing and buildings. Due to the Site's constrained area, the ability to influence biodiversity at ground level is limited, but opportunities for landscaping and planting have been pursued for the various areas of green space on the site.

If any features of ecological value (adjacent to the construction zone) may be affected by the proposed works, these will be protected in line with the best practice requirements.

Local Food Growing

POLICY AND SPD REQUIREMENTS

CPG 3 States that Camden will 'encourage food to be grown wherever possible and suitable', and indicates that the incorporation of infrastructure for growing food is particularly appropriate to the design of housing, developments providing food retail and restaurant outlets, hospitals and schools.

PROPOSED APPROACH

At 3-6 Spring Place the roof space will be either sloping or used to accommodate plant or PV panels and roof access will be restricted due to the proximity of the railway. As a result there are no areas of soft landscaping on the roof or across the wider site.

Since the proposed redevelopment of 3-6 Spring Place predominantly provides office accommodation, with only a relatively small food and beverage area, the provision of infrastructure for growing food is not considered viable or appropriate for the scheme.

4.0 sustainability benchmarking…

…sustainable building services solutions

OBJECTIVE

The purpose of this section of the Sustainability and Energy Report is to review the BREEAM NC 2014 assessment of the scheme and demonstrate that it is reasonable to expect that the requirement for an 'Excellent' rating given in CPG 3 will be met.

BACKGROUND

The Need for Sustainability Benchmarking

The redevelopment of 3-6 Spring Place should not only claim 'environmental friendliness' or 'sustainability credentials' but also be able to demonstrate such claims through benchmarking against a range of independent best practice sustainability targets.

Sustainability benchmarking systems will allow the Project Team to establish where they want to be with the performance of the scheme, decide how they are going to get there and to measure their progress along the way.

Effective sustainability benchmarking systems recognise the links between economic, social and environmental systems and allow the sustainability of a project to be measured and compared with best practice options. The purpose of the sustainability benchmark is to combine an appraisal of all the diverse issues that need to be considered to assess the sustainability of a project into a meaningful ranking against such best practice approaches.

Methodology

The sustainability assessment tools that the London Borough of Camden uses is BREEAM (Building Research Establishment Environmental Assessment Method).

In the case of 3-6 Spring Place, BREEAM New Construction 2014 (NC 2014) has been identified as the most appropriate version of the benchmark for the project.

The proposed development has been registered under this scheme with its operator, the BRE (Building Research Establishment) and the Design Team has been engaged in pre assessment workshops to establish the optimal measures for the development, under the guidance of a BREEAM Assessor and BREEAM AP.

BREEAM ASSESSMENT

Introduction

The Building Research Establishment Environmental Assessment Method (BREEAM) is a widely used methodology for quantifying the environmental impact of buildings. It has been in use since 1990, with periodic updates to reflect best practice and aspirational sustainability performance.

BREEAM is a performance based assessment method and certification scheme which seeks to improve the environmental performance of new buildings whilst promoting a healthy indoor environment for occupants, with BREEAM New Construction 2014 (NC 2014) being the version of the scheme for newly constructed nondomestic buildings.

The issues reviewed by the BREEAM assessment help inform detailed decision making at all stages of design development to completion, enabling continual monitoring and improvement in sustainability performance, and assisting in the delivery of sustainability objectives.

Methodology

The environmental impacts of a new development are assessed at the design stage, and compared with good practice by an independent BREEAM Assessor. The development is also assessed at post construction stage to ensure that the measures targeted at the design stage have been included in the completed development, at which point the final BREEAM certificate is issued.

At each stage 'Credits' are awarded to a building in terms of management, energy use, health and wellbeing, pollution, transport, land use, ecology, materials, waste and water according to its performance. A set of environmental weightings then enables the Credits to be added to produce a single overall score. The building is then rated on a scale of Pass, Good, Very Good, Excellent, or Outstanding and a certificate awarded.

BREEAM assessments are carried out by specialist Assessors who are trained and licensed by BRE. BRE is also responsible for the quality assurance process and the development is certified by them following receipt of the final report from the Assessor, accompanied by the evidence package provided by the project team.

Optimising Sustainability Performance and BREEAM Ratings

The most valuable and cost effective way to use a target BREEAM rating to encourage high sustainability performance is to introduce the main issues at an early stage in the design process, to form a focus for the discussion of the environmental impacts of the building.

Input is needed from across the design team. Although the architect and building services designers have the largest involvement, the project manager, structural engineer and contractors all may have a part to play. In addition, the Quantity Surveyor should have an input where there is potential for items on the Cost Plan to be added or amended.

4.0 sustainability benchmarking…

…sustainable building services solutions

Issues, Categories and Scoring

Credits are awarded for achieving specified levels of performance set by BRE under a large number of issues, which are grouped into nine categories of sustainable design and construction as follows:

- Energy – Operational Energy and CO_2
- Management – Issues related to site operation and commissioning
- Transport – Local issues related to transport
- Pollution – Air and Water Pollution (excluding CO_2) and surface water run off
- Waste – Operational and construction waste
- Materials – Environmental implications of materials selection, recyclable materials
- Water – Consumption issues
- Ecology and Land Use – Ecological value of the site, planting and landscaping
- Health and Wellbeing – Internal and external issues relating to health and comfort

Credits are awarded by a BREEAM Assessor to give a score for each section which is multiplied by the relevant environmental weighting allocated to each category. These weightings help define and rank the impact of the environmental issues.

The category scores are combined into a total BREEAM score, expressed as a percentage of the maximum achievable score.

BREEAM Ratings

The building's overall performance is expressed as rating from 'Pass' to 'Outstanding', which is determined from the total BREEAM score.

In addition to this threshold score, there are mandatory performance levels for certain issues at each rating level.

Assessment Process

To ensure that certification can be awarded, the BREEAM scheme requires formal evidence for each feature of the development assessed – in the form of calculations, specification extracts, annotated drawings, minutes of meetings, manufacturer's product information or formal correspondence.

The role of the BREEAM Assessor is to coordinate the input of the team, and to track the development of ideas over time.

BREEAM NEW CONSTRUCTION 2014 ASSESSMENT METHODOLOGY

Background

BREEAM New Construction 2014 (NC 2014) is the current version of BREEAM for newly constructed non-domestic buildings. The scheme is administered by the Building Research Establishment.

BREEAM NC 2014 seeks to improve the environmental performance of new buildings whilst promoting a healthy indoor environment for occupants.

The environmental impacts of a new development are assessed at the design stage and compared with good practice by independent BREEAM Assessors. The development is finally assessed at post construction stage to ensure that the measures targeted at the design stage have been included in the completed development.

Optimising Scores and Performance in BREEAM NC 2014

There are a number of features within the BREEAM NC 2014 scheme that encourage performance, as follows:

- Minimum standards for higher levels of performance within CO_2 emissions reduction and other issues
- Minimum standards at BREEAM entry level (before any BREEAM rating may be achieved) within energy efficiency, ventilation, safety and responsible sourcing of timber
- Tradable Credits with no minimum standards

4.0 sustainability benchmarking…

…sustainable building services solutions

BREEAM NEW CONSTRUCTION 2014 ASSESSMENT OF 3-6 SPRING PLACE

Background

MTT/SUSTAIN have been appointed to undertake a BREEAM New Construction 2014 ('NC 2014') assessment for 3-6 Spring Place, with a target rating of 'Excellent' sought for the development in accordance with the planning policy requirements of the London Borough of Camden (Policy CS13).

Assessment Type

The scoring presented is based on a BREEAM NC 2014 assessment, on the basis of guidance from the BRE (the scheme's operator) on applicable assessment types for a project of this type.

Assessment Process

The BREEAM assessment summarised in this report has been developed by a BREEAM Accredited Professional (AP) and the current predicted rating is based on BREEAM Pre Assessment review held with the Project Team, including the Applicant.

The scoring shown in this report is based on the discussions during this workshop and further dialogue with members of the team (client, architects, engineers and other specialists). For each available 'Credit', a score has been identified. The Project Team are aware of and have pursued the 'Mandatory Credits' to achieve a BREEAM 'Excellent' rating, the Credits requiring early action and the Credits which may need the appointment of additional external consultants.

The pre assessment Credit selection has been evolved into a Design Stage Credit Tracker which is being used to manage the assessment process through the design stages.

BREEAM Assessor

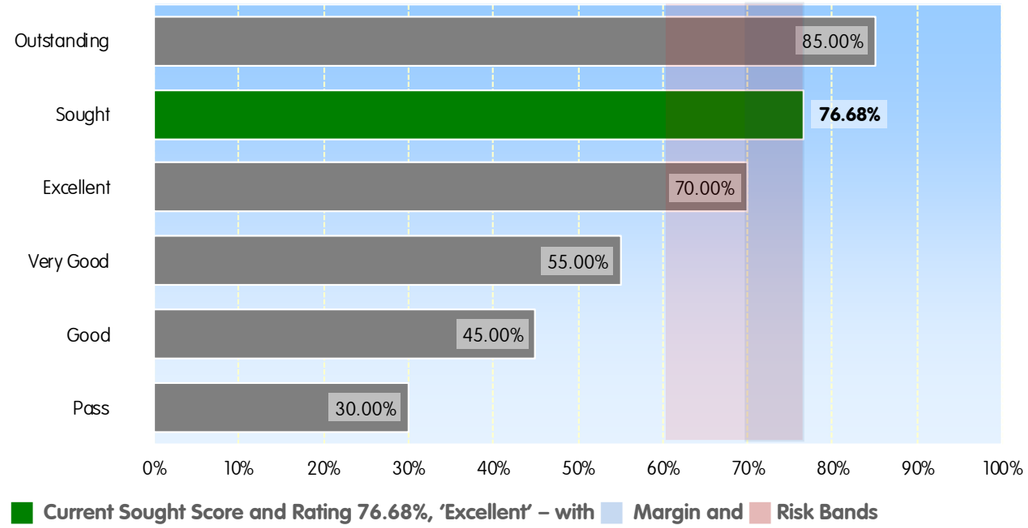
The BREEAM pre-assessment has been produced by Martin Lawless of MTT/SUSTAIN Limited, a licensed BREEAM Assessor and Accredited Professional (BREEAM Assessor and Ref. MTTS-ML04).

Current Position

TARGET SCORE AND RATING

The current Design Stage Credit Tracker shows a sought target score of **76.68%** equivalent to a BREEAM rating of **'Excellent'**. The required rating for the project is 'Excellent', which has a threshold score of 70%.

Accordingly, the required rating is considered likely to be secured, with a fair margin of 6.68% available over the 'Excellent' threshold. Please refer to **appendix b** for a full copy of the current Design Stage Credit Tracker report.



As indicated in the purple bar above, the theoretical 6.68% margin over the 'Excellent' threshold may be diminished by some 'High Risk' issues (i.e. items which may be challenging to deliver in the completed scheme). These will be resolved during the detailed design stage.

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4.0 sustainability benchmarking…

…sustainable building services solutions

Predicted Rating

SUMMARY TABLE

The table below summarises the current Credit scores targeted by category at the Design Stage:

Category	Available Credits	Current Credits Sought	% of Category Achieved	Category Weighting	Weighted Credit Score
Management	21	20	95%	12%	11.43%
Health and Wellbeing	17	11	65%	15%	9.71%
Energy	23	15	65%	15%	9.78%
Transport	9	9	100%	9%	9.00%
Water	8	6	75%	7%	5.25%
Materials	13	9	69%	13.5%	9.35%
Waste	9	8	89%	8.5%	7.56%
Land Use and Ecology	10	10	100%	10%	10.00%
Pollution	13	6	46%	10%	4.62%
Exemplary					
Total BREEAM Score					**76.68%**

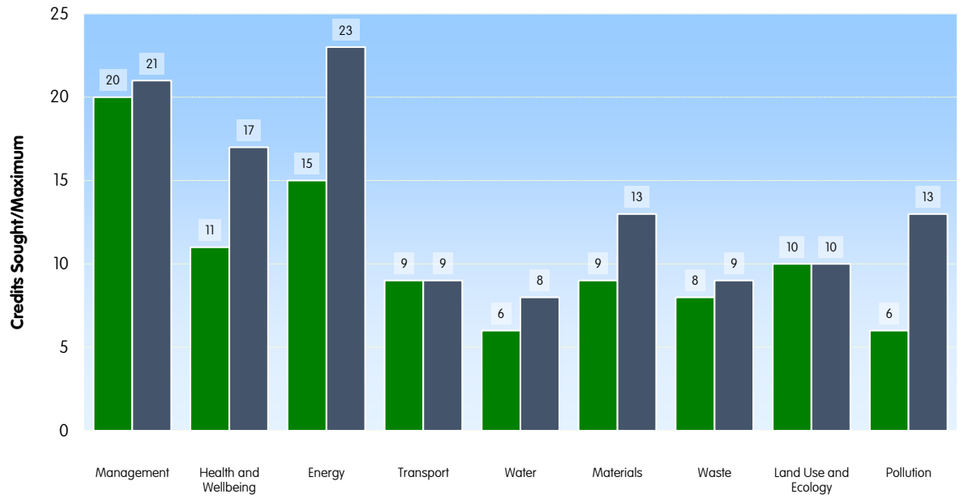
A copy of the full Credit Tracker report with a description of each Credit has been provided in **appendix b.**

NOTES

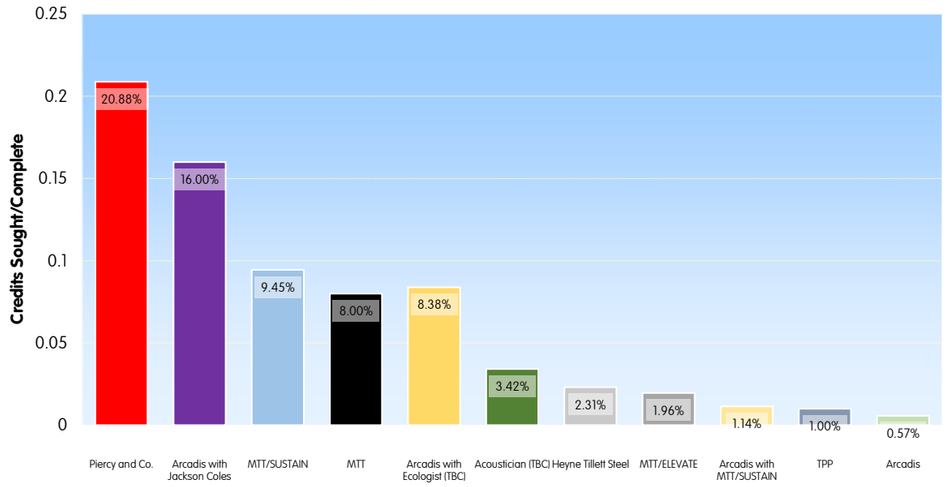
The mandatory requirements for an 'Excellent' rating (Man 03: Responsible Construction Practices, Man 04 Commissioning and Handover, Man 5 Aftercare, Ene 01 Reduction of Energy Use And Carbon Emissions, Ene 02 Energy Monitoring, Wat 01 Water Consumption, Wat 02 Water Monitoring, Mat 03 Responsible Sourcing of Materials, Wst 03 Operational Waste, LE 03: Minimising Impact on Existing Site Ecology) are all considered to be achievable and are included in the sought Credits.

The scoring represents the potential score for the scheme rather than the actual achieved rating. A BREEAM rating can only be formally achieved after completion of construction and when all necessary evidence for the BREEAM Credits has been collected and BRE have formally certified the assessment.

SUMMARY GRAPHS



Credit Scores by Category Sought and Maximum



Credit Scores by Responsible Party

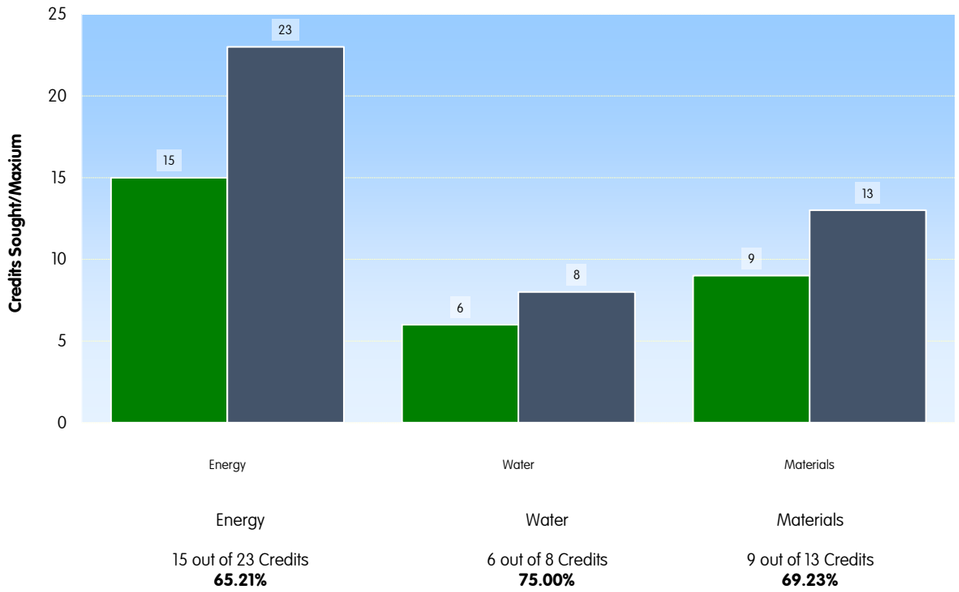
4.0 sustainability benchmarking…

…sustainable building services solutions

LONDON BOROUGH OF CAMDEN SPECIFIC BREEAM TARGETS

It is understood that the London Borough of Camden have a requirement that at least 60% of the available Credits are achieved in the Energy category, 40% in the Materials category and 60% in the Water category.

The pre-assessment Credit Tracker and the graph below demonstrate that this requirement has been addressed:



Energy	Water	Materials
15 out of 23 Credits	6 out of 8 Credits	9 out of 13 Credits
65.21%	**75.00%**	**69.23%**

Credit Scores in the Energy, Water and Materials Categories Sought and Maximum

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5.0 energy review…

…sustainable building services solutions

OBJECTIVE

The purpose of this section of the Energy Statement is review the methodology used in the production of the energy strategy for 3-6 Spring Place.

GENERAL METHODOLOGY

The GLA Guidance Note 'Guidance on Preparing Energy Assessments' Approach

This Energy Statement meets the requirements of the London Plan (and specifically the GLA Energy Team's Guidance Note 'Guidance on Preparing Energy Assessments' March 2016); and follows the Energy Hierarchy (Use Less Energy - 'Be Lean', Supply Energy Efficiently - 'Be Clean' and Use Renewable Energy - 'Be Green'), an effective and robust framework for appraising appropriate measures to reduce carbon emissions and other climate impacts from the development. This is because it provides more up to date guidance and represents current best practice.

The Energy Hierarchy

Energy Hierarchy stage		Typical Measures Investigated
'Be Lean'	Use Less Energy -	• Reduce use through behaviour change. • Incorporate passive heating and cooling and reduce cooling loads via the 'Cooling Hierarchy'. • Install energy efficient lighting and appliances.
'Be Clean'	Supply Energy Efficiently	• Use Combined Heat and Power (CHP/CCHP). • Use existing heating and cooling networks. • Facilitate future use of proposed community heating and cooling networks. • Use site-wide heating networks.
'Be Green'	Use Renewable Energy	• Install renewable energy technologies on-site. • Import renewable energy from off-site.

The following commentary provides more details on each of the steps of the energy strategy following this Energy Hierarchy.

DETAILED METHODOLOGY

Background

At each stage of the Energy Hierarchy detailed energy modelling (via Dynamic Simulation Modelling) has been undertaken based on the methodology from Part L 2013 of the Building Regulations in order to establish the baseline carbon emissions (i.e. the regulated carbon emissions from the current building). The thermal model parameters applied are set out in **appendix c**. All analysis in this document adopts the Building Regulations Part L 2013 CO_2 fuel factors.

The measures at each stage of the Energy Hierarchy described on the following page in brief and detailed information is provided in **sections 8.0, 9.0 and 10.0**.

5.0 energy review…

…sustainable building services solutions

Be Lean

Means of reducing energy demand energy by maximising passive and energy efficiency design measures have been reviewed and selected. This includes optimising building orientation, shading, thermal performance, optimising HVAC plant and efficiency along with all other fixed building services, with a particular focus on lighting efficiency.

As part of this assessment the London Plan's 'Cooling Hierarchy' (as described in London Plan Policy 5.9(B)) has also been considered in the design process, to ensure design proposals reduce or eliminate where possible the extent and installed capacity of cooling plant.

Be Clean

Means of supplying energy efficiently, using viable low carbon technologies, are then reviewed. This includes feasibility assessments of Combined Heat and Power (CHP) and allied systems. Additionally, the viability of connection to any waste heat or Community Heating/Energy networks.

Be Green

Low and Zero Carbon (renewable energy) technologies are reviewed in detail for feasibility within the scheme, relating to the 'Be Clean' and 'Be Green' elements of the London Plan Energy Hierarchy. This section is also structured to respond to BREEAM Credit Ene 04 Low Carbon Design - Low or Zero Carbon Technologies.

Part L Compliance and Baseline

The building is subject to Building Regulations Part L2A, the current Approved Document for which is '2013 edition incorporating 2016 amendments'. Accordingly, under Criterion 1, it must be demonstrated that the CO_2 emissions calculated for the building as designed are no greater than those for the 'notional' building.

This comparison is undertaken via a thermal model using an approved software package and operator. The same model is used for other assessed aspects of the building's energy performance.

THERMAL MODEL

Introduction

Regulated energy demand and consumption and the associated CO_2 emissions for the proposed development have been calculated using Dynamic Simulation Modelling software. This type of software tracks the thermal state of the building on an hourly basis using real weather data, resulting in a detailed picture of the buildings performance.

Dynamic Simulation Modelling

Dynamic Simulation Modelling (DSM) combines mathematical routines simulating several heat and mass transfer mechanisms to calculate the building response. These mechanisms include:

- Conduction
- Convection
- Long wave radiation
- Short wave radiation – absorbed, reflected and transmitted
- Internal conditions – gains from lights, equipment and occupants along with plant operating hours and natural infiltration rates
- Ventilation and air movement from internal natural convection.

This level of detail allows realistic variations in fabric thermal storage (thermal mass effects) weather conditions, occupancy, internal and solar gains to be taken into account and their effects upon the building's internal environment and plant operation to be modelled effectively.

DSM uses zone specific operational profiles (occupancy, lighting, ventilation and DHW demand) and building services performance data along with 3D building geometry and appropriate weather data to effectively model and predict the energy performance of a building.

3D Model

The building and areas under assessment, namely offices, circulation, sanitary and plant areas were modelled for this simulation. The whole block and surrounding site was included in the model to account for the effects of shading and protection.

Images from the 3-6 Spring Place thermal model are shown on the following page.

5.0 energy review…

…sustainable building services solutions

Weather Data

To accurately model the dynamic nature of the buildings thermal response, hourly weather data is used in the DSM process. Typically such data will reflect records of radiation, temperature, humidity, sunshine duration and wind speed and direction throughout the period of a year.

In accordance with CIBSE TM 32:2003 and the NCM Modelling Guide (2013 Edition), the year's weather data applied to the Part L assessments is a CIBSE Test Reference Year (TRY) and based on an average of approximately 20 years.

The TRY consists of hourly data for twelve typical months (selected from approximately 20-year data sets and synthesised to provide a composite one-year sequence of data) allowing the representative energy performance of buildings to be assessed by software simulation under standard weather conditions.

The specific TRY file is based on proximity to the proposed site location – in this case of 3-6 Spring Place the London TRY is applied as it is the most appropriate for the site locations in London.

Software Used

For the purposes of this Energy Statement the Tas dynamic simulation modelling package, from Environmental Design Solutions Limited (EDSL) has been used. The version of the software used was v9.3.3. The version of the National Calculation methodology used was NCM v5.2.4.

EDSL Tas is a fully validated software package based around a 3D geometrical model that is approved by the Department for Communities and Local Government for the purpose of demonstrating compliance with the Building Regulations and for generating Energy Performance Certificates.

Carbon Emissions Factors

Carbon Emission Factors are used to calculate the equivalent CO_2 emissions associated with different fuels. For example, 1 kWh of power from grid-supplied electricity will be associated with significantly higher CO_2 emissions than 1 kWh of power from natural gas.

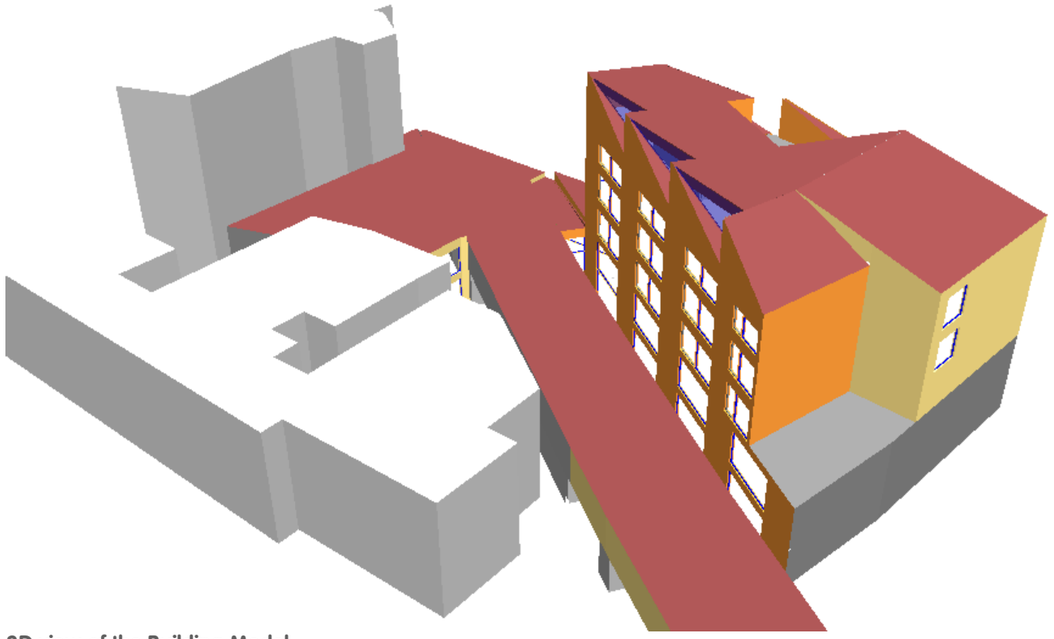
For the purposes of this study, the Carbon Emission Factors used in the Building Regulations Part L 2013 have been adopted throughout.

Further Details

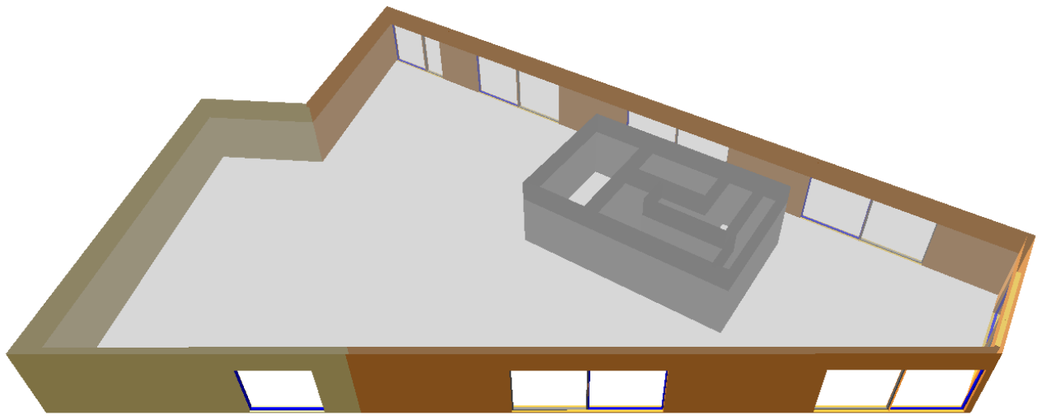
The results presented in this document are derived from the thermal model runs noted in **appendix c**, based on the Piercy and Co. general arrangement and façade drawings. Images from the thermal model are shown on the following page.

3-6 Spring Place Thermal Model Images

The images below are extracted from the Tas model demonstrating the 3D building model's indicative geometry:



3D view of the Building Model



Typical (2nd) Floor of the Building Model.

6.0 'baseline' energy use…

…sustainable building services solutions

OBJECTIVE

Before energy efficiency measures are investigated, it is important to establish the baseline Energy Consumption of the scheme, for comparison and evaluation of energy proposals.

SCOPE

For energy assessments being undertaken under the methodology of the GLA Energy Team's Guidance Note 'Guidance on Preparing Energy Assessments' March 2016, the baseline energy assessment must establish the regulated CO_2 emissions that the heating would be provided by 'gas boilers and that any active cooling would be provided by electrically powered equipment'.

All energy uses, and not just the conventional building services loads (lighting, heating, cooling and ventilation) and energy loads associated with the function of the site should be considered in the establishment of the energy profile, and especially in the selection of a building services strategy and any renewable energy technology.

The following 'regulated' energy uses are considered in the baseline energy analysis:

- Space Heating/Cooling
- Water Heating
- Ventilation
- Fans, Pumps and Controls
- Lighting (internal)

The regulated energy uses can be established using the robust and well-established calculation methodology of Part L of the Building Regulations Part L. However, energy and carbon emissions calculated for Part L do not consider all energy demands and omit assessment of:

- Appliances
- Cooking
- External Lighting
- Lifts

Heating and lighting to common areas internally and external lighting has also been included in this assessment using benchmark figures.

CALCULATION PROCESS

Overview

Energy consumption related to regulated energy use of the scheme have been established from the building emission rate, via the building regulations part L2A methodology. The proposed building was modelled using EDSL Tas which is an accredited building simulation tool. The specification of the existing building and notional extension incorporates all upgrades that will be included in the requirements for consequential improvements. In this case, building services efficiencies and controls will meet the minimum requirements set out in the Non- Domestic Building Services Guide, the lighting shall achieve a lamp efficacy of 60 lamp-lumens per circuit-watt.

Thermal modelling has been brought forward to this planning stage to provide the basis for the Energy Consumption calculations used for the renewable energy assessment and to help check that the built form is on target to satisfy the requirements of Part L2A of the Building Regulations, prior to planning, to avoid rework post planning approval. Further details of the thermal modelling parameters are given in **appendix c**.

Regulated Energy Use

Baseline CO_2 Emissions related to regulated energy use in the scheme have been established under the Building Regulations Part L, specifically based on the Tas thermal model based on the National Calculation Methodology.

For further details of the Tas calculation parameters please refer to **appendix c**.

Non-Regulated Energy Use

Energy use associated with non-Building Regulation elements (small power, equipment, external and common areas lighting, etc.), known as 'non-regulated' have been calculated from industry benchmarks or by the Tas thermal model and incorporated in the assessment.

RESULTS

Due to the use of the building as an office, a significant proportion of the energy use is related to non-regulated energy demand – IT, desktop computing, photocopiers etc. These issues are largely in the control of the occupier, but good energy management and metering can reduce their size.

The baseline energy analysis shows that for offices, the regulated energy use in the building is dominated by cooling, ventilation and lighting energy use, which account for 84% of the overall building energy use. Heating represents 5% of the regulated annual energy consumption.

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7.0 ‘be lean’ energy use…

…sustainable building services solutions

OBJECTIVE

This section of the Energy Statement encompasses the first stage of the Energy Hierarchy, identifying measures to reduce the ‘baseline’ energy demand for the development by passive and active means.

In establishing the proposed energy strategy and servicing strategy for the development, opportunities to minimise energy consumption through available building fabric and building services measures has been considered a priority.

Any measures implemented at this stage will reduce the extent of measures or size of plant needed to address the subsequent ‘be clean’ and ‘be green’ stages.

SCOPE

Regulated Loads

Based on the initial calculations and the project’s characteristics, a number measures to reduce regulated loads have been considered for 3-6 Spring Place.

A consideration of ‘passive’ measures to improve building performance (generally related to the building’s architectural form and specification) includes items such as:

- Improving building fabric thermal performance;
- Improving building fabric air permeability;
- Reducing the effect of thermal bridging;
- Use of natural daylighting;
- Good solar shading.

The performance of the façade and in particular the glazing, will have a significant impact on the building’s performance.

With respect to ‘active’ measures, the building services strategy has been developed in response to the following drivers for the project:

- Maximising the potential of the building to satisfy market expectations (balancing of scope of works with value to create the optimal specification)
- Achieving environmental comfort condition and occupant wellbeing buildability and avoiding unnecessary costs of construction

The guidance given in the London Plan’s ‘Cooling Hierarchy’ has been considered in the design process, to reduce where possible the extent and installed capacity of cooling plant.

Unregulated Loads

As the majority of the unregulated loads arise from the use of the building by the incoming office tenants, the developer has limited scope to reduce the associated energy consumption and CO_2 emissions associated.

However, the provision of a Building User Guide/Tenant’s Manual for the development will provide a means of encouraging more energy-efficient behaviour, whilst the specification of user friendly controls to the building services will enable this to occur.

7.0 'be lean' energy use…

…sustainable building services solutions

COOLING HIERARCHY

Overview

A range of measures have been adopted in the fabric and services designs to reduce the energy demand of the scheme. With respect to building services issues in particular, the design approach for the 'be lean' stage has followed the 'cooling hierarchy' set out in the London Plan, in accordance with the following design and technology considerations:

Minimise Internal Heat Gains Through Efficient Lighting Design

- Improved lighting efficiency including daylight control.
- Internal gains to be reduced by specifying energy efficient equipment, lamps and luminaires, or controls to switch off lighting and other equipment when not required.
- It is noted that occupancy levels and small power loads will be dictated by the intended use of the space.

Reduce Solar Gains Through Optimised Glazing Design and Specification

- This element is challenging due to the need to maximise daylighting, which has proven wellbeing benefits to occupants.
- The high performance solar glazing for the extension reduces the heat entering the building and the heat generated inside the building, reducing the cooling demand.
- Preliminary analysis has been carried out with respect to CIBSE guidance and Part L 2013 Criterion 3.
- Based on the analysis it was recommended to allow for high performance solar glazing to reduce solar gain.

Reduction of the Amount of Heat Entering the Building in Summer

- Dynamic Simulation Modelling (DSM) has been used to analyse the performance for a number of glazing types, with satisfactory results being found for the preferred glass types (please refer to **appendix c**) which are carried forward to the proposed design and Part L2A 2013 assessments.

Passive Ventilation

- Due to site constraints it was not technically feasible to allow for passive measures such as cross ventilation and passive stack.

Efficient Space-Conditioning Design

- Providing a high level building management strategy for future occupants, particularly with respect to optimising the building's operation, small power loads and equipment.
- Provision will be made for different units to be metered and billed separately in order to encourage operational energy efficiency and responsible use of heating/cooling.
- All mechanical and electrical systems were considered to accommodate changing occupancy and equipment densities.

Efficient Mechanical Ventilation Design

- A ventilation system incorporating heat recovery has been specified.
- Specific Fan Powers of 1.75 W/l/s and a high efficiency heat exchanger shall be specified.

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7.0 'be lean' energy use…

…sustainable building services solutions

KEY ISSUES

The following table summarises the review of potential 'be lean' energy efficiency technologies which could be incorporated into the proposed new-build extension.

It indicates whether each is considered viable for the 3-6 Spring Place redevelopment and summarises reasons for either discounting or including them. A CO_2 emissions saving is also identified where relevant.

Energy Hierarchy Stage	Technology	Viability for 3-6 Spring Place	Commentary	CO_2 reduction Tonnes/annum	CO_2 reduction %
Be Lean	Orientation and Shading	**YES**	The orientation of the building favours good solar control with the main elevation of the building facing approximately east and west, allowing solar control through high performance solar glazing without the need for complex external shading features and providing good daylighting.	SEE BELOW	SEE BELOW
	Building Fabric Improvements	**YES**	High performance building fabric with high performance solar double glazing, low U-values and low air permeability rates, which exceed the Part L2A 2013 requirements, will minimise uncontrolled heat losses and gains.	SEE BELOW	SEE BELOW
	Ventilation Efficiency	**YES**	Low Specific Fan Power Air Handling Plant High efficiency AHUs shall be provided to achieve a specific fan power (SFP) of 1.75 W/l/s or lower. The use of on floor air handling plant across much of the building assists in meeting this target by reducing the pressure drops associated with air distribution. Heat Recovery Air handling systems will incorporate plate heat exchanger heat recovery systems. These transfer waste heat from the exhaust air stream to the supply air stream via a honeycomb matrix of heat absorbing material, which is slowly rotated within the supply and exhaust air streams. High efficiency heat recovery devices shall be specified.	SEE BELOW	SEE BELOW
	Heating Efficiency	**YES**	The proposed general heating system (at the 'be lean' stage) shall be gas boilers, in accordance with the GLA Guidance Note section 8.2.	SEE BELOW	SEE BELOW
	Cooling Efficiency	**YES**	The proposed general cooling system (at the 'be lean' stage) shall be 'electrically powered equipment', i.e. a conventional chiller, in accordance with the GLA Guidance Note section 8.2.	SEE BELOW	SEE BELOW
	Building Management System	**YES**	A full Building Management System (BMS) shall be installed to monitor and report on the overall energy consumption of the buildings.	SEE BELOW	SEE BELOW
	Metering	**YES**	The services strategy will include metering of end energy uses for the whole building and on all floors/ per tenancy.	SEE BELOW	SEE BELOW
	TOTAL		Note – This total does not include for energy efficiency measures for unregulated loads	3.3	3.5%

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8.0 'be clean' energy use…

…sustainable building services solutions

OBJECTIVE

This section of the energy strategy reviews 'be clean' low carbon energy supply technologies in order to provide further reduction in the building's CO_2 emissions after consumption has been reduced through the application of energy efficiency measures in the previous 'Be Lean' considerations.

Applicable technologies are reviewed in detail within this section, considering the technology's technical background and their potential for integration within the development, alongside the overall CO_2 emissions savings possible.

In each case a recommendation is made for the technologies inclusion or exclusion at the proposed development.

SCOPE

The following 'Be Clean' (low-carbon energy supply) technologies which have been considered for their viability for the proposed development:

- Waste heat supply
- Community heating networks
- Combined heat and power (CHP)
- Combined cooling, heat and power (CCHP)

WASTE HEAT SUPPLY

Background

Heat provided by process waste heat, if located close to the site, can be low carbon and an energy efficient way of heating a building. It can also negate the need for on-site plant.

Proposed Approach

As no local source of waste heat from building or industrial processes has been identified for the site, the use of waste heat is not recommended for 3-6 Spring Place.

'be clean' energy use…

8.0 'be clean' energy use…

…sustainable building services solutions

COMMUNITY HEATING NETWORKS

Background

Potential approaches include connecting the scheme to existing community energy networks, or if no existing schemes exist investigating whether such networks are planned in the area and designing systems with the flexibility to connect to these in the future. Opportunities to provide a communal heating system across buildings/uses within a multiple building scheme have been reviewed.

Core Strategy Policy CS13, Paragraph 13.9 states that developments should connect to decentralised energy networks where feasible and viable.

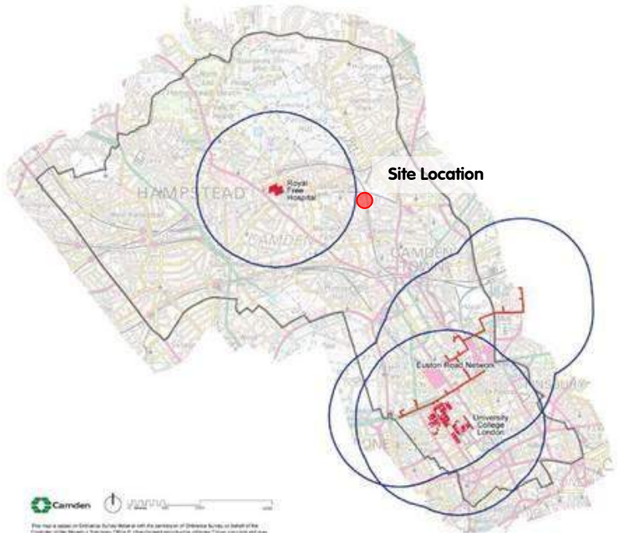
CPG3 outlines in further detail when Camden would expect connections to be made, when a development should future proof, and also when financial contributions are reasonable – with Paragraph 5.17 stating that developments which fall within 1km of an existing decentralised energy network, or one that is likely to be operational within 3 years of occupation of the development, should assess the feasibility of connecting to the network. In these cases, where no connection is made, a financial contribution will be sought.

Paragraph 5.18 states that where developments are proposed within 500m of a potential network (then the development should be future proofed and a financial contribution to fund future expansion secured.

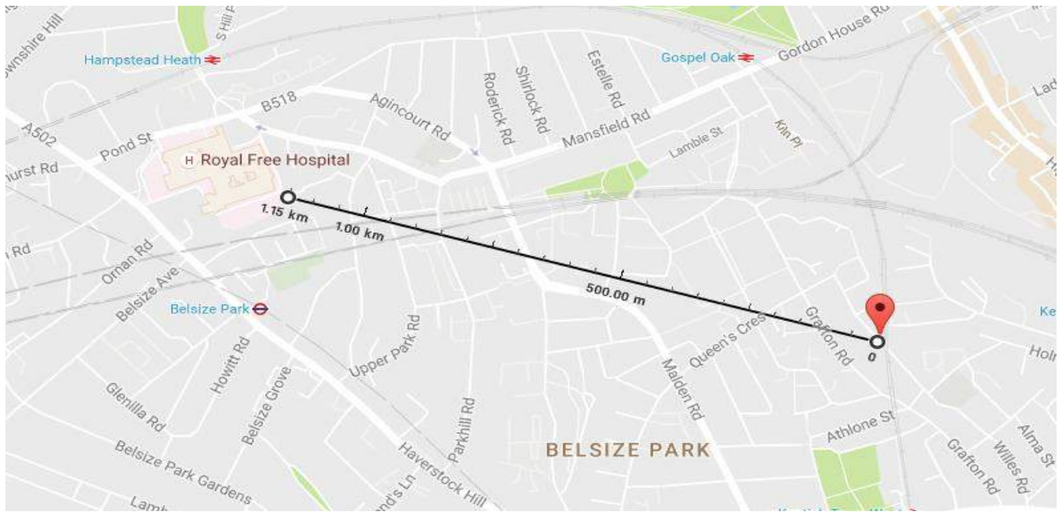
Proposed Approach

CONNECTION TO EXISTING LOCAL COMMUNITY HEATING SYSTEM

Referring to the relevant maps for CS13 and in CPG3, there are no appropriate local community heating system either currently available or proposed.



Developments within 1km Radius of an Existing or Emerging Network, with 3-6 Spring Place Shown



Detail of Site Proximity to Royal Free Hospital – Minimum 1.16 km

8.0 'be clean' energy use…

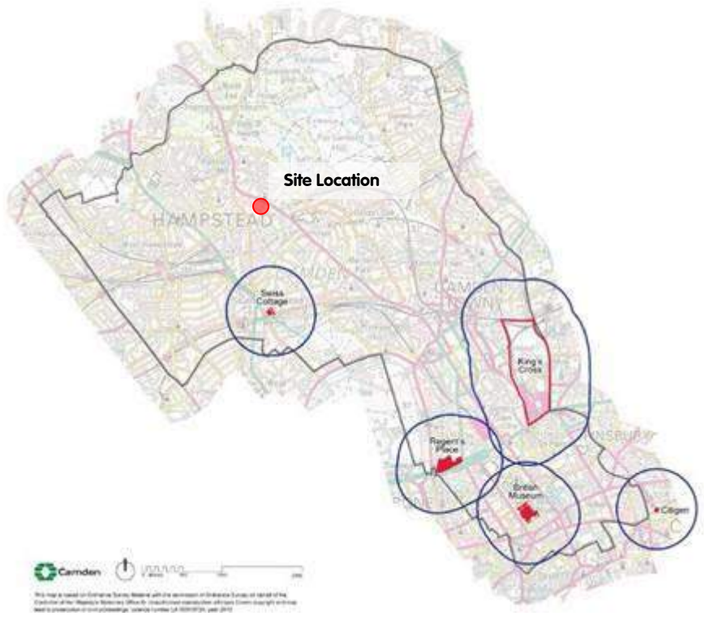
…sustainable building services solutions

FUTURE CONNECTION TO LOCAL COMMUNITY HEATING SYSTEM

It is noted that future connection to such a system is not a viable option for the building because of the intention to pursue a refrigerant-based services strategy (VRF), rather than a water-based one (boiler/chiller) at the 'be green stage'.

The VRF heating and cooling system has been demonstrated to be the optimum building services strategy for the proposed development in terms of energy efficiency and CO_2 emissions and it would not be logical to substitute a water-based system for this to ease the connection to a hypothetical future network.

Based on the above, future connection to a community heating network is not recommended for 3-6 Spring Place.



Developments within 500m Radius of a Potential Network, with 3-6 Spring Placed Shown

'be clean' energy use…

8.0 'be clean' energy use…

…sustainable building services solutions

COMBINED HEAT AND POWER (CHP)

Technical Background and Benefits

Combined heat and power (CHP) uses natural gas to generate electricity with useable heat as a by-product.

CHP plant recovers the waste heat from a site based power generation 'prime mover' (e.g. a natural gas or diesel engine) via the engine water jacket, exhaust gases and oil cooler (dependent on model). This can provide low carbon, lower cost heat and electricity, with lower CO_2 emissions than the electricity grid, where the integration and operation of the CHP plant is optimised.

Technical Considerations

Combined heat and power is a very good solution to reducing CO_2 emissions within buildings where there is a constant year round heat load. The London Plan has now recognised the benefits of CHP in favour of those presented by the incorporation of renewable technology since CHP can achieve significantly better CO_2 emission reductions and still provide a payback on capital investment.

The limiting factor with the use of CHP is that there must be a requirement for heat all year round in order for the installation to be economically viable and to qualify as good quality CHP.

In an office building wherein there is a predominant cooling load, the need for heat is limited for most of the year. In normal circumstances the CHP would be designed on the domestic hot water load since this is a constant all year round.

The only way to maximise the size of the CHP is to couple it with absorption cooling to form a CCHP system. In this case an absorption chiller takes heat from the CHP and through a chemical process creates chilled water for use in the building.

Economic Considerations

CHP plant can offset the cost of conventional boilers, but there will usually be a need to have standby heat capacity for when the CHP plant is idle. The reliability of fossil fuel fired CHP is becoming established and installations are estimated to have a lifetime of 15 years or more.

Local Considerations

Air quality issues need to be considered early on and in detail with respect to CHP viability for a development. Necessary measures would include appropriate plant selection, efficiency of plant to prevent start/stop operation (that increases emissions) and flue location and flue gas treatment.

Proposed Approach

DISCUSSION

There is a limited and seasonal heating demand due to the office use of the building and a food retail/cafeteria element, with no year-round base load.

Although there is also a small year-round hot water demand, CHP would not be a viable option, as it lends itself to medium to large-scale developments, which have a large heating and hot water demand; the total annual heat demand is low and would not provide a sufficient base load to allow a CHP unit to operate efficiently.

RECOMMENDATION

From the results of the thermal modelling a very low domestic hot water load is required at 3-6 Spring Place and heating is only necessary for a proportion of the year.

As discussed previously CHP systems only work efficiently when operated constantly for the majority of the year and therefore 3-6 Spring Place would only have a relatively low heating load and would not provide a year round requirement for heat.

GLA Guidance Note section 11.30 states 'The following types of development need not install on-site CHP: Non-domestic developments with a simultaneous demand for heat and power for less than 5,000 hours per annum. Examples of such developments may include offices and schools.'

Accordingly, combined heat and power is not recommended for 3-6 Spring Place.

8.0 'be clean' energy use…

…sustainable building services solutions

COMBINED COOLING, HEAT AND POWER (CCHP)

Technical Background and Benefits

As with CHP, combined cooling, heat and power (CCHP) recovers the waste heat from a site based power generation prime mover typically via the engine water jacket, exhaust gases and oil cooler. This heat is then used to drive an absorption chiller, the efficiency of which depends primarily on the temperature of the heat source, with typical absorption chiller

This arrangement of combined cooling heat and power (CCHP) is also referred to as tri-generation.

Coefficients of performance (CoPs) tends to be in the low range of 0.7 – 1.1. Where optimised, this can provide low carbon, lower cost heat, cooling and electricity, potentially with lower CO_2 emissions than grid-sourced electricity.

Technical Considerations

CCHP systems cannot respond well to wide variations in loads or short operating hours, so it is important that the plant strategy can be optimised towards maintaining constantly high loads and extended operating periods throughout the year. Operating periods of greater than 4,000-4,500 hours per year are typically necessary

In addition, absorption chillers do not operate efficiently or reliably with variable loads or stop/start operation, and therefore suit relatively consistent cooling base loads and/or significant thermal storage.

Economic Considerations

CCHP viability is also highly sensitive to the CO_2 emissions factors per unit of primary energy, over the anticipated life of the plant, which is typically 20 years.

Proposed Approach

DISCUSSION

The considerations above for CHP also apply for CCHP. A CCHP system would also not be capable of responding appropriately to the anticipated variation in loads in the building.

RECOMMENDATION

The considerations above for CHP also apply for CCHP. A CCHP system would also not be capable of responding appropriately to the anticipated variation in loads in the building.

Accordingly, combined cooling, heat and power is not recommended for 3-6 Spring Place.

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'be clean' energy use…

8.0 'be clean' energy use…

…sustainable building services solutions

KEY ISSUES

The following table summarises the review of potential 'be clean' low-carbon energy supply technologies which could be incorporated into the proposed extension.

It indicates whether each is considered viable for the 3-6 Spring Place redevelopment and summarises reasons for either discounting or including them. A CO_2 emissions saving is also identified where relevant.

Energy Hierarchy Stage	Technology	Viability for 3-6 Spring Place	Commentary and Recommendation for 3-6 Spring Place	CO_2 reduction tonnes/annum	CO_2 Reduction %
Be Clean	**Waste Heat**	**NO**	No local source of waste heat from building or industrial processes has been identified for the site. Waste Heat is therefore not considered a technically feasible 'be clean' technology and is not recommended.	N/A	N/A
	Community Heating Network Connection	**NO**	There is no appropriate local Community Heating system either currently available or proposed. Community Heating Network Connection is therefore not considered a technically feasible 'be clean' approach and is not recommended.	N/A	N/A
	Combined Heat and Power (CHP)	**NO**	There is a limited and seasonal heating demand due to the office use of the building, with no year-round base load. The low load profile and relatively dense occupation also indicate that Combined Heat and Power would not be viable. Combined Heat and Power (CHP) is therefore not considered a technically feasible 'be clean' technology and is not recommended.	N/A	N/A
	Combined Cooling, Heating and Power (CCHP)	**NO**	The considerations above for CHP also apply for CCHP. A CCHP system would also not be capable of responding appropriately to the anticipated variation in loads in the building. Combined Cooling Heating and Power (CHP) is therefore not considered a technically feasible 'be clean' technology and is not recommended.	N/A	N/A
	TOTAL			**N/A**	**N/A**

9.0 'be green' energy use…

…sustainable building services solutions

OBJECTIVE

This section of the Energy Statement reviews 'be green' renewable technologies to provide further reduction in the building's CO_2 emissions after consumption has been reduced through the application of energy efficiency measures in the previous 'be lean' and 'be clean' considerations.

Applicable technologies are reviewed in detail within this section, considering the technology's technical background and its potential for integration within the development, alongside the overall CO_2 emissions savings possible.

In each case a recommendation is made for the technologies inclusion or exclusion at the proposed development.

DETAILED FEASIBILITY STUDY

To provide further background on renewable (or 'low and zero carbon' – 'LZC') technologies and support the BREEAM assessment for the project, a detailed assessment has been carried out to determine which technologies are technically feasible on the site. This may be found in **appendix d**, with its findings summarised in this section of the energy statement.

In the detailed feasibility study, the following factors have been considered to determine which technologies are appropriate for Proposed Approach:

- Energy generated from each LZC energy source per year
- Payback
- Land use
- Local planning criteria
- Noise
- Life cycle cost / life cycle impact of the potential specification in terms of carbon emissions
- Availability of grants

SCOPE

Renewable energy technologies may be defined as those which can provide a source of energy on-site not primarily based on the consumption of fossil fuels or grid electricity and/or those which use a heat or power source that is renewable such as ground source heat and solar energy.

The following 'be green' (renewable energy) technologies have been considered for their viability for the proposed development:

- Fuel cells
- Ground source heating and/or cooling
- Air source heating
- Biomass/biofuel heating
- Photovoltaic panels
- Solar thermal hot water heating
- Wind power
- Micro hydro

9.0 'be green' energy use…

…sustainable building services solutions

KEY ISSUES

The following table summarises the review of potential 'Be Green' renewable energy technologies for the proposed development in **appendix d - 'be green'** - renewable energy.

It indicates whether each is considered viable for the 3-6 Spring Place redevelopment and summarises reasons for either discounting or including them. A CO_2 emissions saving is also identified where relevant.

Energy Hierarchy Stage	Technology	Viability for 3-6 Spring Place	Commentary and Recommendation for 3-6 Spring Place	CO_2 reduction tonnes/annum	CO_2 reduction %
Be Green	**Fuel Cells**	**NO**	Given the novelty and expense of the technology and since no existing hydrogen network exists near the site, fuel cells would not be an appropriate technology for the proposed development. They are suited to applications where a gas fired CHP unit might be considered and tend to be unfavourable in cost and carbon savings terms where these could be applied. Fuel cells are therefore not a technically or economically feasible technology and are not recommended for 3-6 Spring Place.	N/A	N/A
	Ground Source Heating and/or Cooling	**NO**	Since the site is landlocked and has a relatively small footprint, there is insufficient separation distance for a horizontal ground loop and insufficient capacity from vertical ground loop serving a ground source heat pump, with Air Source Heating and/or Cooling (see below) being a more easily implemented technology. Ground Source Heating and/or Cooling is therefore not a technically feasible technology and is not recommended for 3-6 Spring Place.	N/A	N/A
	Air Source Heating and/or Cooling	**YES**	In accordance with Section 13.5 of the GLA Guidance Note on Preparing Energy Assessments, the proposed VRF system (as a heat pump system) has been categorised under this element of the Energy Hierarchy for 3-6 Spring Place. It is a good fit for the envisaged operating conditions and patterns for the building. The proposed heating system shall be high efficiency VRF heat pump with a CoP of 3.9, and a cooling EER of 3.7. The system will be designed to achieve a specific fan power (SFP) lower than the Part L limiting SFP, Air Source Heating and/or Cooling is therefore considered a technically and economically feasible technology and is recommended for 3-6 Spring Place.	7.4	7.8%
	Biomass/Biofuel Heating	**NO**	Issues relating to fuel delivery and storage and the proposed development's limited heating demand (and maintenance requirements) resulting in biomass/biofuels being a relatively complex and expensive technology to implement. Local sourcing of fuel and ensuring local air quality is not adversely affected would also be challenging in the site context. Biomass/biofuel heating is not a technically and economically feasible technology and is not recommended for 3-6 Spring Place.	N/A	N/A
	Photovoltaic Panels	**YES**	After consideration of essential plant space, access requirements, overshading from neighbouring buildings and the desire to avoid visibility from the street, a reasonably sized PV array could be provided on the main roof of the building. PV panels are therefore recommended as a technically and economically feasible renewable energy technology for 3-6 Spring Place.	4.9	5.2%
	Solar Thermal Hot Water Heating	**NO**	Since domestic hot water will be generated in an energy efficient manner (without the need for distribution pipework and pumps) via the proposed building services strategy, and as PV panels are being proposed for the limited suitable roof space, solar thermal hot water is not considered viable for implementation. Solar Thermal Hot Water Heating is therefore recommended as a technically and economically viable renewable energy technology for 3-6 Spring Place.	N/A	N/A
	Wind Power	**NO**	Since there are a the number of obstructions in the dense urban context of the site, likely to worsen the already low predicted wind speeds, the yield of a wind turbine system is likely to be poor and intermittent. Significant integration issues also exist, such as structural vibration and the acceptability of the visual and noise impact of wind turbines to local residents and Network Rail. Wind turbines are therefore not recommended as a technically appropriate renewable energy technology for 3-6 Spring Place.	N/A	N/A
	Micro Hydro	**NO**	There are no records of watercourses crossing the site and so micro-hydro generation is not appropriate due to a lack of hydro resource and is not recommended for 3-6 Spring Place.	N/A	N/A
	TOTAL			**12.3**	**13.0%**

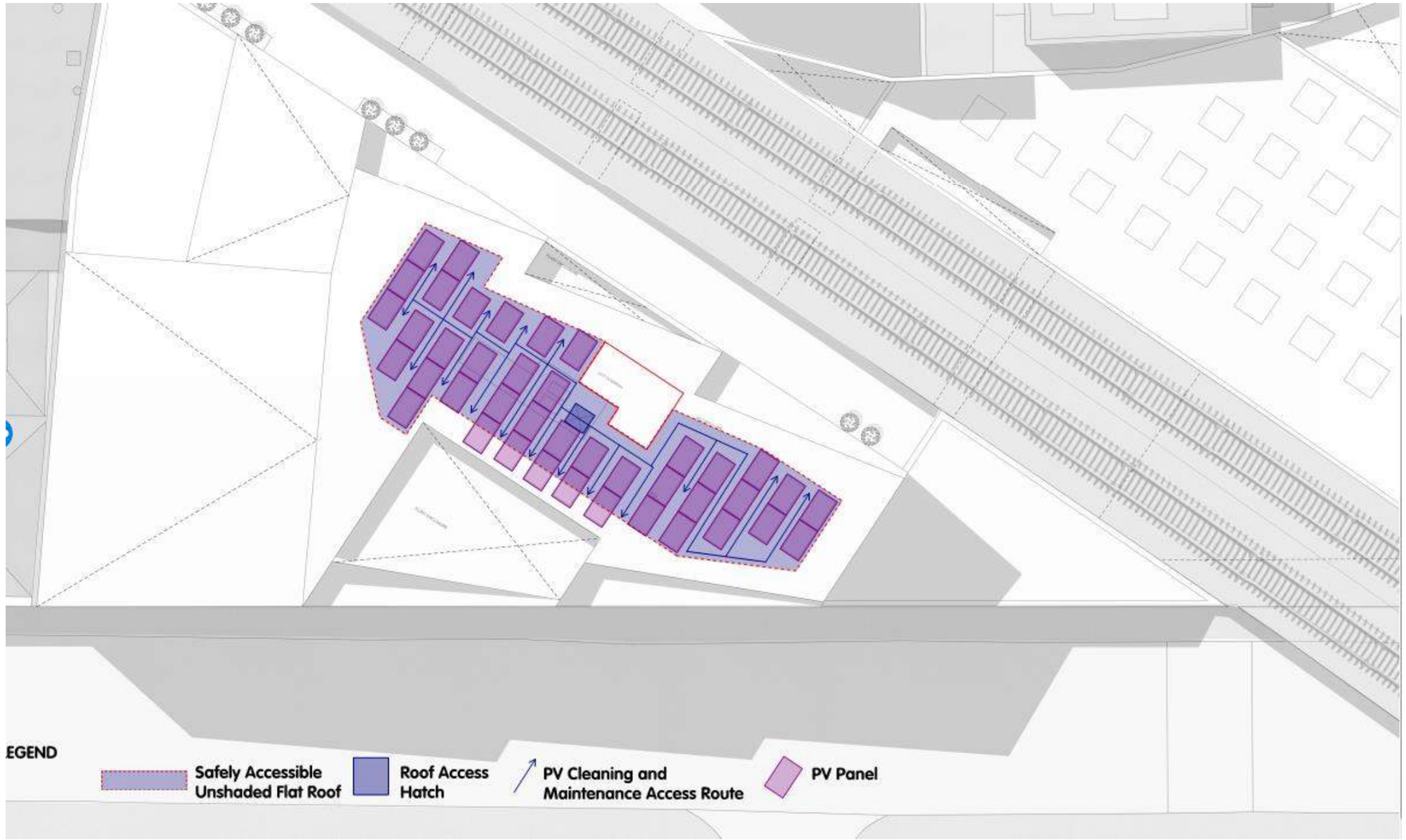
9.0 'be green' energy use…

…sustainable building services solutions

CONCLUSION

From the analysis set out in **appendix d**, it is clear that the most appropriate renewable energy technology for integration on the site is a combination of air source heat pump (VRF) heating and cooling and photovoltaic (PV) panels.

After consideration of essential plant space, access and maintenance requirements and shading, it is possible to accommodate an array of 40 PV panels (with a total effective panel area of 64 m^2). The panels would be inclined and at 15° around the perimeter of the array and 30° at the centre of the array to maximise the yield from the system whilst minimising disruption of the overall massing from the street.



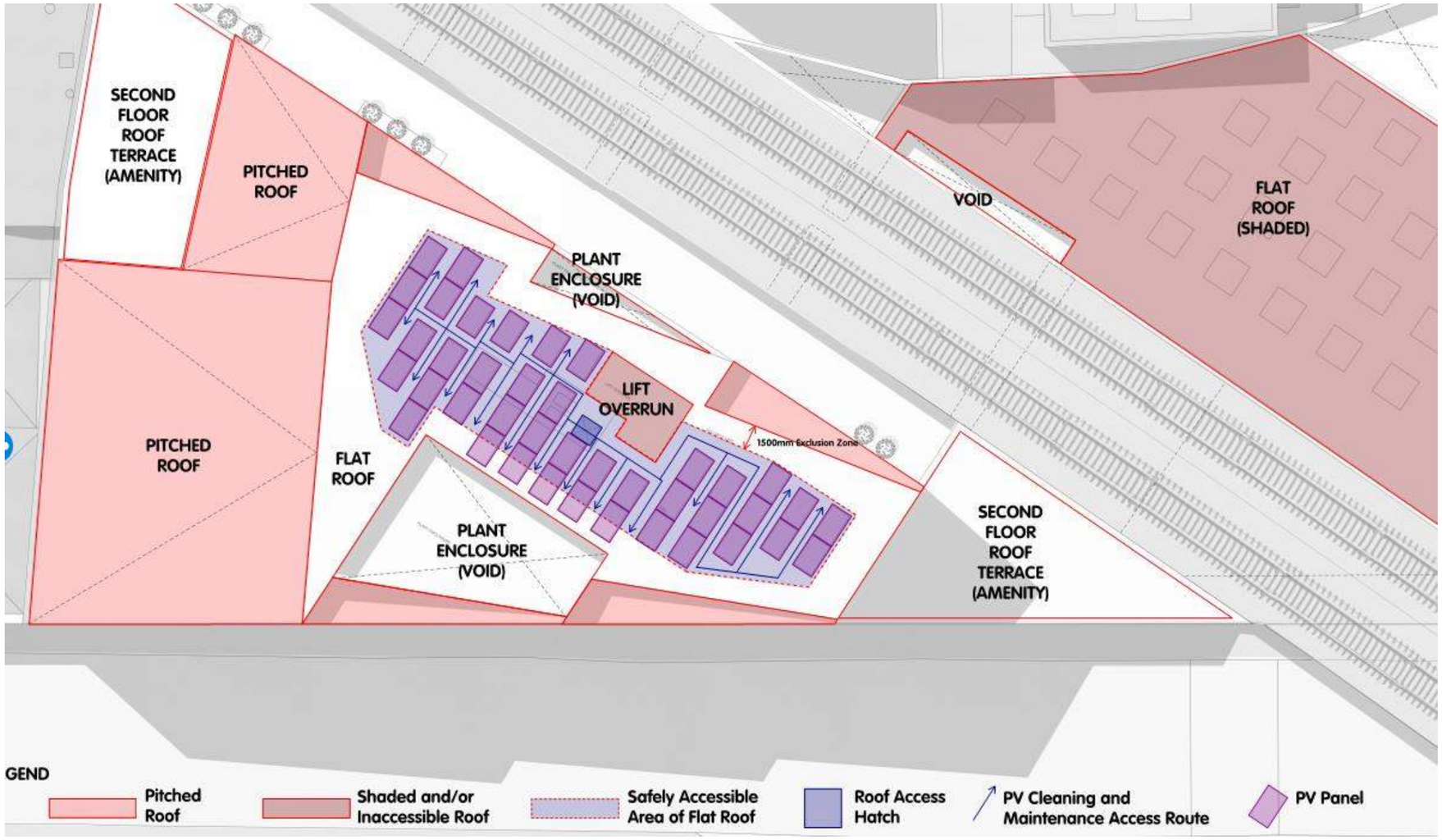
Proposed Roof Plan (NTS)

9.0 'be green' energy use…

…sustainable building services solutions

Note on Constraints on PV Location

Following recommendation from the Access and Maintenance consultant, the secure area is defined by a 1500mm offset from the edge of the roof, which allows a minimal guardrail. Although some panels extend slightly beyond this line access for maintenance can be achieved from within the inner area without compromising safety.



Proposed Roof Plan Showing Constraints (NTS)

10.0 energy summary…

…sustainable building services solutions

SUMMARY ENERGY STATEMENT

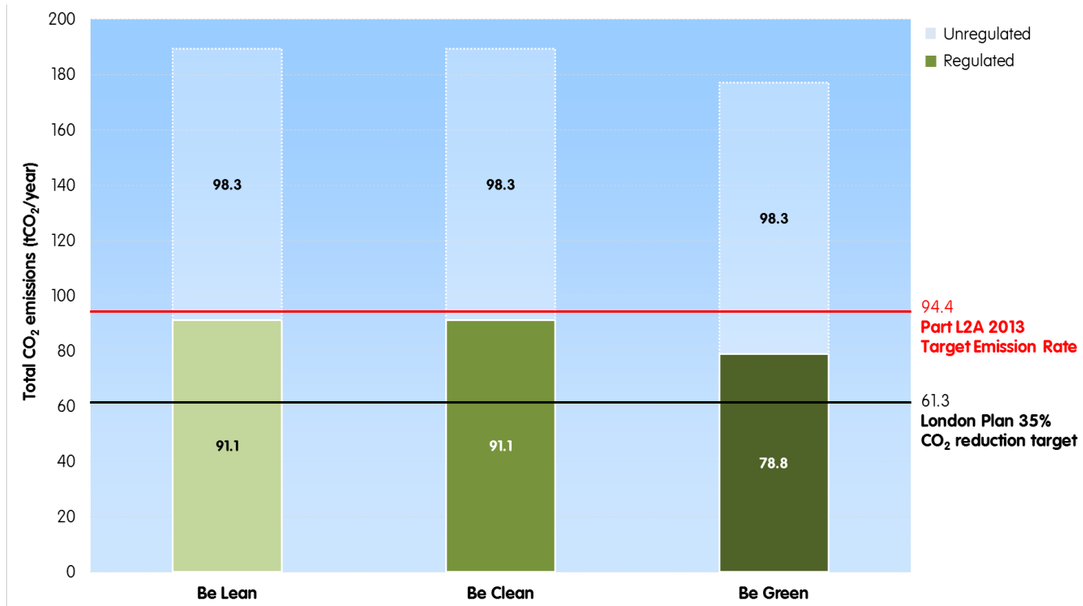
The cumulative effect of the final measures implemented in accordance with the GLA's Energy Hierarchy achieve a total CO_2 emissions reduction of **16.5%** below the baseline emission rate in accordance with Building Regulations Part L 2013. This demonstrates a significant commitment towards reducing carbon emissions through the incorporation of enhanced building fabric, efficient services, and renewable energy systems.

An energy strategy must begin by reducing the demand of the building with the consideration of thermal performance of building fabric, which has been designed to meet or exceed the Building Regulations Part L 2013 standards.

Please refer to **appendix c** for a full summary of the fabric and services parameters.

SUMMARY PART L COMPLIANCE

The modelling results indicate that the calculated CO_2 emissions for the building as currently modelled are **78.8 tCO_2/year**



Part L2A Compliance Summary Graph

OVERALL SUMMARY TABLES

	Carbon dioxide emissions (tCO_2/year)		
	Regulated	**Non-regulated**	**Total**
Part L 2013 Compliant Building	94.4	98.3	192.7
Be Lean	91.1	98.3	189.4
Be Clean	91.1	98.3	189.4
Be Green	78.8	98.3	177.1

Carbon Dioxide Emissions After Each Stage of the Energy Hierarchy

		Carbon dioxide savings			
		tCO_2/year		%	
		Regulated	**Total**	**Regulated**	**Total**
Be Lean	**Savings From Demand Reduction**	3.3	3.3	3.5%	1.7%
Be Clean	**Savings From Clean Energy**	0.0	0.0	0.0%	0.0%
Be Green	**Savings From Renewable Energy**	12.3	12.3	13.0%	6.4%
	Total Cumulative Savings	**15.6**	**15.6**	**16.5%**	**8.1%**

Carbon Dioxide Emissions Savings From Each Stage of the Energy Hierarchy

This is a total saving of **15.6 tCO_2/year** (**16.5%** of regulated emissions) under the baseline emissions rate from Building Regulations Part L2A 2013.

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11.0 carbon offset payment…

…sustainable building services solutions

INTRODUCTION

As part of policy 5.2 of the London Plan, Camden require major developments to offset all remaining CO_2 emissions associated with the building, after implementation of the Energy Hierarchy, through a financial contribution towards measures which reduce CO_2 emissions from the existing building stock.

CALCULATING OFFSET PAYMENTS

Camden's Sustainability Planning Guidance states that where the London Plan carbon reduction target in policy 5.2 cannot be met onsite, they may accept the provision of measures elsewhere in the borough or may require a S106 financial contribution to Camden's Carbon Offset Fund which will be used to secure the delivery of carbon reduction measures elsewhere.

A figure of £90/tCO_2/year for a period of 30 years (£2,700/tCO_2) has been applied as recommended in the Mayor's Sustainable Design and Construction SPG to calculation the carbon offset payment for the proposed development.

OFFSET PAYMENT FOR 3-6 SPRING PLACE

The summary table within the executive summary shows that the total regulated carbon dioxide emissions from the development, following implementation of the Energy Hierarchy is estimated to be **78.8 tCO_2/year** and the total regulated carbon emissions from the baseline building is **94.4 tCO_2/year**.

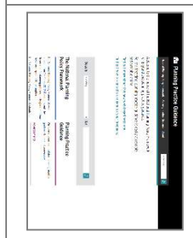
As the target saving is 35% from the baseline building, the current shortfall for the proposed development is **17.44 tCO_2/year**.

The estimated carbon offset payment for this development is therefore calculated as follows: **17.44 tCO_2/year** multiplied by **£2,700** equates to a contribution of **£47,088.**

appendix a – review of planning policy and good practice…

…sustainable building services solutions

NATIONAL POLICIES

Image	Policy/Document	Objective	Key Policy and Targets Summary
	**National Planning Policy Framework** Department for Communities and Local Government, March 2012	The National Planning Policy Framework (NPPF) sets out the Government's planning policies on the delivery of sustainable development through the planning system in England and indicates how these are expected to be applied, informing Local Councils and communities with regards to local plans and planning applications. The NPPF replaces the following documents Planning Policy Statement 1 Delivering Sustainable Development (January 2004), Planning Policy Statement 9 Biodiversity and Geological Conservation (August 2004), Planning Policy Guidance 13 Transport (January 2011), Planning Policy Statement 22 Renewable Energy (August 2004), Planning Policy Statement 23 Planning and Pollution Control (November 2004), Planning Policy Guidance 24 Planning and Noise (October 1994), Planning Policy Statement 25 Development and Flood Risk (March 2010). The NPPF provides a revised and condensed approach to national planning and sustainability that includes economic, social and environmental roles.	Key sections of the National Planning Policy Framework include **'Responding to Climate Change'** and **'Conserving and Enhancing the Natural Environment'**.
	**National Planning Practice Guidance** CLG, March 2014	The National Planning Practice Guidance (NPPG) was launched on 6 March 2014 as a resource replacing almost all previously recognised planning guidance documents with a web-based resource. The NPPG is intended to make the planning system simpler clearer and easier for people to use by reducing the volume of guidance significantly and consolidating it into one resource sitting alongside the National Planning Policy Framework (NPPF).	Key sections of the **National Planning Policy Guidance include Air Quality, Climate Change, Design, Flood Risk and Coastal Change, Health and Wellbeing, Light Pollution, Natural Environment, Noise, Renewable and Low Carbon Energy, Rural Housing, Waste, Water Supply, Wastewater** and **Water Quality** As an example of a section of the NPPG, ID 6, Paragraph 001 Climate Change (Reference ID 600120140306) it is stated In addition to supporting the delivery of appropriately sited green energy, effective spatial planning is an important part of a successful response to climate change as it can influence the emission of greenhouse gases. In doing so, local planning authorities should ensure that protecting the local environment is properly considered alongside the broader issues of protecting the global environment.

appendix a…

REGIONAL POLICIES

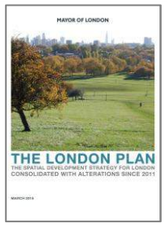
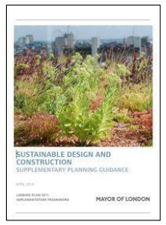
Image	Policy/Standard/Initiative	Commentary	Key Policies and Targets Summary
	**The London Plan** **(The Spatial Development Strategy for London)** **Consolidated with Alterations since 2011** Mayor of London March 2015	The London Plan is the spatial development strategy for London, setting an integrated economic, environmental, transport and social framework for the development of the region. A key element of the London Plan is 'London's Response to Climate Change'. In it Policy 5.2 'Minimising carbon dioxide emissions', directs Applicants to adopt the Mayor's Energy Hierarchy: 'Be Lean' (use less energy), 'Be Clean' (supply energy efficiently) and 'Be Green' (use renewable energy), and to achieve relevant CO_2 emissions reduction targets. Policy 5.3 'Sustainable Design and Construction' directs Applicants to achieve the highest standards of sustainable design and construction. On 10 March 2015, the Mayor published (i.e. adopted) the Further Alterations to the London Plan (FALP). From this date, the FALP are operative as formal alterations to the London Plan and form part of the development plan for Greater London. The London Plan has been updated to incorporate the Further Alterations. It also incorporates the Revised Early Minor Alterations to the London Plan (REMA), which were published in October 2013.	**Policy 5.2**: Achieve a minimum **40% improvement over Part L:2010 CO_2 emissions (October 2013-2016);** This must be achieved in accordance with the Mayor's Energy Hierarchy: Be Lean (use less energy), Be Clean (supply energy efficiently), Be Green (use renewable energy). **Policy 5.2 – Minimising Carbon Dioxide Emissions** requires that all residential buildings between 2013 – 2016 achieve a 40% improvement on 2010 Building Regulations. The London Plan Sustainable Design and Construction SPG (2014) updates this target stating that the Mayor will adopt a carbon dioxide improvement target beyond Part L 2013 of 35%. **Policy 5.3 – Sustainable Design and Construction** states that the highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments. Major development should meet the minimum standards outlined in the London Plan Supplementary Planning Guidance and this should be clearly demonstrated. **Policy 5.5 – Decentralised Energy Networks** states the Mayor expects 25% of heat and power used in London to be generated by localised decentralised energy systems by 2025. The Mayor will prioritise the development of decentralised heating and cooling networks. **Policy 5.6 - Decentralised Energy** – requires that all developments should evaluate the feasibility of Combined Heat and Power (CHP) systems, and examine the opportunities to extend the system beyond the site boundary to adjacent sites. **Policy 5.7 – Renewable Energy** states that within the framework of the energy hierarchy, major development proposals should provide a reduction in expected carbon dioxide emissions through the use of on-site renewable energy generation, where feasible. **Policy 5.8 – Innovative Energy Technologies** encourages the more widespread use of innovative energy technologies to reduce use of fossil fuels and carbon dioxide emissions. **Policy 5.9 – Overheating and Cooling** seeks to reduce the impact of the urban heat island effect, reduce potential overheating and reduce reliance on air conditioning systems. **Policy 5.10 – Urban Greening** encourages new planting in the public realm and green infrastructure, to contribute to the adaptation to, and mitigation of, the effects of climate change. **Policy 5.12 – Flood Risk Management** states that new developments must comply with the flood risk assessment and management requirements, and will be required to pass the Exceptions Test addressing flood resilient design and emergency planning. **Policy 5.13 – Sustainable Drainage** requires that developments should use sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed close to its source. **Policy 5.15 – Water Use and Supplies** requires that development should minimise the use of mains water by incorporating water saving measures and equipment and that residential development is designed so that mains water consumption meets a target of 105 litres/person/day or less. **Policy 5.18 - Construction, Excavation and Demolition Waste** - Waste should be removed from construction sites, and materials brought to the site, by water or rail transport wherever that is practicable. **Policy 7.3 – Designing Out Crime** requires that development should reduce the opportunities for criminal behaviour and contribute to a sense of security without being overbearing or intimidating.

Image	Policy/Standard/Initiative	Commentary	Key Policies and Targets Summary
	**Sustainable Design and Construction, The London Plan Supplementary Planning Guidance** Greater London Authority (GLA), 2006	The Supplementary Planning Guidance (SPG) is applicable to all development types and associated spaces. The SPG provides guidance on the way that the seven measures identified in the London Plan policy can be implemented to meet the London Plan objectives on sustainable design and construction. All future developments should meet the highest standards of sustainable design and construction: These will include measures to: Re-use land and buildings Conserve energy, materials, water and other resources Ensure designs make the most of natural systems, both within, in and around the building Reduce the impacts of noise, pollution, flooding and micro-climatic effects Ensure developments are comfortable and secure for users Conserve and enhance the natural environment, particularly in relation to biodiversity Promote sustainable waste behaviour in new and existing developments, including support for local integrated recycling schemes, CHP schemes and other treatment.	Applications for strategic developments should include a statement showing how sustainability principles will be met in terms of demolition, construction and long-term management. Boroughs should ensure that, where appropriate, the same sustainability principles are used to address planning applications.
	**The Mayor's Waste Management Strategies** - London's Wasted Resource: The Mayor's Municipal Waste Management Strategy and Making Business Sense of Waste: The Mayor's Business Waste Management Strategy, Greater London Authority (GLA), 2011	The Mayor's key targets set out in the Mayor's Waste Management Strategies 2011 for the management of business waste is as follows: - Achieve 70% reuse, recycling and composting of commercial and industrial (C&I) waste by 2020, maintaining these levels to 2031 - Achieve 95% reuse, recycling and composting of construction, demolition and excavation (CDE) waste by 2020, maintaining these levels to 2031	The Mayor's key targets for the management of municipal waste are as follows: • To achieve zero municipal waste direct to landfill by 2025. • To reduce the amount of household waste produced from 970 kg per household in 2009/10 to 790kg per household in 2031. This is equivalent to a 20% reduction per household. • To increase London's capacity to reuse or repair municipal waste from approximately 6,000 tonnes a year in 2008 to 20,000 tonnes a year in 2015 and 30,000 tonnes in 2031. • To recycle or compost at least 45 per cent of municipal waste by 2015, 50% by 2020 and 60% by 2031. • To cut London's greenhouse gas emissions through the management of London's municipal waste. • To generate as much energy as practicable from London's organic and non-recycled waste in a way that is no more polluting in carbon terms than the energy source it is replacing. This is estimated to be possible for about 40% of London's municipal waste after recycling or composting targets are achieved by 2031.

appendix a – review of planning policy and good practice…

…sustainable building services solutions

LOCAL POLICIES

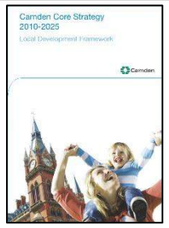
Image	Policy/Standard/Initiative	Commentary	Key Policies and Targets Summary
		Camden's Core Strategy sets out the key elements of the Council's planning vision and strategy for the borough. It is the central part of the Local Development Framework (LDF), a group of documents setting out the planning strategy and policies. The Core Strategy contributes to achieving the vision and objectives of Camden's Community Strategy and helps the Council's partners and other organisations deliver relevant parts of their programmes. Section 3: A Sustainable and Attractive Camden – Tackling Climate Change and Improving and Protecting Camden's Quality of Life sets out key elements: • Making Camden more sustainable and tackling climate change, in particular improving the energy performance of buildings, providing decentralised energy and heating networks and reducing and managing our water use. • Promoting a more attractive local environment by securing high quality places, conserving our heritage, providing parks and open spaces, and encouraging biodiversity. • Improving health and wellbeing. • Making Camden a safer place whilst retaining its vibrancy. • Dealing with waste and increasing recycling.	See Below

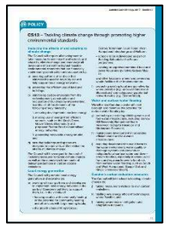
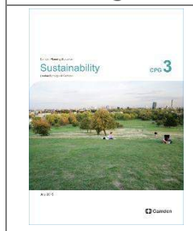
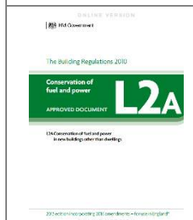
Image	Policy/Standard/Initiative	Commentary	Key Policies and Targets Summary
	**CS13 – Tackling Climate Change through Promoting Higher Environmental Standards**	This policy ensures the London Borough of Camden is committed to reducing CO2 emissions and minimising the effect of the Borough on the environment through responsible construction. It is also a priority of the Council to ensure the Borough becomes more adaptable to climate change through redevelopment. The policy gives close consideration to energy, water and flooding in reducing and adapting to climate change. The strategy for achieving the targets set for individual developments and the Borough as a whole are consistent with the London Plan, particularly with regard to the Mayor's Energy Hierarchy.	Reducing the Effects of and Adapting to Climate Change The Council will require all development to take measures to minimise the effects of, and adapt to, climate change and encourage all development to meet the highest feasible environmental standards that are financially viable during construction and occupation by: • ensuring patterns of land use that minimise the need to travel by car and help support local energy networks; • promoting the efficient use of land and buildings; • minimising carbon emissions from the redevelopment, construction and occupation of buildings by implementing, in order, all of the elements of the following energy hierarchy: • ensuring developments use less energy, • making use of energy from efficient sources, such as the King's Cross, Gower Street, Bloomsbury and proposed Euston Road decentralised energy networks; • generating renewable energy on-site; and • ensuring buildings and spaces are designed to cope with, and minimise the effects of, climate change. The Council will have regard to the cost of installing measures to tackle climate change as well as the cumulative future costs of delaying reductions in carbon dioxide emissions. Local Energy Generation The Council will promote local energy generation and networks by: • working with our partners and developers to implement local energy networks in the parts of Camden most likely to support them, i.e. in the vicinity of: • housing estates with community heating or the potential for community heating and other uses with large heating loads; the growth areas of King's Cross;Euston; Tottenham Court Road; West Hampstead Interchange and Holborn; • schools to be redeveloped as part of Building Schools for the Future programme; • existing or approved combined heat and power/local energy networks (see Map 4); • and other locations where land ownership would facilitate their implementation. f) protecting existing local energy networks where possible (e.g. at Gower Street and Bloomsbury) and safeguarding potential network routes (e.g. Euston Road); Wafer and Surface Wafer Flooding We will make Camden a water efficient borough and minimise the potential for surface water flooding by: g) protecting our existing drinking water and foul water infrastructure, including Barrow Hill Reservoir, Hampstead Heath Reservoir, Highgate Reservoir and Kidderpore Reservoir; h) making sure development incorporates efficient water and foul water infrastructure; i) requiring development to avoid harm to the water environment, water quality or drainage systems and prevents or mitigates local surface water and down- stream flooding, especially in areas up-hill from, and in, areas known to be at risk from surface water flooding such as South and West Hampstead, Gospel Oak and King's Cross (see Map 5). Camden's Carbon Reduction Measures The Council will take a lead in tackling climate change by: j) taking measures to reduce its own carbon emissions; k) trialling new energy efficient technologies, where feasible; and l) raising awareness on mitigation and adaptation measures.

Image	Policy/Standard/Initiative	Commentary	Key Policies and Targets Summary
	**London Borough of Camden Development Policies, 2015** London Borough of Camden, 2015	Camden Development Policies form part of the Council's Local Development Framework (LDF), the group of documents setting out the planning strategy and policies. The lead Local Development Framework document is the Core Strategy discussed above, which sets out the key elements of the Council's planning vision and strategy for the borough and contains strategic policies.	See Below
	**Policy DP17 - Walking, Cycling and Public Transport**	Development should make suitable provision for pedestrians, cyclists and public transport and, where appropriate, will also be required to provide for interchanging between different modes of transport.	Provision may include: • Convenient, safe and well-signalled routes including footways and cycle ways designed to appropriate widths. • Other features associated with pedestrian and cycling access to the development, where needed, for example seating for pedestrians, signage, high quality cycle parking, workplace showers and lockers. • Safe road crossings where needed. • Bus stops, shelters, passenger seating and waiting areas, signage and timetable information.
	**DP22 – Promoting Sustainable Design and Construction**	Within London Borough of Camden Development Policies, 2015 for Policy DP23 Promoting Sustainable Design and Construction it is noted: *22.1 Promoting a sustainable Camden is an integral element of our Local Development Framework strategy. Core Strategy policy CS13 – Tackling climate change through promoting higher environmental standards sets out a key part of our overall approach to tackling climate change, which includes promoting higher environmental standards in design and construction. Policy DP22 – Promoting sustainable design and construction contributes towards delivering the strategy in policy CS13 by providing detail of the sustainability standards we will expect development to meet. DP22 should be read in conjunction with Core Strategy policy CS13 and policy DP23 – Water. Core Strategy policy CS11 and policies DP16 to DP21 in this document set out our approach to sustainable transport.* *22.4 Although the need for sustainable design and construction is not specific to Camden, the borough's highly built-up, inner urban environment means that we face specific environmental issues such as poor air quality and surface water flooding but have fewer options on how we can implement sustainable development and minimise our carbon emissions. The measures we can take to minimise the impacts of climate change and adapt to its effects need to consider, and be appropriate to, Camden's dense and historic character and sensitive environments. They should also take opportunities to build on the borough's past high performance on requiring sustainable measures within developments.* *22.5 Core Strategy policy CS13 states that the Council will have regard to the costs and feasibility of measures to tackle climate change within developments (paragraph 13.4). This approach also applies to policy DP22. We will also take into account the cumulative costs of not responding to the need to mitigate and adapt to climate change as well as the long term cost savings, such as on energy and water bills, to future occupiers. Measures to tackle climate change are integral in the development process and are a priority of the Council. Therefore they should not be seen as 'add-ons'.* Key Considerations are: • Sustainable design and construction measures • Sustainable design and construction assessment tools • Designing to adapt to climate change	The Council will require development to incorporate sustainable design and construction measures. Schemes must: a) demonstrate how sustainable development principles, including the relevant measures set out in paragraph 22.5 below, have been incorporated into the design and proposed implementation; and b) incorporate green or brown roofs and green walls wherever suitable. The Council will promote and measure sustainable design and construction by: c) expecting new build housing to meet Code for Sustainable Homes Level 3 by 2010 and Code Level 4 by 2013 and encouraging Code Level 6 (zero carbon) by 2016.; d) expecting developments (except new build) of 500 sq m of residential floorspace or above or 5 or more dwellings to achieve "very good" in EcoHomes assessments prior to 2013 and encouraging "excellent" from 2013; e) expecting non-domestic developments of 500sqm of floorspace or above to achieve "very good" in BREEAM assessments and "excellent" from 2016 and encouraging zero carbon from 2019. The Council will require development to be resilient to climate change by ensuring schemes include appropriate climate change adaptation measures, such as: f) summer shading and planting; g) limiting run-off; h) reducing water consumption; i) reducing air pollution; and j) not locating vulnerable uses in basements in flood-prone areas.

Image	Policy/Standard/Initiative	Commentary	Key Policies and Targets Summary
	**Policy DP23 Water**	Within London Borough of Camden Development Policies, 2015 for Policy DP23 Water it is noted: *23.1 Our built environment plays a large role in the way water is consumed, distributed and disposed of.* *The way water is used in a building and the pollutants it picks up running across a site affect the quality of the water that reaches our combined storm water and sewer system. In addition, the location of a development, and any flood mitigation measures used, can have an impact on local and downstream surface water flooding. For example, by capturing surface water on-site so that the flood risk to downstream properties is reduced or, in poorly located and designed schemes, by diverting surface water onto adjoining sites, increasing the risk of flooding on those sites.* *23.2 As noted in paragraph 22.4 above, although the need for sustainable design and construction is not specific to Camden, our dense built-up environment limits the ways sustainability can be addressed. The efficient use and disposal of water and the minimisation of surface water run-off are elements of sustainable design and construction that need to be addressed sensitively taking into account Camden's specific characteristics.* *23.3 Core Strategy policy CS13 – Tackling climate change through promoting higher environmental standards sets out our overall approach to tackling climate change which includes reducing our water consumption and reducing the risk of surface water flooding. Map 2 and policy CS13 identify areas of the borough that have been affected by sewer or surface water flooding in the past as well as areas identified as being at risk of surface water flooding.23.4 Policy DP23 contributes to the implementation of the strategy set out in policy CS13 by seeking to reduce water consumption and limit the amount of waste water entering the combined storm water and sewer network. Policy DP23 should be read in conjunction with policy Core Strategy CS13,policy DP22 – Sustainable design and construction above and the North London Strategic Flood Risk Assessment.* Key Considerations are: • Efficient use of water • Reducing surface water run-off • Minimising flood risk • Water features	The Council will require developments to reduce their water consumption, the pressure on the combined sewer network and the risk of flooding by: • Incorporating water efficient features and equipment and capturing, retaining and re-using surface water and grey water on-site; • Limiting the amount and rate of run-off and waste water entering the combined storm water and sewer network through the methods outlined above and other sustainable urban drainage methods to reduce the risk of flooding; • Reducing the pressure placed on the combined storm water and sewer network from foul water and surface water run-off and ensuring developments in the areas identified by the North London Strategic Flood Risk Assessment and shown on Map 2 as being at risk of surface water flooding are designed to cope with the potential flooding; • Ensuring that developments are assessed for upstream and downstream groundwater flood risks in areas where historic underground streams are known to have been present; and • Encouraging the provision of attractive and efficient water features.

Image	Policy/Standard/Initiative	Commentary	Key Policies and Targets Summary
	**Camden Planning Guidance – Sustainability (CPG 3), 2015** London Borough of Camden, July 2015	The London Borough of Camden CPG 3 has been compiled in order to support the policies in the Borough's Local Development Framework (LDF), which provides a long-term strategic plan for land and building use, new developments and conservation within the London Borough of Camden. The guidance is in support of the Local Development Framework and provides information on ways to achieve carbon reductions and more sustainable developments. It covers: • The Energy Hierarchy • Energy Efficiency: New Buildings • Energy Efficiency: Existing Buildings • Decentralised Energy Networks and Combined Heat and Power • Renewable Energy' • Water Efficiency • Sustainable Use of Materials • Sustainability Assessment Tools • Brown Roofs, Green Roofs and Green Walls • Flooding • Adapting to Climate Change • Biodiversity • Local Food Growing In particular, this document was produced to provide additional guidance with regard to the adjacent policies - DP22 and CS13. Planning permissions are made in accordance with the policies set out in the LDF and they set out the general direction in which change will be encouraged or resisted. Camden Planning Guidance is consistent with the Core Strategy and the Development Policies, and forms a Supplementary Planning Document (SPD) which is an additional "material consideration" in planning decisions. This document was updated on 4 September 2013. The LDF contains a wide range of policies for the growth and development of the London Borough of Camden. Included are policies on housing, the environment, transport, leisure, retail and community uses. Along with other development plan documents and council strategies, the LDF aims to improve and create a better borough for those who live, work and visit.	For existing building projects CPG 3 states that 10% of the project cost should be spent on environmental improvements and developments are to target at least a 20% reduction in carbon dioxide emissions through the installation of on-site renewable technologies. The creation of 5 or more homes will need to be designed in line with EcoHomes (or BREEAM Domestic Refurbishment 2012) which now supercedes this). All non-residential floor space over 500sqm will need to be designed in line with BREEAM. All developments should incorporate green or brown roofs. They should be considered as to how they could be occupied in the future and to mitigate against flooding. Proposals should demonstrate positive measures for enhancing biodiversity

OTHER REFERENCES

Image	Policy/Standard/Initiative	Commentary	Key Policies and Targets Summary
	**BREEAM New Construction 2014** Building Research Establishment Launched 27th May 2014	The Building Research Establishment Environmental Assessment Method (BREEAM) is a widely used environmental assessment methodology for non-domestic buildings, covering a broad range of sustainability categories: Management, Health and Wellbeing, Energy, Transport, Water, Materials, Waste, Land Use and Ecology and Pollution. The methodology is used to quantify and reduce the environmental impacts of the built environment by rewarding designs that take positive steps to minimise their environmental effects. Undertaking a BREEAM assessment and integrating the associated design requirements into the scheme helps to set Best Practice sustainability standards across a broad range of building design, construction and operational targets, summarised by a single rating, from 'Pass' to 'Outstanding' (BREEAM).	The key changes in BREEAM NC 2014 include an update to the section weightings for Energy, Transport, Water, Materials, and Waste, new weightings have been introduced for shell only/shell and core projects. Minimum standards apply to responsible construction practices, commissioning and handover, aftercare, reduction of energy use and carbon emissions, energy monitoring, water consumption, water monitoring, responsible sourcing of materials, construction waste management and operational waste.
	**Building Regulations Approved Document Part L2A 'Conservation of fuel and power in buildings other than dwellings' (2013);** **2010 edition incorporating 2010, 2011 and 2013 amendments** Department for Communities and Local Government, 2016	Building Regulations Part L sets out elemental minimum energy and CO2 emissions performance standards for all elements of the built environment along with assessment methodologies necessary to confirm compliance. The latest update to part L in 2016 sets out amendments to the current Part L documents, with regards to the requirements of the provision of an Energy Strategy document, to include the viability assessment of all Low and Zero Carbon technologies.	**Regulation 25A** states Applicants 'Must analyse and take into account the technical, environmental and economic feasibility of using high efficiency alternative systems (such as the following systems) in the construction, if available: • Decentralised energy supply systems based on energy from renewable sources • Co–generation • District (community) or block heating or cooling, particularly where it is based entirely or partially on energy from renewable sources. 'Energy from renewable sources' is defined as 'energy from renewable non–fossil sources, namely wind, solar, aero thermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gases and biogases and heat pumps, where appropriate for the type and scale of development'

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appendix b – BREEAM NC 2014 pre-assessment…

…sustainable building services solutions

CREDIT TRACKER TABLE

.

BREEAM NC 2014 - Credit Tracker Summary

MTT/SUSTAIN

Project: 3-6 Spring Place **Job Number:** 8081

Subject: BREEAM NC 2014 - Pre-Assessment Stage

PRE-ASSESMENT - SUMMARY

PRE-ASSESSMENT

Group	Credit ID	Credit Name	Maximum Credits	Baseline Credits	Enhanced Credits	Credit Status	Resp. Parties	Risk
Man.	Man 01.1	Project Brief and Design - Stakeholder Consultation (	1	1	1		ARCAD	
	Man 01.2	- Stakeholder Consultation (Third Party)	1	1	1		PIERCY	
	Man 01.3	- Sustainability Champion (Design)	1	1	1		ARCAD MTTS	
	Man 01.4	- Sustainability Champion (Monitoring Progress)	1	1	1		ARCAD MTTS	
	Man 02.1	Life Cycle Cost and Service Life Planning - Elemental	2	0	2		ARCAD JC	
	Man 02.2	- Component Level LCC Plan	1	0	1		ARCAD JC	
	Man 02.3	- Capital Cost Reporting	1	1	1		ARCAD JC	
	Man 03.0	Responsible Construction Practices - Pre-Requisite	0	0	0		ARCAD JC	
	Man 03.1	- Environmental Management	1	1	1		ARCAD JC	
	Man 03.2	- Construction Stage Sustainability Champion	1	1	1		ARCAD JC	
	Man 03.3	- Considerate Construction	2	2	2		ARCAD JC	
	Man 03.4	Considerate Construction - Monitoring of Constructic	1	1	1		ARCAD JC	
	Man 03.5	- Monitoring of Construction Site Impacts - Transp	1	1	1		ARCAD JC	
	Man 04.1	Commissioning and Handover - Commissioning an	1	1	1		ARCAD JC	
	Man 04.2	- Commissioning Building Services	1	1	1		ARCAD JC	
	Man 04.3	- Testing and Inspecting Building Fabric	1	0	1		ARCAD JC	
	Man 04.4	- Handover	1	1	1		ARCAD JC	
	Man 05.1	Aftercare - Aftercare Support	1	0	1		ARCAD JC	
	Man 05.2	- Seasonal Commissioning	1	1	1		ARCAD JC	
	Man 05.3	- Post Occupancy Evaluation	1	0	0			
Health and Wellbeing	Hea 01.1	Visual Comfort - Glare Control	1	1	1		PIERCY	
	Hea 01.2	- Daylighting	1	0	0		PIERCY	
	Hea 01.3	- View Out	1	0	0		PIERCY	
	Hea 01.4	- External and Internal Lighting, Zoning and Contr	1	1	1		MTT	
	Hea 02.1	Indoor Air Quality - Indoor Air Quality Plan	1	1	1		MTT	
	Hea 02.2	- Ventilation	1	0	0			
	Hea 02.3	- Volatile Organic Compound (VOC) Emission Leve	1	1	1		PIERCY	
	Hea 02.4	- Volatile Organic Compound (VOC) Emission Leve	1	0	0			
	Hea 02.5	- Adaptability - Potential for Natural Ventilation	1	0	0			
	Hea 04.1	Thermal Comfort - Thermal Modelling	1	1	1		MTTS	
	Hea 04.2	- Adaptability - for a Projected Climate Change Sc	1	0	0			
	Hea 04.3	- Thermal Zoning and Controls	1	1	1		MTT	
	Hea 05.1	Acoustic Performance - Education, Healthcare, Offic	3	3	3		ACO	
	Hea 06.1	Safety and Security - Safe Access	0	0	0		PIERCY	
	Hea 06.2	- Security of Site and Building	2	2	2		PIERCY	
Energy	Ene 01	Reduction of Energy Use and Carbon Emissions	12	5	5		MTTS	
	Ene 02.1	Energy Monitoring - Sub-metering of major energy c	1	1	1		MTT	
	Ene 02.2	- Sub-metering of high energy load and tenancy c	1	1	1		MTT	
	Ene 03	External Lighting	1	1	1		MTT	
	Ene 04.1	Low Carbon Design - Passive Design - Passive Desig	1	0	1		MTTS	
	Ene 04.2	- Free Cooling	1	0	0			
	Ene 04.3	- Low or Zero Carbon Technologies	1	1	1		MTTS	
	Ene 05	Energy Efficient Cold Storage	0	0	0			
	Ene 06.1	Energy Efficient Transportation Systems - Energy Con	1	1	1		MTTE	
	Ene 06.2	- Energy efficient features - Lifts	2	2	2		MTTE	
	Ene 08	Energy Efficient Equipment	2	0	2			
Transport	Tra 01.1	Public Transport Accessibility - Accessibility Index	3	3	3		MTTS	
	Tra 01.2	- Dedicated Bus Service	0	0	0			
	Tra 02	Proximity to Amenities	1	1	1		MTTS	
	Tra 03.1	Cyclist Facilities - Cycle Storage	1	1	1		PIERCY	
	Tra 03.2	- Cyclist Facilities	1	1	1		PIERCY	
	Tra 04	Maximum Car Parking Capacity	2	2	2		PIERCY	
	Tra 05	Travel Plan	1	1	1		TPP	

Group	Credit ID	Credit Name	Maximum Credits	Baseline Credits	Enhanced Credits	Credit Status	Resp. Parties	Risk
Water	Wat 01	Water Consumption	5	3	3		PIERCY	
	Wat 02	Water Monitoring	1	1	1		MTT	
	Wat 03.1	Water Leak Detection - Leak Detection System	1	1	1		MTT	
	Wat 03.2	- Flow Control Devices	1	1	1		MTT	
	Wat 04	Water Efficient Equipment	0	0	0			
Materials	Mat 01	Life Cycle Impacts	5	3	3		PIERCY	
	Mat 02	Hard Landscaping and Boundary Protection	1	1	1		PIERCY	
	Mat 03.1	Responsible Sourcing of Materials	0	0	0		ARCAD JC	
	Mat 03.2	Responsible Sourcing of Materials - Sustainable Proc	1	1	1		ARCAD JC	
	Mat 03.3	- Responsible Sourcing of Materials (RSM)	3	1	1		ARCAD JC	
	Mat 04	Insulation - Embodied Impact	1	1	1		PIERCY	
	Mat 05	Designing for Durability and Resilience	1	1	1		PIERCY	
	Mat 06	Material Efficiency	1	0	1		PIERCY	
Waste	Wst 01.1	Construction Waste Management - Construction Res	3	3	3		ARCAD JC	
	Wst 01.2	- Diversion of Resources from Landfill	1	1	1		ARCAD JC	
	Wst 02	Recycled Aggregates	1	0	0			
	Wst 03	Operational Waste	1	1	1		PIERCY	
	Wst 04	Speculative Floor and Ceiling Finishes	1	1	1		PIERCY	
	Wst 05	Adaptation To Climate Change	1	0	1			
	Wst 06	Functional Adaptability	1	0	1			
Land Use and Ecology	LUE 01.1	Site Selection - Previously Occupied Land	1	1	1		PIERCY	
	LUE 01.2	- Contaminated Land	1	1	1		ARCAD JC	
	LUE 02.1	Ecological Value of Site and Protection of Ecological I	1	1	1		ARCAD ECO	
	LUE 02.2	- Protection of Ecological Features	1	1	1		ARCAD ECO	
	LUE 03	Minimising Impact On Existing Site Ecology	2	2	2		ARCAD ECO	
	LUE 04.1	Enhancing Site Ecology (Ecologists Report and Recon	1	1	1		ARCAD ECO	
	LUE 04.2	Enhancing Site Ecology (Increase in Ecological Value	1	0	1		ARCAD ECO	
	LUE 05	Long Term Impact On Biodiversity	2	2	2		ARCAD ECO	
Pollution	Pol 01.1	Impact of Refrigerants - Impact of Refrigerant	2	0	0			
	Pol 01.2	- Leak Detection and Containment	1	0	0			
	Pol 02	NOx Emissions	3	0	0			
	Pol 03.1	Surface Water Run-off - Flood Risk	2	2	2		HTS	
	Pol 03.2	- Surface Water Run Off	0	0	0		HTS	
	Pol 03.3	Surface Water Run-off - Minimising Water Course Po	1	0	0		HTS	
	Pol 04	Reduction of Night Time Light Pollution	1	1	1		MTT	
	Pol 05	Reduction of Noise Pollution	1	1	1		ACO	
Exemplary	Exe Man 01	Project Brief and Design - Stakeholder Consultation (	1	0	0			
	Exe Man 03	Responsible Construction Practices	1	0	0			
	Exe Man 05	Aftercare	1	0	0			
	Exe Hea 01.4	Visual Comfort - Internal and external lighting	1	0	0			
	Exe Hea 02	Indoor Air Quality	2	0	0			
	Exe Ene 01	Reduction of CO2 Emissions	1	0	0			
	Exe Wat 01	Water Consumption	1	0	0			
	Exe Mat 01	Life Cycle Impacts	1	0	0			
	Exe Mat 03	Responsible Sourcing of Materials	1	0	0			
	Exe Wst 01.1	Construction Waste Management	1	0	0			
	Exe Wst 01.2	Construction Waste Management	1	0	0			
	Exe Wst 02	Recycled Aggregates	1	0	0			
	Exe Wst 05	Adaptation to Climate Change	1	0	0			
	Exe Pol 03	Surface Water Run-Off	1	0	0			

credit tracker - summary...

BREEAM NC 2014 - Credit Tracker

Project: 3-6 Spring Place **Job Number:** 8081

Subject: BREEAM NC 2014 - Design Stage

Assessor: Ellis Leake-Lyall **Date:** 22nd August 2016

Checked By: Martin Lawless **Date:** 22nd August 2016

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% Req. Rating: Excellent Sought %: 76.68% Sought Rating: Excellent Complete %: 0.00% Complete Rating: N/A Risk %: 15.74%

Sought Margin %: 6.68% Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Man 01.1	Project Brief and Design - Stakeholder Consultation (Project Delivery)	1	1			1. Prior to completion of the Concept Design (RIBA Stage 2), the project delivery stakeholders have met to identify and define their roles, responsibilities and contributions for each of the key phases of project delivery. 2. In defining the roles and responsibilities for each key phase of the project, the following must be considered: a. End user Requirements b. Aims of the design and design strategy c. Particular installation and construction Requirements/limitations d. Occupiers budget and technical expertise in maintaining any proposed systems e. Maintainability and adaptability of the proposals f. Requirements for the production of project and end user documentation g. Requirements for commissioning, training and aftercare support. 3. The project team demonstrate how the project delivery stakeholder contributions and outcomes of the consultation process has influenced or changed the Initial Project Brief, including if appropriate, the Project Execution Plan, Communication Strategy, and the Concept Design.	1 to 3	1. A Project Brief and/or Project Execution Plan (PEP) and/or Consultation Plan (undertaken at RIBA Stage 2) defining the roles and responsibilities for the project delivery stakeholders that include the client, the building occupier (where known), the Design Team and the principal contractor or the construction project manager. 2. A Project Brief and/or PEP and/or Consultation Plan must define the roles and responsibilities of the project delivery stakeholders for the key phases of the project delivery and include the following: a. End user Requirements b. Aims of the design and design strategy c. Particular installation and construction Requirements/limitations d. Occupiers budget and technical expertise in maintaining any proposed systems e. Maintainability and adaptability of the proposals f. Requirements for the production of project and end user documentation g. Requirements for commissioning, training and aftercare support. 3. Meeting minutes to demonstrate how the project delivery stakeholder contributions and outcomes of the consultation process has influenced or changed the Initial Project Brief, including if appropriate, the Project Execution Plan, Communication Strategy, and the Concept Design.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought, with the Credit Requirements being easily documented for a project of this type and scale. MTTS to provide template for completion at a Project team Meeting as soon as possible. Time Critical Action - RIBA Stage 2 - Prior to completion of the Concept Design (RIBA Stage 2), the project delivery stakeholders have met to identify and define their roles, responsibilities and contributions for each of the key phases of project delivery.	ARCAD	

credit tracker...

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Man 01.2	Project Brief and Design - Stakeholder Consultation (Third Party)	**1**	**1**			4. 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. 5. 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. 6. 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. Relevant parties includes but is not limited to the following: 1. Actual/intended building users (if known) including facilities management (FM) staff or those responsible for the day-to-day operation of the building and grounds. 2. Representative consultation group from the existing community (if the building is a new development in an existing community) or for a community still under construction. 3. Existing partnerships and networks that have knowledge of, and experience working on, existing buildings of the same type. 4. Potential users of any shared facilities, e.g. operators of clubs and community groups. AND the following where relevant: 5. In educational buildings, representatives of Local Education Authority, Board of Governors etc. 6. Local or national historic/heritage groups (over and above any requirements relating to statutory consultees). 7. Specialist service and maintenance contractors/representatives where the building function has particular technical requirements in complex environments, e.g. buildings containing laboratories.	4 to 7	4. Copy of the consultation documentation and/or meeting minutes confirming that all relevant third party have been consulted and this covers the following content: a. Functionality, build quality and impact (including aesthetics) b. Provision of appropriate internal and external facilities (for future building occupants and visitors/users) c. Management and operational implications d. Maintenance resources implications e. Impacts on the local community, e.g. local traffic/transport impact f. Opportunities for shared use of facilities and infrastructure with the community/appropriate stakeholders, if relevant/appropriate to building type. g. Compliance with statutory (national/local) consultation requirements. h. Inclusive and accessible design. In the case of educational building types, minimum content also includes: i. How the building/grounds could best be designed to facilitate learning and provide a range of social spaces appropriate to the needs of pupils, students and other users. In the case of building types containing technical areas or functions, e.g. laboratories, workshops etc., minimum content also includes: j. The end users broad requirements for such facilities, including appropriate sizing, optimisation and integration of equipment and systems. 5. Meeting minutes, specifications and design drawings confirming how the consultation process has influenced Initial Brief and Concept Design. 6. Meetings minutes and/or Letter confirming that consultation feedback has been given to, and received by, all relevant parties by RIBA Stage 4.	200616 - Piercy confirmed that DP9 are liaising with LCA to prepare a consultation strategy with stakeholders. The proposal and approach will be reviewed at the next pre-app meeting (w/c 4th July) , with subsequent public consultation likely taking place before the school holidays (w/c 18th July). At this stage dates are still indicative. Piercy to provide consultation documentation in line with the Credit requirements and evidence for MTTS to review. ___ 200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit would be reviewed and should remain an 'Enhanced' Credit. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score, with the Credit Requirements not necessarily being part of the pre-planning/planning activity for a project of this this type and scale. The Credit may be sought as part of the 'Enhanced' score. ___ Time Critical Action - RIBA Stage 2,4 - 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.. Consultation feedback must be provided to stakeholders at RIBA Stage 4. ___	**PIERCY**	
Man 01.3	Project Brief and Design - Sustainability Champion (Design)	**1**	**1**			8. An a Sustainability Champion has been appointed to facilitate the setting and achievement of BREEAM performance target(s) for the project. The Design Stage Sustainability Champion is appointed to perform this role during the project preparation and brief stage, as defined by the RIBA Plan of Work 2013. 9. The defined BREEAM performance target(s) has been contractually agreed between the client and design/project team no later than the Concept Design stage. 10. To achieve this Credit at the interim (design) assessment stage, the agreed BREEAM performance target(s) must be demonstrably achieved by the project design. This is demonstrated via the BREEAM Assessor's Design Stage certification report.	8 to 10	8. Copy of a letter of appointment of a Sustainability Champion at the feasibility stage (RIBA Stage 1 or equivalent). 9. Copy of a letter and or Project Brief confirming BREEAM performance target has been agreed between the client and the Design Team no later than Concept Design stage (RIBA Stage 2 or equivalent).	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS note that, as a BREEAM AP, Martin Lawless is able to undertake the role of Sustainability Champion at the Design Stage and agree the evidence documentation. It is noted that this Credit would not be achievable until the conclusion of the Design Stage assessment. ___ Additional Team Appointment - A Sustainability Champion (Design Stage) must be appointed. ___ Time Critical Action - RIBA Stage 1,2 - The BREEAM AP must be appointed at RIBA Stage 1. The defined BREEAM performance targets have been formally agreed between the client and design/project team no later than the Concept Design stage (RIBA Stage 2 or equivalent). ___	**ARCAD MTTS**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %:	Req. Rating:	Sought %:	Sought Rating:	Complete %:	Complete Rating:	Risk %:
>70%	Excellent	76.68%	Excellent	0.00%	N/A	15.74%

Sought Margin %:	Complete Margin %:
6.68%	0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Man 01.4	Project Brief and Design - Sustainability Champion (Monitoring Progress)	**1**	**1**			11. The Sustainability Champion criteria 8, 9 and 10 have been achieved. 12. 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.	11 to 12	Copy of a letter of appointment for a sustainability champion to monitor progress against the agreed BREEAM performance targets throughout the design process.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS note that, as a BREEAM AP, Martin Lawless could also undertake the role of Sustainability Champion during the Construction Stage to allow this Credit to be sought. ___ Additional Team Appointment - A Sustainability Champion (Monitoring Progress) must be appointed. ___ Time Critical Action - RIBA Stage 1,2,3,4 - The Sustainability Champion must attend key project/design team meetings during the Concept Design, Developed Design and Technical Design stages, as defined by the RIBA Plan of Work 2013, reporting during, and prior to, completion of each stage, as a minimum. ___	**ARCAD MTTS**	
Man 02.1	Life Cycle Cost and Service Life Planning - Elemental Life Cycle Cost	**2**	**2**			Elemental Life Cycle Cost (LCC) 1. 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 Standardized method of life cycle costing for construction procurement PD 156865:2008. 2. The LCC analysis shows: a. An outline LCC plan for the project based on the buildings basic structure and envelope, appraising a range of options and based on multiple cash flow scenarios e.g. 20, 30, 50+ years; b. The fabric and servicing strategy for the project outlining services component and fit-out options (if applicable) over a 15 year period, in the form of an elemental LCC Plan.	1 to 2	Copy of the Life Cycle Cost analysis report in compliance with BREEAM requirements.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit may be achievable. JC/Arcadis to confirm. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score, but it may be sought as part of the 'Enhanced' scoring. It should be noted that the Life Cycle Costing activities are usually beyond the conventional Cost Consultants role and would be likely to justify additional fees/expense. This Credit has been flagged as a 'High Risk' issue because it is a time-critical Credit which would need action within RIBA Stage 2. Action - QS to provide fee quotation for undertaking the Elemental Life Cycle Costing exercise. ___ Time Critical Action - RIBA Stage 2 - 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 Standardized method of life cycle costing for construction procurement PD 156865:2008. ___	**ARCAD JC**	
Man 02.2	Life Cycle Cost and Service Life Planning - Component Level LCC Plan	**1**	**1**			Component Level LCC Plan 3. 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 following component types (where present): a. Envelope, e.g. cladding, windows, and/or roofing b. Services, e.g. heat source cooling source, and/or controls c. Finishes, e.g. walls, floors and/or ceilings d. External spaces, e.g. alternative hard landscaping, boundary protection. 4. 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.	3 to 4	3. Copy of a Component Level LCC Plan in line with PD 156865:2008 and includes the component as defined in BREEAM criteria. 4. Design Examples of using the Component level LCC Plan to influence building and systems design/specification to minimize life cycle costs and maximise critical value.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit may not be achievable. JC/Arcadis to confirm. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score, but it may be sought as part of the 'Enhanced' scoring, although it should be noted that the Life Cycle Costing activities are usually beyond the conventional Cost Consultants role and would be likely to justify additional fees/expense. This Credit has been flagged as a 'High Risk' issue because it is a time-critical Credit which would need action within RIBA Stage 4. Action - QS to provide fee quotation for undertaking the Component Life Cycle Costing exercise. ___ Time Critical Action - RIBA Stage 4 - 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. ___	**ARCAD JC**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Man 02.3	Life Cycle Cost and Service Life Planning - Capital Cost Reporting	**1**	**1**			Capital Cost Reporting 5. Report the capital cost for the building in pounds per square metre (£k/ m2), via the BREEAM Assessment Scoring and Reporting tool, Assessment Issue Scoring tab, Management section.		Provide details of the capital cost.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS note that (assuming that there are no confidentiality issues) it is reasonable this Credit as this level of cost reporting is relatively simple to provide. ___	**ARCAD JC**	
Man 03.0	Responsible Construction Practices - Pre-Requisite	**0**	**0**			**Pre-Requisite** 1. All timber and timber based products used on the project is Legally harvested and traded timber. The legal timber and wood-derived products are those that originate from a forest where the following criteria are met: 1. The forest owner/manager holds legal use rights to the forest. 2. There is compliance by both the forest management organisation and any contractors with local and national legal criteria including those relevant to: a. Forest management b. Environment c. Labour and welfare d. Health and safety e. Other parties' tenure and use rights f. All relevant royalties and taxes are paid. 3.There is full compliance with the criteria of CITES. (Further information on the UK Government's Timber Procurement Policy and compliant responsible sourcing certification schemes is available from the CPET (Central Point of Expertise on Timber) website www.cpet.org.uk/)	PR	A letter of commitment and/or a company Timber/Procurement Policy or equivalent.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this mandatory criteria will be met. ___ 140416 (Pre Assessment Review) MTTS note that achieving this Credit is a mandatory requirement for any BREEAM rating and therefore must be undertaken. ___	**ARCAD JC**	
Man 03.1	Responsible Construction Practices - Environmental Management	**1**	**1**			1. The principal contractor operates an environmental management system (EMS) covering their main operations. The EMS must be either: a. third party certified, to ISO 14001/EMAS or equivalent standard; or b. have a structure that is in compliance with BS 8555:2003 and has reached phase four of the implementation stage, 'implementation and operation of the environmental management system', and has completed phase audits one to four, as defined in BS 8555. For Healthcare NHS buildings, as a pre-requisite of awarding any of the available Credits for this issue, the principal contractor must achieve the measure requiring operation of 'An Environmental Management System' 2. 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: PPG6.	1 to 2	1. A copy of the current EMS certificate (ISO 14001 / EMAS or equivalent) 2. A letter confirming procedures on-site are in accordance with Pollution Prevention Guidelines, Working at construction and demolition-sites: PPG6.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the Principal Contractor for a project of this type and scope is very likely to be EMS certified. The Credit Requirements should be conveyed into the tender documentation via Contract Preliminaries. ___	**ARCAD JC**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %:	Req. Rating:	Sought %:	Sought Rating:	Complete %:	Complete Rating:	Risk %:
>70%	Excellent	76.68%	Excellent	0.00%	N/A	15.74%

Sought Margin %:	Complete Margin %:
6.68%	0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Man 03.2	Responsible Construction Practices - Construction Stage Sustainability Champion	**1**	**1**			Sustainability Champion (Construction) 3. A Sustainability Champion is appointed to monitor the project to ensure ongoing compliance with the relevant sustainability performance/process criteria, and therefore BREEAM target(s), during the Construction, Handover and Close Out stages (as defined by the RIBA Plan of Works 2013, stages 5 and 6). To do this the Sustainability Champion will ideally be site based or will visit the site regularly to carry out spot checks, with the relevant authority to do so and require action to be taken to address shortcomings in compliance. The Sustainability Champion will monitor site activities with sufficient frequency (see compliance note CN6) to ensure that risks of non-compliance are minimised. They will report on progress at relevant project team meetings including identifying potential areas of non-compliance and any action needed to mitigate. 4. The defined BREEAM performance target forms a requirement of the principal contractors contract (see compliance note Man 01 Project brief and design – CN5 and in Man 01 Project brief and design – Relevant definitions). 5. To achieve this Credit at the final post construction stage of assessment, the BREEAM-related performance target for the project must be demonstrably achieved by the project. This is demonstrated via the BREEAM Assessor's final post construction stage assessment report.	3 to 5	3. A copy of a letter of appointment of a sustainability champion to monitor the project during the construction, hand over and close out stages. 4. A copy of the contractor BREEAM performance target specification.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the Principal Contractor for a project of this type and scope are very likely to have appropriate personnel to fulfil this role. Please note that the Sustainability Champion at this stage must be an individual who is site base and can oversee the BREEAM issues on site, rather than the BREEAM AP pointed for the early stage Sustainability Champion role. The Credit Requirements should be conveyed into the tender documentation via Contract Preliminaries. ___ Additional Team Appointment - A Sustainability Champion (Construction Stage) must be appointed. ___	**ARCAD JC**	
Man 03.3	Responsible Construction Practices - Considerate Construction	**2**	**2**			Considerate Construction 6. Where the principal contractor has used a 'compliant' organisational, local or national considerate construction scheme and their performance against the scheme has been confirmed by independent assessment and verification. The BREEAM Credits can be awarded as follows: a. One Credit where the contractor achieves a CCS score between 25 and 34 with at least 5 in each sections b. Two Credits where the contractor significantly exceeds and achieve a CCS score between 35 and 39 with at least 7 in each sections. Refer to the Relevant definitions section for a list of compliant schemes and therefore how performance, as determined by a compliant scheme, translates in to BREEAM Credits.	6	A copy Contractor's Tender document or a letter of commitment confirming: - A requirement to register with the CCS - The total score to be targeted and the minimum score to be achieved in each section	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that two Credits are sought as part of the 'Baseline' score as the Principal Contractor for a project of this type and scope should have good experience and ability in achieving good CCS scores. The Credit Requirements should be conveyed into the tender documentation via Contract Preliminaries. ___ Note - To achieve an 'Excellent' rating, it is mandatory to achieve 1 Credit under this issue. ___	**ARCAD JC**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Man 03.4	Considerate Construction - Monitoring of Construction Site Impacts - Utility Consumption	1	1			Monitoring of Construction Site Impacts 7. Responsibility has been assigned to an individual(s) for monitoring, recording and reporting energy use, water consumption and transport data (where measured) resulting from all on-site construction processes (and dedicated off-site monitoring) throughout the build programme. To ensure the robust collection of information, this individual(s) must have the appropriate authority and responsibility to request and access the data required. Where appointed, the Sustainability Champion could perform this role. First monitoring Credit - Utility consumption Energy Consumption 8. Criterion 7 is achieved. 9. Monitor and record data on principal constructors 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. 10. Report the total carbon dioxide emissions (total kgCO2/project value) from the construction process via the BREEAM Assessment Scoring and Reporting tool. Water Consumption 11. Criterion 7 is achieved. 12. Monitor and record data on principal constructors and subcontractors potable water consumption (m3) arising from the use of construction plant, equipment (mobile and fixed) and site accommodation. 13. Using the collated data report the total net water consumption (m3), i.e. consumption minus any recycled water use, from the construction process via the BREEAM Assessment Scoring and Reporting tool.	7 to 13	A copy of a letter confirming assignment of a named individual with the responsibility for monitoring, recording and reporting energy and water use in compliance with BREEAM criteria.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the Principal Contractor should be able to put appropriate procedures in place for this activity. The Credit Requirements should be conveyed into the tender documentation via Contract Preliminaries. ___	ARCAD JC	
Man 03.5	Considerate Construction - Monitoring of Construction Site Impacts - Transport of Construction Material	1	1			Second Monitoring Credit - Transport of Construction Materials and Waste 14. Criterion 7 is achieved. 15. Monitor and record data on transport movements and impacts resulting from delivery of the majority of construction materials to site and construction waste from site. As a minimum this must cover: a. Transport of materials from the factory gate to the building site, including any transport, intermediate storage and distribution. See Relevant definitions. b. Scope of this monitoring must cover the following as a minimum: i. Materials used in major building elements (i.e. those defined in BREEAM issue Mat 01 Life cycle impacts), including insulation materials. ii. Ground works and landscaping materials. c. Transport of construction waste from the construction gate to waste disposal processing/recovery centre gate. Scope of this monitoring must cover the construction waste groups outlined in the projects waste management plan. 16. Using the collated data, report separately for materials and waste, the total fuel consumption (litres) and total carbon dioxide emissions (kgCO2 eq), plus total distance travelled (km) via the BREEAM Assessment Scoring and Reporting tool.	14 to 16	A copy of a letter confirming the assignment of an individual for monitoring, recording and reporting transport movement in compliance with BREEAM criteria.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the Principal Contractor should be able to put appropriate procedures in place for this activity. The Credit Requirements should be conveyed into the tender documentation via Contract Preliminaries. ___	ARCAD JC	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% Req. Rating: Excellent Sought %: 76.68% Sought Rating: Excellent Complete %: 0.00% Complete Rating: N/A Risk %: 15.74%

Sought Margin %: 6.68% Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Man 04.1	Commissioning and Handover - Commissioning and Testing Schedule and Responsibilities	1	1			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 commissioning activities are carried out in accordance with current Building Regulations, BSRIA and CIBSE guidelines and/or other appropriate standards, where applicable. Where a building management system (BMS) is specified, refer to compliance note CN5 on BMS commissioning procedures. 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.	1 to 4	1. A schedule that identifies commissioning and testing 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. A copy of letter or main contract specification confirming that all commissioning will be carried out in accordance with current Building Regulations, BSRIA and CIBSE guidelines and/or other appropriate standards, where applicable. and also in compliance with BMS commissioning procedures, where applicable. 3. A copy of letter of appointment or main contract specification confirming an appropriate project team member to monitor and programme pre-commissioning, commissioning, testing and, where necessary, re-commissioning activities on behalf of the client. 4. A construction programme and letter which 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.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the Principal Contractor should be able to put appropriate procedures in place for this activity. The Credit Requirements should be conveyed into the tender documentation via Contract Preliminaries. ___ Time Critical Action - RIBA Stage 4 - Appointment of Commissioning Monitor must occur at RIBA Stage 4. ___	ARCAD JC	
Man 04.2	Commissioning and Handover - Commissioning Building Services	1	1			Commissioning Building Services 5. 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 hand-over stages. Where there are simple building services, this role can be carried out by an appropriate project team member (see criterion 3 above), provided they are not involved in the general installation works for the building services system(s).	5	A copy of letter confirming that a specialist commissioning manager is appointed during the design stage with his responsibilities as defined in the BREEAM criteria. Or where there are simple building services that an appropriate project team member is appointed.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the Project manager could provide correspondence in due course setting out the appointment of a specialist commissioning subcontractor, in accordance with the BREEAM requirements. The Credit Requirements should be conveyed into the tender documentation via Contract Preliminaries. ___	ARCAD JC	
Man 04.3	Commissioning and Handover - Testing and Inspecting Building Fabric	1	1			Testing and Inspecting Building Fabric 6. The commissioning and testing schedule and responsibilities Credit is achieved. 7. The integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths is quality assured through completion of post construction testing and inspection. Dependent on building type or construction, this can be demonstrated through the completion of a thermographic survey as well as an airtightness test and inspection. The survey and testing must be undertaken by a Suitably Qualified Professional in accordance with the appropriate standard. 8. Any defects identified in the thermographic survey or 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.	6 to 8	7. A copy of the main contract specification or letter from the contractor confirming that a thermographic survey or an airtightness test and inspection will be carried out at the post-construction stage by a Suitably Qualified Professional in accordance with the appropriate standard. 9. A copy of the main contract specification or letter from the contractor confirming that any defects identified in the thermographic survey or the airtightness testing reports are rectified prior to building handover and close out.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit is to be reviewed as part of the 'shopping list'. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is not sought as part of the baseline score as it is thought that although the Principal Contractor could agree to carry appropriate testing of the building fabric, the potential need to impose remediation of any issues discovered may not be cost effective. The Credit is shown in the Enhanced score as there is potential for the contractor to fulfil the requirement to test the building fabric and remediate where necessary. The Credit Requirements should be conveyed into the tender documentation via Contract Preliminaries. ___ Additional Team Appointment - A Thermographic Surveyor and Air Tightness Tester must be appointed. ___	ARCAD JC	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Man 04.4	Commissioning and Handover - Handover	1	1			Handover 9. A Building User Guide (BUG) is developed prior to handover for distribution to the building occupiers and premises managers (see Relevant definitions). 10. 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.	9 to 10	9. A letter confirming that a building user guide will be provided with a detailed contents list describing what it will include. Full details of the content of the building user guide is defined in the BREEAM assessment manual. 10. A copy of the training schedule or a letter confirming that a training schedule will be provided in accordance with the BREEAM criteria.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as a Building User Guide and a training schedule for building/occupiers/premises managers could be produced for the building relatively easily. The Credit Requirements should be conveyed into the tender documentation via Contract Preliminaries. ___ Note - To achieve an 'Excellent' rating, it is mandatory to achieve Criterion 10 (BUG). ___	ARCAD JC	
Man 05.1	Aftercare - Aftercare Support	1	1			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. 2.There is (or will be) operational infrastructure and resources in place to co-ordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months, once the building is occupied. This is done to facilitate analysis of discrepancies between actual and predicted performance, with a view to adjusting systems and/or user behaviours accordingly.	1 to 2	1. A copy of main contract specification or a letter confirming that: a. a meeting will be arranged between the aftercare team and the building occupier and cover the content in accordance with BREEAM criteria. b. On site facilities management training and aftercare support for at least the first month of building occupation will be provided. c. Confirmation that provision will be made for longer term aftercare support for at least 12 months after occupation. 2. A letter of commitment confirming that there will be operational infrastructure and resources in place to co-ordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months, once the building is occupied	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit is to be reviewed as part of the 'shopping list'. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score, as the appropriate aftercare provision would be unlikely to be allowed for in the Project Team and Contractor appointments and would be dependent on the tenant working co-operatively with the base build Project Team for a period of time following completion and handover of the building. The Credit may be sought as part of the 'Enhanced' score. ___	ARCAD JC	

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Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Man 05.2	Aftercare - Seasonal Commissioning	**1**	**1**			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 or concerns 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.	3	A copy of main contract specification or letter confirming that a seasonal commissioning will be completed over a 12 month period, once the building becomes substantially occupied in compliance with the BREEAM requirement criteria.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the seasonal commissioning duties and programming could be allowed for in the Project Team appointments and Contractor procurement. The Credit Requirements should be conveyed into the tender documentation via Contract Preliminaries. ___ Note - To achieve an 'Excellent' rating, it is mandatory to achieve 1 Credit. ___	**ARCAD JC**	
Man 05.3	Aftercare - Post Occupancy Evaluation	**1**	**0**			4.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 and needs to cover: a. A review of the design intent and construction process (review of design, procurement, construction and handover processes). i. Internal environmental conditions (light, noise, temperature, air quality) ii. Control, operation and maintenance iii. Facilities and amenities iv. Access and layout v. Other relevant issues vi. Sustainability performance (energy/water consumption, performance of any sustainable features or technologies e.g. materials, renewable energy, rainwater harvesting etc.). b. A review of the design intent and construction process (review of design, procurement, construction and handover processes). c. Feedback from a wide range of building users including facilities management on the design and environmental conditions of the building covering: i. Internal environmental conditions (light, noise, temperature, air quality) ii. Control, operation and maintenance iii. Facilities and amenities iv. Access and layout v. Other relevant issues. d. Sustainability performance (energy/water consumption, performance of any sustainable features or technologies e.g. materials, renewable energy, rain- water harvesting etc.). 5.The client or building occupier makes a commitment to carry out the appropriate dissemination of information on the building's post-occupancy performance. This is done to share good practice and lessons learned and inform changes in-user behaviour, building operational processes and procedures, and system controls.	4 to 5	A letter of commitment to carry out a post-occupancy evaluation exercise one year after initial building occupation. Confirming that the POE will be carried out by an independent party and cover all the BREEAM criteria requirements. And A letter of the commitment to carry out the appropriate dissemination of information on the building's post occupancy performance.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should not be sought. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is sought, as it is unlikely to be fulfilled and is not sought for the 'Baseline' or 'Enhanced' score. ___ Additional Team Appointment - A Facilitator for Post Occupancy Evaluation must be appointed. ___		

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

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Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Hea 01.1	Visual Comfort - Glare Control	**1**	**1**			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. Compliant shading measures for meeting glare control criteria include: - building integrated measures (e.g. low eaves) - occupant controlled devices such as blinds (where transmittance value is < 0.1 (10%)) - bioclimatic design - external shading or brise soleil. 2. The glare control strategy avoids increasing lighting energy consumption, by ensuring that: a. The glare control system is designed to maximise daylight levels under all conditions whilst avoiding disabling glare in the workplace or other sensitive areas. The system should not inhibit daylight from entering the space under cloudy conditions, or when sunlight is not on the facade. AND b. The use or location of shading does not conflict with the operation of lighting control systems.	1 to 2	Marked-up copy of the design plan confirming the location of the glare control and a description of the function of each building areas. A copy of the relevant specification clauses, window schedule or design plan confirming type of shading system and control to be installed.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit is to be reviewed as part of the 'shopping list'. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score as it is not expected that glare control systems will be provided as part of the base build works. The Credit may be sought as part of the 'Enhanced' score. ___	**PIERCY**	
Hea 01.2	Visual Comfort - Daylighting	**1**	**0**			3. Daylighting criteria have been met using either of the following options: a. The relevant building areas meet good practice daylight factor(s) and other criterion as outlined in Table - 10 and Table - 11. OR b. The relevant building areas meet good practice average and minimum point daylight illuminance criteria as outlined in Table - 12.	3	Design drawings and daylight calculations.	200416 (Pre Assessment Workshop) - Piercy confirmed that this Credit would be reviewed and they would confirm if it is achievable. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score as it does not seem likely that the relevant daylighting levels will be met. Where a daylighting report is produced to show that daylighting levels will be met, the Credit may be achievable and is therefore shown within the 'Enhanced' scoring. ___ Additional Team Appointment - A Daylight Consultant must be appointed. ___	**PIERCY**	
Hea 01.3	Visual Comfort - View Out	**1**	**0**			4. 95% of the floor area in relevant building areas is within 7m of a wall which has a window or permanent opening that provides an adequate view out. 5. The window/opening must be ≥ 20% of the surrounding wall area (refer to Relevant definitions in the Additional information section). Where the room depth is greater than 7m, compliance is only possible where the percentage of window/opening is the same as, or greater than, the values in table 1.0 of BS 82061. 6. In addition, the building type criteria in Table - 13 are applicable to view out criteria.	4 to 6	Design drawings	200416 (Pre Assessment Workshop) - Piercy confirmed that this Credit would be reviewed and confirm if achievable. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score as they do not believe 95% of the floor area will not be within 7m of a wall with a window that provides an adequate view out. Therefore the Credit is not shown within either the 'Baseline' or 'Enhanced' score. Action - Piercy and Co. to verify whether the view out criteria could be met. ___	**PIERCY**	

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Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Hea 01.4	Visual Comfort - External and Internal Lighting, Zoning and Controls	**1**	**1**			Internal lighting 7. All fluorescent and compact fluorescent lamps are fitted with high frequency ballasts. 8. Internal lighting in all relevant areas of the building is designed to provide an illuminance (lux) level appropriate to the tasks undertaken, accounting for building user concentration and comfort levels. This can be demonstrated through a lighting design strategy that provides illuminance levels in accordance with the SLL Code for Lighting 2012 and any other relevant industry standard. 9. For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 7 sections 3.3, 4.6, 4.7, 4.8 and 4.9. This gives recommendations highlighting: a. Limits to the luminance of the luminaires to avoid screen reflections. (Manufacturers' data for the luminaires should be sought to confirm this.) b. For uplighting, the recommendations refer to the luminance of the lit ceiling rather than the luminaire; a Design Team calculation is usually required to demonstrate this. c. Recommendations for direct lighting, ceiling illuminance, and average wall illuminance. External lighting 10. All external lighting located within the construction zone is designed to provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night. To demonstrate this, external lighting provided is specified in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas and BS EN 12464-2:2014 Light and lighting - Lighting of work places - Part 2: Outdoor work places. 11. Internal lighting is zoned to allow for occupant control in accordance with the criteria below for relevant areas present within the building: a. In office areas, zones of no more than four workplaces b. Workstations adjacent to windows/atria and other building areas separately zoned and controlled c. Seminar and lecture rooms: zoned for presentation and audience areas d. Library spaces: separate zoning of stacks, reading and counter areas e. Teaching space or demonstration area f. Whiteboard or display screen g. Auditoria: zoning of seating areas, circulation space and lectern area h. Dining, restaurant, café areas: separate zoning of servery and seating/dining areas i. Retail: separate zoning of display and counter areas j. Bar areas: separate zoning of bar and seating areas k. Wards or bedded areas: zoned lighting control for individual bed spaces and control for staff over groups of bed spaces l. Treatment areas, dayrooms, waiting areas: zoning of seating and activity areas and circulation space with controls accessible to staff. 12. Areas used for teaching, seminar or lecture purposes have lighting controls provided in accordance with CIBSE Lighting Guide 5. 13. In addition the building type criteria in Table - 14 (for Education, Prisons and Courts).	7 to 13	A copy of the relevant lighting specification clause confirming that : - All fluorescent and compact fluorescent lamps are fitted with high frequency ballast. - Lighting design is in accordance with the SLL Code for Lighting 2012. - For areas where computer screens are regularly used the lighting design complies with CIBSE lighting Guide 7. - External lighting provided is specified in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas and BS EN 12464-2:2014 Light and lighting - Lighting of work places - Part 2: Outdoor work places. Design floor plans showing each function for each area of the building and the lighting zones and controls. A copy of the relevant lighting specification clause(s) confirming the type and scope of the occupant control.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the internal and external lighting levels, zoning and controls are likely to be compliant with the relevant standards. ___ Note - the Credit criteria should be reflected within the M&E specification. ___	**MTT**	
			0						0		
Hea 02.1	Indoor Air Quality - Indoor Air Quality Plan	**1**	**1**			1. An indoor air quality plan has been produced, with the objective of facilitating a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during occupation of the building. The indoor air quality plan must consider the following: a. Removal of contaminant sources b. Dilution and control of contaminant sources c. Procedures for pre-occupancy flush out d. Third party testing and analysis e. Maintaining indoor air quality in-use.	1	A copy of the Indoor Air Quality plan in compliance with the BREEAM criteria.	200416 (Pre Assessment Workshop) - Arcadis are to consult with MTT regarding the IAQP and an appointment of a specialist. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as an air quality plan could be procured for the building. Although this is an additional appointment, it is a relatively cost-effective Credit to seek. ___ Additional Team Appointment - A Specialist Consultant for Indoor Air Quality Plans must be appointed. ___	**MTT**	

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Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Hea 02.2	Indoor Air Quality - Ventilation	**1**	**0**			The building has been designed to minimise the concentration and recirculation of pollutants in the building as follows 2. Provide fresh air in to the building in accordance with the criteria of the relevant standard for ventilation. 3. Design ventilation pathways to minimise the build-up of air pollutants in the building, as follows: a. In air-conditioned and mixed-mode buildings/spaces i. The building's air intakes and exhausts are over 10m apart and intakes are over 20m from sources of external pollution. OR ii. The location of the buildings air intakes and exhausts, in relation to each other and external sources of pollution, is designed in accordance with BS EN 13779:2007 Annex A2. b. In naturally-ventilated buildings/spaces openable windows/ventilators are over 10m from sources of external pollution. 4. Where present, HVAC systems must incorporate suitable filtration to minimise external air pollution, as defined in BS EN 13779:2007 Annex A3. 5. Areas of the building subject to large and unpredictable or variable occupancy patterns have CO2 or air quality sensors specified and: a. In mechanically ventilated buildings/spaces sensor(s) are linked to the mechanical ventilation system and provide demand-controlled ventilation to the space. b. In naturally ventilated buildings/spaces sensors either have the ability to alert the building owner or manager when CO2 levels exceed the recommended set point, or are linked to controls with the ability to adjust the quantity of fresh air, i.e. automatic opening windows/roof vents.	2 to 5	2. Design team calculations and/or performance criteria confirming: - The fresh air rate set for each space - That the fresh air rate can be met using the chosen strategy - The design is in accordance with the relevant standards 3. A marked-up drawing highlighting: - Locations of intakes, extracts, openable windows, ventilators - Any existing or proposed external sources of pollution 4. A copy of the relevant specification clauses confirming: - HVAC system incorporate suitable filtration as defined in BS EN 13779:2007 Annex A3. - Air quality monitoring sensors (CO2) and the link details with the system implemented. 5. A copy of the relevant specification clauses confirming the provision of CO2 or air quality sensors.	040816 MTT confirmed that intakes will not be over 20m from external pollution. Therefore, the Credit is not achievable. ___ 200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as separation of ventilation intakes and exhausts can be a consideration in the mechanical services design and ventilation will be designed in accordance with the relevant standards. ___ Note - the Credit criteria should be reflected within the M&E specification. ___		
Hea 02.3	Indoor Air Quality - Volatile Organic Compound (VOC) Emission Levels (Products)	**1**	**1**			6. All decorative paints and varnishes specified meet the criteria in Table - 18 of the BREEAM Guidance Manual. 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).	6 to 7	A copy of the relevant specification clause confirming that : - All decorative and vanishes specified meet the criteria in Table 18 within the BREEAM manual. - At least five of the seven remaining product meet the testing and emission levels criteria in Table 18 within the BREEAM manual.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the Credit Requirements can be addressed within the architectural specification. This Credit has been flagged as a 'High Risk' issue because the requirements for specific VOC standards may impose restrictions on the ranges of materials which may be specified in the building. It should also be noted that materials should only be procured from manufacturers that can provide datasheets detailing the VOC levels and testing and performance standards. ___	**PIERCY**	

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Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Hea 02.4	Indoor Air Quality - Volatile Organic Compound (VOC) Emission Levels (Post Construction)	**1**	**0**			8. 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, 2010). 9. 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. 10. Where VOC and formaldehyde levels are found to exceed the limits defined in criteria 10 and 11, the project team confirms the measures that have, or will be taken, in accordance with the IAQ plan, to reduce the levels to within these limits. 11. The testing and measurement of the above pollutants are in accordance with the following standards where relevant: a. BS ISO 16000-4: 2011 Diffusive sampling of formaldehyde in air b. BS ISO 16000-6: 2011 VOCs in air by active sampling c. BS EN ISO 16017-2: 2003 VOCs - Indoor, ambient and workplace air by passive sampling d. BS ISO 16000-3: 2011 formaldehyde and other carbonyls in air by pumped sampling. 12. The measured concentration levels of formaldehyde (µg/m3) and TVOC (µg/m3) are reported, via the BREEAM Assessment Scoring and Reporting Tool.	8 to 12	A copy of the relevant specification clause or letter of commitment confirming that: - Formaldehyde and TVOC will be measured post construction (but pre-occupancy) in compliance with the criteria requirement. - If the formaldehyde or VOC levels founds exceed the limits defined, the project team confirms that measures will be taken in accordance with the IAQ plan, to reduce the levels to within these limits. - The testing and measurement are in accordance with following standards: a. BS ISO 16000-4: 2011 Diffusive sampling of formaldehyde in air b. BS ISO 16000-6: 2011 VOCs in air by active sampling c. BS EN ISO 16017-2: 2003 VOCs - Indoor, ambient and workplace air by passive sampling d. BS ISO 16000-3: 2011 formaldehyde and other carbonyls in air by pumped sampling.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should not be sought. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' or 'Enhanced' scores, whilst the Credit Requirements can be addressed in the architectural specification, the risk remains that the tests will not show acceptable results. ___		
Hea 02.5	Indoor Air Quality - Adaptability - Potential for Natural Ventilation	**1**	**0**			13. 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: a. 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: i. 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. OR ii. The design demonstrates that the natural ventilation strategy provides adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates. This is demonstrated using ventilation design tool types recommended by CIBSE AM10 (or for education buildings by using the ClassVent tool). For a strategy which does not rely on openable windows, or which has occupied spaces with a plan depth greater than 15m, the design must demonstrate (in accordance with criterion 13.a.i. above) that the ventilation strategy can provide adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates. 14. The natural ventilation strategy is capable of providing at least two levels of user-control on the supply of fresh air to the occupied space.	13 to 14	Design plan and specification confirming that: - Ventilation strategy in each occupied space - Depth of the rooms - The type of window/ventilators and total openable area - The location of openings - The type and degree/level of user-control And Copy of the results of the ventilation design calculation in compliance with CIBSE AM10.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should not be sought. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' or 'Enhanced' scores, as the building will be mechanically ventilated and the opportunity to retrospectively implement natural ventilation may not exist. ___		

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Hea 04.1	Thermal Comfort - Thermal Modelling	**1**	**1**			Thermal Modelling 1. Thermal modelling has been carried out using software in accordance with CIBSE AM11 Building Energy and Environmental Modelling. 2. The software used to carry out the simulation at the detailed Design Stage provides full dynamic thermal analysis. For smaller and more basic building designs with less complex heating or cooling systems, an alternative less complex means of analysis may be appropriate (such methodologies must still be in accordance with CIBSE AM11). 3. The modelling demonstrates that: a. For air conditioned buildings, summer and winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5; or other appropriate industry standard (where this sets a higher or more appropriate requirement/level for the building type). b. For naturally ventilated/free running buildings: i. Winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5; or other appropriate industry standard (where this sets a higher or more appropriate requirement/level for the building type). ii. The building is designed to limit the risk of overheating, in accordance with the adaptive comfort methodology outlined in CIBSE TM52: The limits of thermal comfort: avoiding overheating in European buildings 4. For air conditioned buildings, the PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied) indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.	1 to 4	A copy of the relevant specification confirming the criteria for thermal comfort analysis Or A letter from the Design Team confirming: - The name of the thermal comfort modelling software used - The software has been selected and comply in accordance with CIBSE AM11 A copy of the results from the modelling demonstrating that the operative temperature ranges is in accordance with the relevant standards.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as thermal modelling is used for EPC, Part L compliance and plant sizing purposes. ___ Time Critical Action - RIBA Stage 4 - It is recommended that the specialist Thermal Comfort assessment study is undertaken by the end of RIBA Stage 4. ___	**MTTS**	
Hea 04.2	Thermal Comfort - Adaptability - for a Projected Climate Change Scenario	**1**	**0**			Adaptability - for a projected climate change scenario 5. Criteria 1 to 4 are achieved. 6. The thermal modelling demonstrates that the relevant requirements set out in criteria 3 are achieved for a projected climate change environment (see Relevant definitions). 7. Where thermal comfort criteria are not met for the projected climate change environment, the project team demonstrates how the building has been adapted, or designed to be easily adapted in future using passive design solutions in order to subsequently meet the requirements under criterion 6. 8. For air conditioned buildings, the PMV and PPD indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.	5 to 8	6. A copy of the results from the modelling demonstrating that the operative temperature ranges is in accordance with the relevant standards for a projected climate change environment. 7. A letter confirming that if the criteria are not met the building will be adapted, or designed to be easily adapted in future using passive design solutions.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should not be sought. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' or 'Enhanced' scores as, although the Credit could be sought if a specialist overheating study was undertaken, this could become a significant design task as the project team would need to demonstrate how the building could be adapted, or designed to be easily adapted in future using passive design solutions. ___		

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Hea 04.3	Thermal Comfort - Thermal Zoning and Controls	**1**	**1**			Thermal Zoning and Controls 9. Criteria 1 to 4 are achieved. 10. The thermal modelling analysis (undertaken for compliance with criteria 1 to 4) has informed the temperature control strategy for the building and its users. 11. The strategy for proposed heating/cooling system(s) demonstrates that it has addressed the following: a. Zones within the building and how the building services could efficiently and appropriately heat or cool these areas. For example consider the different requirements for the central core of a building compared with the external perimeter adjacent to the windows. b. The degree of occupant control required for these zones, based on discussions with the end user (or alternatively building type or use specific design guidance, case studies, feedback) considers: i. User knowledge of building services ii. Occupancy type, patterns and room functions (and therefore appropriate level of control required) iii. How the user is likely to operate or interact with the system(s), e.g. are they likely to open windows, access thermostatic radiator valves (TRV) on radiators, change air-conditioning settings etc., iv. The user expectations (this may differ in the summer and winter) and degree of individual control (i.e. obtaining the balance between occupant preferences, for example some occupants like fresh air and others dislike drafts). c. How the proposed systems will interact with each other (where there is more than one system) and how this may affect the thermal comfort of the building occupants. d. The need or otherwise for an accessible building user actuated manual override for any automatic systems	9 to 11	Marked-up design plan and specification clause confirming: - Scope of the heating/cooling system - The type of the users control for above systems - The scope of the controls / control zone - The occupancy type, patterns and room functions - An accessible building user actuated manual override for any automatic systems	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought, with the appropriate level of controls and zoning for the purposes of BREEAM likely to be consistent with the operational requirements of the building. Note - a strategy for proposed heating/cooling system(s) must be produced to comply with this Credit. ___	**MTT**	
Hea 05.1	Acoustic Performance - Education, Healthcare, Office and Law courts building types	**3**	**3**			Up to three Credits for Education, Healthcare, Office and Law Courts building types 1. The building meets the appropriate acoustic performance standards and testing requirements defined in the checklists and tables section which defines criteria for the acoustic principles of: a. Sound insulation b. Indoor ambient noise level c. Reverberation times	1	Copy of the acoustic report and calculations undertaken by the acoustic consultant. A copy of the specification clause confirming commitment of other acoustic requirements: - The sound insulation performance in compliance with the relevant standards - The indoor ambient noise level in compliance with the relevant standards. - Reverberation times requirements in compliance with the relevant standards.	200416 (Pre Assessment Workshop) - The Design Team confirmed that John Lloyd is the acoustician for this project. ___ 140416 (Pre Assessment Review) MTTS recommend that the three Credits are sought as part of the 'Baseline' score as a high quality noise environment is expected to be required as part of the building design. Appointment - a suitably qualified acoustician must be appointed. ___	**ACO**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

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Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Hea 06.1	Safety and Security - Safe Access	**0**	**0**			Safe Access Where external site areas form part of the assessed development the following apply: 1. Dedicated cycle paths provide direct access from the site entrance(s) to any cycle storage provided, without the need to deviate from the cycle path and, if relevant, connect to offsite cycle paths (or other appropriate safe route) where these run adjacent to the development's site boundary. 2. Footpaths on site provide direct access from the site entrance(s) to the building entrance(s) and connect to public footpaths off-site (where existing), providing practical and convenient access to local transport nodes and other off-site amenities (where existing). 3. Where provided, drop-off areas are designed off/adjoining to the access road and provide direct access to pedestrian footpaths, therefore avoiding the need for the pedestrian to cross vehicle access routes. 4. Dedicated pedestrian crossings must be provided where pedestrian routes cross vehicle access routes, and appropriate traffic calming measures must be in place to slow traffic down at these crossing points. 5. For large developments with a high number of public users or visitors, pedestrian footpaths must be signposted to other local amenities and public transport nodes off-site (where existing). 6. The lighting for access roads, pedestrian routes and cycle lanes is compliant with the external lighting criteria defined in Hea 01 Visual comfort, i.e. in accordance with BS 5489-12013 Lighting of roads and public amenity areas. Where vehicle delivery access and drop-off areas form part of the assessed development, the following apply: 7. Delivery areas are not directly accessed through general parking areas and do not cross or share pedestrian and cyclist routes and other outside amenity areas accessible to building users and general public. 8. There is a dedicated parking/waiting area for goods vehicles with appropriate separation from the manoeuvring area and staff and visitor car parking. 9. Parking and turning areas are designed for simple manoeuvring according to the type of delivery vehicle likely to access the site, thus avoiding the need for repeated shunting. 10. There is a dedicated space for the storage of refuse skips and pallets away from the delivery vehicle manoeuvring area and staff/visitor car parking (if appropriate given the building type/function).	1 to 10	A scaled proposed site plan, specification or design details highlighting all necessary features and dimensions in compliance with all relevant criteria. Lighting specification confirming external lighting requirements.	200416 (Pre Assessment Workshop) - The Design Team confirmed that there are no external areas associated with the site. ___ 140416 (Pre Assessment Review) MTTS note that, if the assessed building does not have any external areas and access to the building is direct from the public highway/footpath i.e. there is no on-site vehicle access and parking areas, then the criteria concerning safe access are not applicable. In such instances the two available Credits (Hea 06.1 = 1 Credit and Hea 06.2 = 1 Credit) must be assessed and awarded based on compliance with the security criteria (Hea 06.2). Therefore, 0 Credits are shown for this issue and 2 Credits for Hea 06.2. ___	**PIERCY**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% Req. Rating: Excellent Sought %: 76.68% Sought Rating: Excellent Complete %: 0.00% Complete Rating: N/A Risk %: 15.74%

Sought Margin %: 6.68% Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Hea 06.2	Safety and Security - Security of Site and Building	**2**	**2**			11. A suitably qualified security specialist (SQSS) conducts an evidence-based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent). The project and site specific SNA must include the following: i. A visual audit of the site and surroundings, identifying environmental cues and features pertinent to the security of the proposed development. ii. Formal consultation with relevant stakeholders, including the local ALO, CPDA & CTSA (as applicable), in order to obtain a summary of crime and disorder issues in the immediate vicinity of the proposed development. iii. Identify risks specific to the proposed, likely or potential use of the building(s). iv. Identify risks specific to the proposed, likely or potential user groups of the building(s). v. Identify any detrimental effects the development may have on the existing community. 12. A suitably qualified security specialist (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. 13. The recommendations or solutions proposed by the suitably qualified security specialist (SQSS) are implemented. Any deviation from those recommendations or solutions will need to be justified, documented and agreed in advance with a suitably qualified security specialist.	11 to 13	11. A copy of a letter confirming the appointment of a Suitably Qualified Security Specialist to conduct a Security Needs Assessment. 12. Correspondence or copy of the report/feedback from the Suitably Qualified Security Specialist. 13. A marked-up plan highlighting that the recommendations from the SQSS are implemented.	200616 - Piercy confirmed that an SQSS has been contacted and are awaiting a response. ___ 200416 (Pre Assessment Workshop) - The Design Team confirmed that Hea 06.1 is not applicable and therefore 2 Credits are achievable, where compliance with this issue is met. The Design Team confirmed that they would consult and Security Specialist to provide safety and security recommendations for this development. ___ 140416 (Pre Assessment Review) MTTS Note that Credit Hea 06.1 is not achievable due to having no external areas, 2 Credits can be awarded for Hea 06.2. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as part of the 'Baseline' score as security provision on site is likely to be easily addressed through measures already envisaged for the scheme and the Security Consultant is unlikely to request any measures above and beyond what would be included in the 'baseline' design proposals. ___ Additional Team Appointment - A Suitably Qualified Security Specialist (SQSS) must be appointed. ___ Time Critical Action - RIBA Stage 2 - The Security Needs Assessment must be undertaken at RIBA Stage 2. ___	**PIERCY**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

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Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Ene 01	Reduction of Energy Use and Carbon Emissions	**12**	**5**			1. Calculate an Energy Performance Ratio for New Constructions (EPRNC). Compare the EPRNC achieved with the benchmarks in Table - 25 and award the corresponding number of BREEAM Credits. A description of how the EPRNC is calculated from a buildings modelled operational energy performance, primary energy consumption and CO2 emissions is provided in the Methodology section. Note: Zero net regulated CO2 emissions are only required to achieve the maximum number of Credits (12). There is no additional CO2 minimum requirement for any BREEAM rating. Note: The four countries of the UK have their own building regulations for energy and whilst they use the same methodology and approved calculation software, each have different definitions of the notional building and, set different requirements for regulatory compliance i.e. baseline performance. This is accounted for in the BREEAM NC 2014 Ene 01 methodology through the 'translator curves' defined for each country. Therefore, the EPRNC and BREEAM Credits are determined by comparing the assessed buildings modelled operational energy performance relative to the regulatory baseline for the country in which the building is located. See Compliance Note: CN3. Up to four Credits - zero regulated carbon - Requirements 2-3 2. The building achieves an EPRNC≥ 0.9 and zero net regulated CO2 emissions (see Relevant definitions). 3. An equivalent percentage of the buildings modelled 'regulated' operational energy consumption, as stipulated in Table - 26, is generated by carbon neutral onsite or near-site sources and used to meet energy demand from 'unregulated' building systems or processes. Five Credits - carbon negative - Requirement 4 4. The building is 'carbon negative' in terms of its total modelled operational energy consumption, including regulated and unregulated energy (see Relevant definitions in the Additional information section of this issue).	1	A copy of the Building Regulations Output Document from the approved software. The output documents must be based on the design stage of analysis. A copy of the Building Regulations Output Document from the design stage SAP calculations (where relevant for multi-residential buildings) As above, plus evidence confirming: 1. The total carbon neutral energy generation (kWh/yr.) 2.The source of the carbon neutral energy 3. Calculated estimate of energy consumption from unregulated systems/process (kWh/yr.) (only required if confirming zero regulated carbon or carbon negative exemplary Credits). 4. Calculated estimate of exported energy surplus (only required if confirming carbon negative status).	200416 (Pre Assessment Workshop) - The Design Team confirmed that 5 Credits should be targeted for this issue. ___ 140416 (Pre Assessment Review) MTTS note that a sensible 'Baseline' score of 6 Credits is shown as it's actual score would depend on the outcome of the thermal modelling exercise. This has been highlighted as a 'Medium Risk' Credit as it is subject to the thermal modelling exercise. ___ Note - To achieve an 'Excellent' rating, it is mandatory to achieve 5 Credits. ___	**MTTS**	
Ene 02.1	Energy Monitoring - Sub-metering of major energy consuming systems	**1**	**1**			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. 4. The end energy consuming uses are identifiable to the building users, for example through labelling or data outputs.	1 to 4	Specification document or technical drawings confirming: - Energy consuming systems and their rated outputs. - Metering arrangement for each system type and location of meter specified. - The BMS system type and scope and monitoring capability.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the requirements for metering under BREEAM are expected to be addressed through the planned metering and BBMS system for the building with no additional cost. ___ Note - To achieve an 'Excellent' rating, it is mandatory to achieve 1 Credit. ___ Note - the Credit criteria should be reflected within the M&E specification. ___	**MTT**	

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Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Ene 02.2	Energy Monitoring - Sub-metering of high energy load and tenancy areas	**1**	**1**			Sub-metering of high energy load and tenancy areas 5. 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	5	Specification document or technical drawings confirming: - Metering arrangements for each department/function and/or tenancy area - Type of metered specified - The BMS system type and scope and monitoring capability.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the requirements for metering under BREEAM are expected to be addressed through the planned metering and BBMS system for the building with no additional cost. ___ Note - the Credit criteria should be reflected within the M&E specification. ___	**MTT**	
Ene 03	External Lighting	**1**	**1**			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.	1 to 3	Marked-up site plan and building elevations showing: - Location and purpose of all external lighting fittings. Lighting specification or designer's calculations confirming: - The average luminous efficacy is no less than 60 luminaire lumens per circuit Watt and all external light fittings are automatically controlled.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the general lighting specification is likely to comply with the BREEAM criteria. Where external lighting is not specified the Credit can be awarded by default. ___ Note - the Credit criteria should be reflected within the M&E specification. ___	**MTT**	
Ene 04.1	Low Carbon Design - Passive Design - Passive Design Analysis	**1**	**1**			1. 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. 2. The project team carries out an analysis of the proposed building design/development by Concept Design stage (RIBA Stage 2 or equivalent) to identify opportunities for the implementation of passive design solutions that reduce demands for energy consuming building services. 3. The building uses passive design measures to reduce the total heating, cooling, mechanical ventilation and lighting demand in line with the findings of the passive design analysis and the analysis demonstrates a reduction in the total energy demand as a result (the installation should contribute at least 5% of overall building energy demand and/or CO2 emissions).	1 to 3	A copy of the passive design analysis that identify opportunities for the implementation of passive design solutions. A copy of specification clause(s) confirming that the building uses passive design measures in line with the findings of the passive design analysis.	200416 (Pre Assessment Workshop) - The Design Team confirmed that if the modelling of the building confirms passive design significantly reduces CO2 emissions (5%), then passive design analysis can be undertaken. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score as the requirement for the subsequent implementation of passive design measures which achieve a reduction of energy demand of CO2 emissions of at least 5%. It is considered challenging to target this level of reduction for a building of this type from the types of measures available under BREEAM. The Credit is sought as part of the 'Enhanced' scoring as it may be feasible to carry out a passive design analysis that shows a reduction in CO2 emissions of 5%. ___ Time Critical Action - RIBA Stage 2 - The project team carries out an analysis of the proposed building design/development by Concept Design stage (RIBA Stage 2 or equivalent) to identify opportunities for the implementation of passive design solutions that reduce demands for energy consuming building services. ___	**MTTS**	
Ene 04.2	Low Carbon Design - Free Cooling	**1**	**0**			4. The passive design analysis Credit is achieved. 5. 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. 6. The building uses ANY of the free cooling strategies listed in compliance note CN5 to reduce the cooling energy demand, i.e. it does not use active cooling.	4 to 6	Results from a dynamic simulation model demonstrating the feasibility of the free cooling strategy and meeting the first Credit of Hea 04	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should not be sought. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' or 'Enhanced' scores as none of the applicable free cooling strategies (Night time cooling, ground coupled air cooling, displacement ventilation, ground water cooling, surface water cooling, evaporative cooling, desiccant dehumidification/evaporative cooling (using waste heat), absorption cooling (using waste heat) or natural ventilation) are likely to be identified as strategies to be adopted in the building. ___ Time Critical Action - RIBA Stage 2 - The free cooling feasibility study must be undertaken at RIBA Stage 2. ___		

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

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Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Ene 04.3	Low Carbon Design - Low or Zero Carbon Technologies	**1**	**1**			7. A feasibility study has been carried out by the completion of the Concept Design stage (RIBA Stage 2 or equivalent) by an energy specialist (see Relevant definitions) to establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy source(s) for the building/development. The LZC study should cover as a minimum: 1. Energy generated from LZC energy source per year 2. Carbon dioxide savings from LZC energy source per year 3. Life cycle cost of the potential specification, accounting for payback 4. Local planning criteria, including land use and noise 5. Feasibility of exporting heat/electricity from the system 6. Any available grants 7. All technologies appropriate to the site and energy demand of the development. 8. Reasons for excluding other technologies 9. Where appropriate to the building type, connecting the proposed building to an existing local community CHP system or source of waste heat or power OR specifying a building/site CHP system or source of waste heat or power with the potential to export excess heat or power via a local community energy scheme. 8. A local LZC technology/technologies has/have been specified for the building/development in line with the recommendations of this feasibility study and this method of supply results in a meaningful reduction in regulated carbon dioxide (CO2) emissions (see Compliance Note: CN16).	7 to 8	A copy of the feasibility study confirming it has been carried out by an energy specialist to establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy source(s) for the building/development. A copy of specification clause confirming that a local LZC technology has been specified for the project in line with the recommendations of this feasibility study and this method of supply results in a meaningful reduction in regulated carbon dioxide (CO2) emissions (at least 5%).	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as a feasibility study for low and zero carbon technologies, which is likely to be required as part of the planning application for the site and can be repurposed to address the BREEAM requirements and it is likely that some level of LZC technology (possibly an area of PV panels sufficient to offset 5% of CO2 emissions) could be specified for the building's roof. ___ Additional Team Appointment - A Energy Specialist must be appointed. ___ Time Critical Action - RIBA Stage 2 - A feasibility study has been carried out by the completion of the Concept Design stage (RIBA Stage 2 or equivalent) by an energy specialist (see Relevant definitions) to establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy source(s) for the building/development. ___	**MTTS**	
Ene 05	Energy Efficient Cold Storage	**0**	**0**			One Credit - Refrigeration energy consumption The refrigeration system, its controls and components have been designed, installed and commissioned as follows: 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. 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 CN3.2 for a list of components). 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 Criteria 1 and 2 have been achieved. The installed refrigeration system demonstrates a saving in indirect greenhouse gas emissions (CO_2 eq.) over the course of its operational life.	All	One or more of the appropriate evidence types listed in The BREEAM evidential requirements section can be used to demonstrate compliance with these criteria.	140416 (Pre Assessment Review) MTTS recommend that no commercial/industrial size refrigeration will be specified for the development and therefore it is not applicable to the assessment. ___		

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Ene 06.1	Energy Efficient Transportation Systems - Energy consumption	**1**	**1**			Energy Consumption 1. Where either lifts, escalators or moving walks (transportation types) are specified: a. An analysis of the transportation demand and usage patterns for the building has been carried out to determine the optimum number and size of lifts (including counter-balancing ratio), escalators and/or moving walks. b. The energy consumption has been estimated in accordance with ISO BS EN 25745 Part 2 - Lifts and/or Part 3 - Escalators and Travelling Walkways for one of the following: i. At least two types of system (for each transportation type required); OR ii. An arrangement of systems (e.g. for lifts, hydraulic, traction, machine room-less lift (MRL)); OR iii. A system strategy which is 'fit for purpose'. c. The use of regenerative drives should be considered. (Note: A regenerative drive should only be considered where it produces an energy saving greater than the additional standby energy used to support the drives. Regenerative drives will typically be appropriate for lifts with high travel and high intensity use.) d. The transportation system with the lowest energy consumption is specified.	1	A copy of the transportation analysis undertaken and findings/recommendations. A copy of the relevant specification clause confirming that: - The energy consumption has been estimated in accordance with ISO BS EN 25745 Part 2 - Lifts and/or Part 3 - Escalators and Travelling Walkways for one of the following: i. At least two types of system (for each transportation type required); OR ii. An arrangement of systems (e.g. for lifts, hydraulic, traction, machine room-less lift (MRL)); OR iii. A system strategy which is 'fit for purpose'. - The use of regenerative drives (if applicable) - The transportation system with the lowest energy consumption is specified	200416 (Pre Assessment Workshop) - MTTS to liaise with Richard Smith (MTT) to provide compliant lift analysis report. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as a Lift Consultant can likely be appointed to carry out BREEAM compliant lift analysis for the development. ___ Additional Team Appointment - A Lift Consultant must be appointed. ___ Time Critical Action - RIBA Stage 4 - It is recommended that the transportation demand and usage pattern analysis of lifts and escalators is undertaken at RIBA Stage 4. ___	**MTTE**	
Ene 06.2	Energy Efficient Transportation Systems - Energy efficient features - Lifts	**2**	**2**			Energy Efficient Features 2. Criterion 1 is achieved. Lifts 3. For lifts, the following three energy-efficient features are specified: a. The lifts operate in a stand-by condition during off-peak periods. For example the power side of the lift controller and other operating equipment such as lift car lighting, user displays and ventilation fans switch off when the lift has been idle for a prescribed length of time. b. The lift car lighting and display lighting provides an average lamp efficacy, (across all fittings in the car) of > 55 lamp lumens/circuit Watt and lighting switches off after the lift has been idle for a prescribed length of time. c. The lift uses a drive controller capable of variable-speed, variable-voltage, and variable-frequency (VVVF) control of the drive motor. 4. Where the use of regenerative drives is demonstrated to save energy, they are specified. Escalators and/or moving walks Each escalator and/or moving walk complies with at least one of the following: 5. It is fitted with a load-sensing device that synchronises motor output to passenger demand through a variable speed drive; OR 6. It is fitted with a passenger-sensing device for automated operation (auto walk), so the escalator operates in standby mode when there is no passenger demand.	2 to 6	A copy of the lifts and/or escalators specification confirming that the lifts and escalators to be installed on the project meets the relevant criteria.	200416 (Pre Assessment Workshop) - MTTS to liaise with Richard Smith (MTT) to provide compliant lift analysis report. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as a Lift Consultant can likely be appointed to carry out BREEAM compliant lift analysis for the development. ___ Additional Team Appointment - A Lift Consultant must be appointed. ___ Time Critical Action - RIBA Stage 4 - It is recommended that the transportation demand and usage pattern analysis of lifts and escalators is undertaken at RIBA Stage 4. ___	**MTTE**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

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Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Ene 08	Energy Efficient Equipment	**2**	**2**			1. Identify the building's unregulated energy consuming loads and, for each estimate or model, its contribution to the total unregulated energy consumption of the building, assuming a typical/standard specification. 2. Identify the systems and/or processes that have a major impact on the total unregulated energy demand of the development and its operation and demonstrate, through either good practice design or specification, a meaningful reduction in the total unregulated energy demand of the building. 3. Demonstrate a meaningful reduction in the total annual unregulated energy demand of the building. See Table - 28 Table - 28 contains solutions deemed to satisfy compliance for common examples of significant contributors to unregulated energy demand for a number of different building types/functions.	1 to 3	Professional specialist reports, Construction specification, Design drawings and Other third party information	220816 The Credit is soughtb to ensure that the mininum 60% score in the Energy Category is achieved. ___ 200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should not be sought. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' or 'Enhanced' scores as it would have implications on the type, specification and costs for the various items of equipment to be specified in the building, potentially having operational impacts for the tenant. ___		
Tra 01.1	Public Transport Accessibility - Accessibility Index	**3**	**3**			1. The public transport Accessibility Index (AI) for the assessed building is calculated and BREEAM Credits awarded in accordance with the table of building types, AI benchmarks and BREEAM Credits in Table - 29 (see checklists and tables). 2. The Accessibility Index is determined by entering the following information in to the BREEAM Tra 01 calculator: a. The distance (m) from the main building entrance to each compliant public transport node b. The public transport type(s) serving the compliant node e.g. bus or rail c. The average number of services stopping per hour at each compliant node during the operating hours of the building for a typical day	1 to 2	A copy of the site plan showing location of public transport networks and distance from the site.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that 3 Credits can be sought as part of the 'Baseline' score as the development is on a site with a high (>8) accessibility index. ___	**MTTS**	
Tra 01.2	Public Transport Accessibility - Dedicated Bus Service	**0**	**0**			3. For buildings with a fixed shift pattern, i.e. where building users will predominantly arrive/depart at set times, one Credit can be awarded where the building occupier provides, or commits to providing a dedicated bus service to and from the building at the beginning and end of each shift/day. This Credit is only available in cases where a development is unable to achieve any of the available Credits using the Accessibility Index criteria (i.e. its location has a low public transport Accessibility Index).	3	Communications records.	This Credit is not applicable to the assessment. ___		
Tra 02	Proximity to Amenities	**1**	**1**			1. Where the building is located within close proximity of, and accessible to, local amenities which are likely to be frequently required and used by building occupants, as outlined in Table - 31. 2.Where a building type is indicated to have core amenities (Labelled as C in Table - 31) at least two of these must be provided as a part of the total number required. The remaining number of amenities required can be met using any other applicable amenities (including any remaining core amenities).	1 to 2	A scaled site plan indicating amenities and distance from the site.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the building will be in close proximity to all the required amenities. ___	**MTTS**	
Tra 03.1	Cyclist Facilities - Cycle Storage	**1**	**1**			Cycle storage (excluding Multi-Residential and Prisons) 1. Compliant cycle storage spaces that meet the minimum levels set out in Table - 32 of the BREEAM Manual are installed.	1	A copy of relevant specification clause confirming the provision and fitting for a cycle storage spaces in compliance with the relevant criteria. A copy of design drawing showing the location and fitting of the cycle storage space.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the provision of an appropriate number of compliant cycle racks can be provided. ___ Note - the required number of cycle racks is calculated at 1 rack per 10 persons. Where occupancy is not known, an occupant density of 0.111/m2 (of office, reception and food service areas) can be used. Where 3 Credits are achievable under Tra 01, the total cycle rack requirement can be halved. ___	**PIERCY**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

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Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Tra 03.2	Cyclist Facilities - Cyclist Facilities	**1**	**1**			Cyclist facilities (excluding Multi-Residential and Prisons) 2. Criterion 1 has been achieved. 3. At least two of the following types of compliant cyclist facilities have been provided for all staff and pupils (where appropriate) a. Showers b. Changing facilities c. Lockers d. Drying spaces	2 to 3	A copy of relevant specification clause confirming the provision and fittings for cyclist facilities (showers, changing area, lockers, drying spaces) in compliance with the relevant criteria. A copy of design drawing showing the location and fitting of the cycle facilities (showers, changing area, lockers, drying spaces).	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the provision of an appropriate number of compliant cyclist facilities (showers, changing areas, lockers, etc.) can be provided.	**PIERCY**	
Tra 04	Maximum Car Parking Capacity	**2**	**2**			Maximum car parking capacity is based on the building type and the Building's accessibility index (see Tra 1). Max car parking capacity is equal to 1 space per X building users, where is X is determined by building type and accessibility index. Assessor to calculate the maximum car parking requirements.	1	A copy of the site plan showing the number of car parking space that will be provided for the development.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. 140416 (Pre Assessment Review) MTTS recommend that two Credits are sought as part of the 'Baseline' score as these can be awarded by default as there is no parking space provision for this project.	**PIERCY**	
Tra 05	Travel Plan	**1**	**1**			1. A travel plan has been developed as part of the feasibility and Design Stages (RIBA Stages 1 - 4). 2. 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) a. 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. b. Travel patterns and transport impact of future building users. c. Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children) d. Disabled access (accounting for varying levels of disability and visual impairment) e. Public transport links serving the site f. Current facilities for cyclists 3. The travel plan includes a package of measures to encourage the use of sustainable modes of transport and movement of people and goods during the buildings operation and use. 4. If the occupier is known, they must be involved in the development of the travel plan and they must confirm that the travel plan will be implemented post construction and supported by the buildings management in operation.	1 to 4 (All)	A copy of the travel plan developed by the design stages. A copy of the travel assessment/statement confirming that the travel plan is structured to meet the needs of the particular site and covers the following (as a minimum): a. 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. b. Travel patterns and transport impact of future building users. c. Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children) d. Disabled access (accounting for varying levels of disability and visual impairment) e. Public transport links serving the site f. Current facilities for cyclists. Also confirming that the travel plan includes a package of measures to encourage the use of sustainable modes of transport and movement of people and goods during the buildings operation and use A letter from the occupier confirming that the travel plan will be implemented post construction and supported by the buildings management in operation.	220716 - TPP confirmed that a compliant travel plan will be produced. 200616 - Piercy confirmed that a transport consultant has been appointed and will update them with the BREEAM requirements. 200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the provision of a compliant Travel Plan is considered to be a cost-effective (and potentially beneficial) action for the project. Additional Team Appointment - A Transport Consultant must be appointed to produce a compliant travel plan - this may not have the same content and scope as the transport survey etc. to be provided for planning purposes. Time Critical Action - RIBA Stage 1,2,3,4 - A travel plan has been developed as part of the feasibility and Design Stages (RIBA Stages 1 - 4).	**TPP**	

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Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Wat 01	Water Consumption	**5**	**3**			1. An assessment of the efficiency of the building's domestic water consuming components is undertaken using the BREEAM Wat 01 calculator. 2. The water consumption (litres/person/day) for the assessed building is compared against a baseline performance and BREEAM Credits awarded based upon Table - 35. 3. 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 machine (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 8525-12010 Greywater Systems - Part 1 Code of Practice. Any rainwater systems must be specified and installed in compliance with BS 85152009+A12013 Rainwater Harvesting Systems - Code of practice.	All	A copy of the relevant specification clause confirming the flow rates of the sanitary fittings in compliance with the Credit sought and the relevant criteria. A copy of the relevant specification clause(s) confirming that the greywater system is must be specified and installed in compliance with BS 8525-1:2010 Greywater Systems - Part 1 Code of Practice and any rainwater systems must be specified and installed in compliance with BS 8515:2009+A1:2013 Rainwater Harvesting Systems - Code of practice. And The greywater and/or rainwater system yield (L/person/day) is used to off-set non potable water demand from components that would otherwise be supplied using potable water.	200416 (Pre Assessment Workshop) - The Design Team confirmed that the Enhanced score should be increased to 4 Credits and that rainwater systems may be a possibility. ___ 140416 (Pre Assessment Review) MTTS recommend that three Credits are sought as part of the 'Baseline' score as this is usually achievable for a development of this type. The 'Enhanced' score remains the same as it is likely that to achieve further Credits, sacrificing the quality of the water use appliances would be required. ___ Note - To achieve an 'Excellent' rating, it is mandatory to achieve 1 Credit. ___	**PIERCY**	
Wat 02	Water Monitoring	**1**	**1**			1. The specification of a water meter on the mains water supply to each building; this includes instances where water is supplied via a borehole or other private source. 2. Water-consuming plant or building areas, consuming 10% or more of the building's total water demand, are either fitted with easily accessible sub meters or have water monitoring equipment integral to the plant or area (see Guidance Manual for additional areas to be metered). 3. 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, e.g. a building management system (BMS), for the monitoring of water consumption. 4. If the site on which the building is located has an existing BMS, managed by the same occupier/owner (as the new building), the pulsed water meter(s) for the new building must be connected to the existing BMS.	All	A copy of the specification clause confirming: - The specification and type of water meter(s). A copy of a Design plan(s) showing: - Location of the water meter(s) in each assessed building/unit.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the requirements for water metering under BREEAM are expected to be addressed through the proposed metering system for the building with no additional cost. ___ Note - To achieve an 'Excellent' rating, it is mandatory to achieve Criterion 1. ___ Note - the Credit criteria should be reflected within the M&E specification. ___	**MTT**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

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Sought Margin %: 6.68% Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Wat 03.1	Water Leak Detection - Leak Detection System	**1**	**1**			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 OR an in-built automated diagnostic procedure for detecting leaks is installed. 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, e.g. continuous, high and/or low level, over set time periods. 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.	1	A copy of relevant specification clause(s) confirming the scope and performance criteria of the leak detection system. and / or Manufacturers details regarding the specification of the system.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought, as the metering systems would be simple and cost-effective to specify as part of the works. Note - the Credit criteria should be reflected within the M&E specification.	**MTT**	
Wat 03.2	Water Leak Detection - Flow Control Devices	**1**	**1**			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). The following could be considered as types of flow control devices: - A time controller, i.e. an automatic time switch device to switch off the water supply after a predetermined interval - A programmed time controller, i.e. an automatic time switch device to switch water on and/or off at predetermined times. - A volume controller, i.e. an automatic control device to turn off the water supply once the maximum pre-set volume is reached - A presence detector and controller, i.e. an automatic device detecting occupancy or movement in an area to switch water on and turn it off when the presence is removed - A central control unit, i.e. a dedicated computer-based control unit for an overall managed water control system, utilising some or all of the types of control elements listed above.	2	A copy of specification clause(s) confirming the flow control devices to be installed, its scope and performance criteria. OR Manufacturers details regarding the specification of the system.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought, as the flow control devices would be simple and cost-effective to specify as part of the works. Note - the Credit criteria should be reflected within the M&E specification.	**MTT**	
Wat 04	Water Efficient Equipment	**0**	**0**			1. The design team has identified all unregulated water demands that could be realistically mitigated or reduced. 2. System(s) or processes have been identified to reduce the unregulated water demand, and demonstrate, through either good practice design or specification, a meaningful reduction in the total water demand of the building.	2	Documentation detailing the planting and irrigation strategy. Relevant section/clauses of the building specification or contract. AND/OR Design drawings (where necessary). Manufacturers product details.	140416 (Pre Assessment Review) The design team are to confirm whether the development will incorporate any unregulated water use systems. This will allow the Assessor to determine whether the Credit should be included within the assessment or not.		
Mat 01	Life Cycle Impacts	**5**	**3**			1. BREEAM Credits are awarded 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 (include for Multi -residential and Other Buildings) - Floor finishes/coverings (include for Multi -residential and Other Buildings) 2. Credits are awarded on the basis of the total number of points achieved, as determined by the BREEAM Mat 01 calculator. This point's score is based on the Green Guide rating(s) achieved for the specifications that make up the main building elements listed above. 3. Life cycle greenhouse gas emissions ($kgCO_2$ eq.) for each element are also required to be reported based on a 60-year building life. Where specific data is not available for a product or element, generic data should be used. Generic data can be obtained from the online Green Guide for each element and must be entered in to the BREEAM Mat 01 table.	1 to 2 (all)	Complete Mat 01 table to be provided by the assessor. The table will require the Green Guide ratings and areas of the building elements listed below. In addition provide a copy of the relevant specification and design drawing of the construction of the applicable elements: - External walls - Windows - Roof - Upper floor slab - Internal walls - Floor finishes/coverings The specification for this element should be highly rated (A and A+) in the Green Guide specification (www.thegreenguide.org.uk)	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. 140416 (Pre Assessment Review) MTTS recommend that three Credits are sought as part of the 'Baseline' score, but note that the actual Credit score achievable will not be confirmed until material build-ups of the relevant building elements have been determined. As an estimate it is reasonable to seek 3 (Baseline) or 4 (Enhanced) out of a possible 6 Credits. The potential exists for a higher Credit score here and this issue should be kept under review as the design progresses, in case the opportunity arises for higher-cost and/or less beneficial Credits to be omitted from the assessment.	**PIERCY**	

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Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Mat 02	Hard Landscaping and Boundary Protection	**1**	**1**			1. Where at least 80% of all external hard landscaping and 80% of all boundary protection (by area) in the construction zone achieves an A or A+ rating, as defined in the Green Guide to Specification. Green Guide ratings for the specification(s) of each element can be found at www.thegreenguide.org.uk	1 (All)	A copy of the relevant specification and design drawing of any external hard landscape and boundary protection. This must include a detailed description of each material type and areas covered by that material and corresponding Green Guide Rating.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as part of the 'Baseline' score as any proposed hard landscaping can be specified to achieve A or A+ Green Guide ratings. ___	**PIERCY**	
Mat 03.1	Responsible Sourcing of Materials	**0**	**0**			**Pre-Requisite** 1. All timber used on the project is legally harvested and traded timber (see Relevant definitions). Note: a. It is a minimum requirement for achieving a certified BREEAM rating certification (for any rating level) that compliance with criterion 1 is confirmed. b. For other materials there are no pre-requisite requirements at this stage.	1	A copy of a timber/procurement policy or letter confirming that the timber used on the project will be legally harvested and traded.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this mandatory criteria will be met. ___ 140416 (Pre Assessment Review) MTTS note that this Pre Requisite is a mandatory requirement to achieve any BREEAM ratings and therefore must be undertaken. ___	**ARCAD JC**	
Mat 03.2	Responsible Sourcing of Materials - Sustainable Procurement Plan	**1**	**1**			2. The principal contractor sources materials for the project in accordance with a sustainable procurement plan. The plan should contain the following: a. Risks and opportunities are identified against a broad range of social, environmental and economic issues. BS 8902:2009 Responsible sourcing sector certification schemes for construction products- Specification can be used as a guide to identify these issues. b. Aims, objectives and targets to guide sustainable procurement activities. c. The strategic assessment of sustainably sourced materials available locally and nationally. There should be a policy to procure materials locally where possible. d. Procedures are in place to check and verify that the sustainable procurement plan is being implemented/adhered to on individual projects. These could include setting out measurement criteria, methodology and performance indicators to assess progress and demonstrate success.	2	A copy of the sustainable procurement plan.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the principle contract can be required to procure materials in accordance with a BREEAM compliant Sustainable Procurement Plan. The Credit Requirements should be conveyed into the tender documentation via Contract Preliminaries. ___ Time Critical Action - RIBA Stage 4 - The Sustainable Procurement Plan must be provided at RIBA Stage 4. ___	**ARCAD JC**	
Mat 03.3	Responsible Sourcing of Materials - Responsible Sourcing of Materials (RSM)	**3**	**1**			3. The available Credits can be awarded where the applicable building and hard landscaping materials are responsibly sourced in accordance with the BREEAM methodology. Ensure that all timber is FSC certified and all other materials have a BES 6001 certification. As a minimum materials should have a ISO14001 certification.	3	A marked-up design plan confirming the location of the applicable materials. A copy of the relevant responsible sourcing scheme certificate(s) for the relevant specifications/products.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that materials can be specified and procured from manufacturers with responsible sourcing certification (BES 6001, FSC, PEFC, ISO 14001, etc.). The number of Credits achievable will not be clear until it is confirmed which materials are responsibly sourced and to what responsible sourcing route. Therefore, the 'Enhanced' score remains the same. ___	**ARCAD JC**	
Mat 04	Insulation - Embodied Impact	**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. See the Methodology section (in the supporting documents) for a description of calculating the Insulation Index.	1 to 2 (all)	A marked-up design plan and/or specifications confirming the location of the insulating materials, the area and the thickness or volume of the insulation specified. Manufacturers details confirming the thickness and thermal conductivity of the insulating materials specified for each applicable building element. A copy of the specification confirming that this element should be highly rated (A and A+) in the Green Guide specification. www.thegreenguide.org.uk	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as it is anticipated that insulation materials can be specified for the building fabric that are Green Guide rated A or A+. ___	**PIERCY**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
									200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as part of the 'Baseline' score as it is anticipated that insulation materials can be specified for the building services that are Green Guide rated A or A+. ___	MTT	
Mat 05	Designing for Durability and Resilience	1	1			Protecting vulnerable parts of the building from damage. 1. 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: a. Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc.). b. Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas. c. 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. 2. The relevant building elements incorporate appropriate design and specification measures to limit material degradation due to environmental factors.	1 to 2 (All)	Design drawing marked-up to illustrate the vulnerable areas/parts of the building and the suitable durability measures, as described in the criteria, specified. A copy of the specification clause confirming measures specified to limit material degradation due to environmental factors. Example of applicable elements, environmental factors and material degradation effects to consider: • Applicable building elements: External walls, roof, glazing, externals doors.. • Environmental factors: Water/moisture , solar radiation, wind, pollutants, air contaminants.. • Material degradation effects: Corrosion, leaching, rotting..	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought. It is noted that the requirements within BREEAM NC 2014 are more onerous than the previous versions of BREEAM. ___	PIERCY	
Mat 06	Material Efficiency	1	1			1. Opportunities have been identified, and appropriate measures investigated and implemented, to optimise the use of materials in building design, procurement, construction, maintenance and end of life 2. The above is carried out by the design/construction team in consultation with the relevant parties at each of the following RIBA stages: a. Preparation and Brief b. Concept Design c. Developed Design d. Technical Design e. Construction	1 to 2 (all)	Provide the following: A copy of reports (at Preparation and Brief stage) outlining the activity relating to material efficiency (ideas discussed, analysis and decisions taken). Design drawings or building integrated model (BIM), calculations showing reduction of material use through design (Concept Design/Developed Design stages). and/or A copy of meeting notes, construction program, responsibilities schedule.	200416 (Pre Assessment Workshop) - Piercy confirmed that this Credit would be reviewed and confirm if achievable. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score, it could be sought as part of the 'Enhanced' scoring if the appropriate Materials Efficiency studies can be undertaken. This Credit has been flagged as a 'High Risk' issue because this is a time-critical Credit which would need action within RIBA Stage 1. ___ Time Critical Action - RIBA Stage 1,2,3,4 - Materials Use Optimisation Strategy must be produced/reviewed at RIBA Stages 1,2, 3 and 4. ___	PIERCY	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Wst 01.1	Construction Waste Management - Construction Resource Efficiency	**3**	**3**			1. Where a Resource Management Plan (RMP) has been developed covering the non-hazardous waste related to on-site construction and 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 off-site manufacture/fabrication (excluding demolition and excavation waste) meets or is lower than Table - 48 (see supporting documents). Note: - Volume (m3) is actual volume of waste (not bulk volume). 3. Where existing buildings on the site will be demolished a pre-demolition audit of any existing buildings, structures or hard surfaces is completed to determine if, in the case of demolition, refurbishment/reuse is feasible and, if not, to maximise the recovery of material from demolition for subsequent high-grade/value applications. The audit must be referenced in the RMP and cover: a. Identification of the key refurbishment/demolition materials. b. Potential applications and any related issues for the reuse and recycling of the key refurbishment and demolition materials in accordance with the waste hierarchy	1 to 3	A copy of the RMP including the waste benchmarks targets and where relevant a copy of the pre-demolition audit that complies with the BREEAM requirements criteria.	200416 (Pre Assessment Workshop) - The Design Team confirmed that HTS would be responsible for providing the pre-demolition audit. ___ 140416 (Pre Assessment Review) MTTS recommend that three Credits are sought as part of the 'Baseline' score as the principle contractor can be required to produce and implement a compliant Resource Management Plan. The Credit Requirements should be conveyed into the tender documentation via Contract Preliminaries. ___ Time Critical Action - RIBA Stage 4 - The Construction Resource Management Plan needs to be developed at RIBA Stage 4. A pre-demolition audit should be undertaken (where existing buildings on the site will be demolished) at RIBA Stage 4. ___	**ARCAD JC**	
Wst 01.2	Construction Waste Management - Diversion of Resources from Landfill	**1**	**1**			4. 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 5. Waste materials will be sorted into separate key waste groups see Table - 50 (according to the waste streams generated by the scope of the works) either on-site or offsite through a licensed contractor for recovery.	4 to 5	A copy of a specification clause or RMP confirming the target value/percentage of non hazardous construction/demolition or excavation waste to be diverted from landfill and that waste materials will be sorted into separate key waste groups. And/or Copy of letter from the main contractor confirming commitment to achieve the targeted value of waste diversion from landfill and that waste will be sorted in line with BREEAM requirement criteria.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as it is expected that the BREEAM requirements for waste sorting and for targeted levels of waste diversion form landfill could relatively easily be achieved on the project. The Credit Requirements should be conveyed into the tender documentation via Contract Preliminaries. ___	**ARCAD JC**	
Wst 02	Recycled Aggregates	**1**	**0**			Recycled Aggregates 1. The percentage of high-grade aggregate that is recycled and/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. 2. The total amount of recycled and/or secondary aggregate specified, and meeting criterion 1, is greater than 25% (by weight or volume) of the total high-grade aggregate specified for the development. 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. 3. The recycled and/or secondary aggregates are EITHER: a. Construction, demolition and excavation waste obtained on-site or off-site OR b. Secondary aggregates obtained from a non-construction post-consumer industrial by-product source (see Relevant definitions section).	1 to 3	A copy of the calculation confirming the % level of high grade aggregate that is recycled and/or secondary aggregate in the following application: - Structural frame - Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads - Building foundations - Concrete road surfaces - Pipe bedding - Granular fill and capping (see Relevant definitions section) In addition, calculation confirming that the total amount or recycled and/or secondary aggregate specified is greater than 25% of the total high aggregate specified for the project. A copy of the relevant specification or report confirming the type of recycled and/or secondary aggregates as specified in the BREEAM criteria.	120716 HTS confirmed that the RC frame currently proposed is not likely to be provided with recycled aggregate. They also confirmed that his Credit would be difficult and expensive to achieve. ___ 200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit is to be reviewed as part of the 'shopping list'. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score as the % of recycled aggregate may not be achieved. If it can be demonstrated that the development will use a high % of recycled aggregate, the Credit may be achieved. ___		

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Wst 03	Operational Waste	**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 waste management 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. 2. Where the consistent generation in volume of the appropriate operational waste streams is likely to exist, e.g. large amounts of packaging or compostable waste generated by the building's use and operation, the following facilities are provided: a. Static waste compactor(s) or baler(s); situated in a service area or dedicated waste management space. b. Vessel(s) for composting suitable organic waste resulting from the building's daily operation and use; OR adequate space(s) for storing segregated food waste and compostable organic material prior to collection and delivery to an alternative composting facility. c. Where organic waste is to be stored/composted onsite, a water outlet is provided adjacent to or within the facility for cleaning and hygiene purposes. Additionally for healthcare buildings only 3. The specified/installed operational waste facilities are compliant with the relevant NHS guidelines for that part of the UK (See Guidance Manual) Additionally for multi-residential buildings with self contained dwellings/bedsits only 4. Each dwelling/bedsit has a provision of three internal storage containers, as follows a. A minimum total capacity of 30 litres b. No individual container smaller than 7 litres c. All containers in a dedicated non obstructive position d. The storage containers for recycling are provided in addition to non-recyclable waste storage. Additionally for multi-residential buildings with individual bedrooms and communal facilities only 5. The above storage requirements (criterion 4) for self-contained dwellings/bedsits are met for every six bedrooms 6. The recyclable storage is located in a dedicated non obstructive position in either a. Communal kitchens; OR b. Where there are no communal kitchens present, in a communal space such as communal lounges or utility areas. 7. Home composting facilities and a home composting information leaflet is provided within the kitchen area or communal space for each self contained dwelling, bedsit or Office building types only	1 to 7	Design drawings and/or relevant section/clauses of the building specification or contract confirming provision and scope of dedicated facilities. Documentary evidence from the Design Team confirming compliance with the relevant Healthcare Technical Memorandum. Design drawing and relevant specification clause confirming that both multi-residential buildings type comply with internal waste containers, location and composting criteria.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought and that the appropriate storage provision for recyclable waste would be made in the internal layout of the building. ___ Note - To achieve an 'Excellent' rating, it is mandatory to achieve 1 Credit. ___	**PIERCY**	
Wst 04	Speculative Floor and Ceiling Finishes	**1**	**1**			1. For tenanted areas (where the future occupant is not known), prior to full fit-out works, carpets, other floor finishes and ceiling finishes have been installed in a show area only. 2. In a building developed for a specific occupant, that occupant has selected (or agreed to) the specified floor and ceiling finishes.	1 to 2 (All)	A letter or Design drawings and/or relevant section/clauses of the building specification or contract. AND/OR A letter from the client, project team or building user where the future occupant is known.	200416 (Pre Assessment Workshop) - The Design Team confirmed that no floor and ceiling finishes are to be provided. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' or 'Enhanced' scores as it is likely that, as part of the Base Build works, floor and ceiling finishes will be provided. Action - The Credit may be sought at a later point in the project when the ceiling and floor types are fully defined. ___	**PIERCY**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Wst 05	Adaptation To Climate Change	**1**	**1**			Structural and Fabric Resilience 1. 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: a. 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: i. Hazard identification ii. Hazard assessment iii. Risk estimation iv. Risk evaluation v. Risk management.	1	A copy of the Risk assessment report in line with the BREEAM Criteria.	200616 - Piercy requested a workshop for this Credit. MTTS to advise on availability. Credit to be confirmed as sought/not sought following the workshop. ___ 200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit is to be reviewed as part of the 'shopping list'. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score, but it may be sought as part of the 'Enhanced' scoring if the appropriate Structural and Fabric Resilience studies were undertaken. ___ Additional Team Appointment - A Facilitator for the Adaptation to Climate Change Strategy must be appointed. ___ Time Critical Action - RIBA Stage 2 - Conduct a climate change adaptation strategy appraisal for structural and fabric resilience by the end of Concept Design (RIBA Stage 2 or equivalent). ___	**PIERCY MTTS**	
Wst 06	Functional Adaptability	**1**	**1**			1. 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. 2. Functional adaptation measures have been implemented (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.	1 to 2	A copy of the Functional adaptation strategy and implementation plan report in accordance with the criteria. Marked-up design drawing showing the functional adaptation measures implemented in accordance with the functional adaptation strategy recommendations.	200616 - Piercy requested a workshop for this Credit. MTTS to advise on availability. Credit to be confirmed as sought/not sought following the workshop. ___ 200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit is to be reviewed as part of the 'shopping list'. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' or 'Enhanced' scores, but it may be sought as part of the 'Enhanced' scoring if the appropriate Functional Adaptability studies were undertaken. ___ Additional Team Appointment - A Facilitator for the Functional Adaptability Strategy must be appointed. ___ Time Critical Action - RIBA Stage 2 - 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. ___	**PIERCY MTTS**	
LUE 01.1	Site Selection - Previously Occupied Land	**1**	**1**			1. At least 75% of the proposed development's footprint is on an area of land which has previously been occupied by industrial, commercial or domestic buildings or fixed surface infrastructure.	1	Design drawings (including existing site plan), report or site photographs confirming: 1. Type and duration of previous land use. 2. Area (m2) of previous land use. Proposed site plan showing; 3. Location and footprint (m2) of proposed development and temporary works.	200616 - Evidence provided confirming 100% of the developments footprint is on previously occupied land. This Credit will be achieved at the Design Stage. ___ 200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that at least 75% of the proposed developments footprint is on an area of previously occupied land and therefore the Credit is sought as part of the 'Baseline' score. ___	**PIERCY**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
LUE 01.2	Site Selection - Contaminated Land	**1**	**1**			2. The site is deemed to be significantly contaminated as confirmed by a contaminated land specialist's site investigation, risk assessment and appraisal, which has identified: a. The degree of contamination b. The contaminant sources/types c. The options for remediating sources of pollution which present an unacceptable risk to the site. 3. The client or principal contractor confirms that remediation of the site will be carried out in accordance with the remediation strategy and its implementation plan as recommended by the contaminated land specialist.	2 to 3	Professional specialist reports, a copy of the remediation strategy and implementation plan, communication records	200416 (Pre Assessment Workshop) - The Design Team confirmed that the land is likely to be significantly contaminated and reporting and remediation of contaminated land would be fulfilled. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score, but it may be sought as part of the 'Enhanced' score if it can be identified by a contaminated land specialist that the site is contaminated and remedial measures can be implemented. ___ Additional Team Appointment - A Ground Investigation Consultant / Contaminated Land Professional must be appointed. ___ Time Critical Action - RIBA Stage 4. - It is recommended that the remediation strategy and implementation plan should be undertaken (if the land is contaminated) at RIBA Stage 4. ___	**ARCAD JC**	
LUE 02.1	Ecological Value of Site and Protection of Ecological Features - Ecological value of site	**1**	**1**			Ecological value of site 1. Land within the construction zone is defined as 'land of low ecological value' using either: a. The BREEAM checklist for defining land of low ecological value (see Checklists and tables within supporting documents); OR b. A Suitably Qualified Ecologist (SQE) who has identified the land as being of 'low ecological value' within an ecological assessment report, based on a site survey.	1	A copy of the completed checklist signed and dated by the client or a Design Team member. Plans, site photographs and specifications confirming presence of ecological features. A copy of the Ecologist's report highlighting information required in accordance with BREEAM criteria.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the site is very likely to be designated as 'land of low ecological value'. ___ Additional Team Appointment - A Suitably Qualified Ecologist must be appointed. ___ Time Critical Action - RIBA Stage 5 - The Suitably Qualified Ecologist needs to undertake an ecological survey before demolition and clearing of the site. ___	**ARCAD ECO**	
LUE 02.2	Ecological Value of Site and Protection of Ecological Features - Protection of Ecological Features	**1**	**1**			Protection of Ecological Features 2. All existing features of ecological value within and surrounding the construction zone and site boundary area are adequately protected from damage during clearance, site preparation and construction activities in line with BS420202013. 3. In all cases, the principal contractor is required to construct ecological protection recommended by the SQE, prior to any preliminary site construction or preparation works (e.g. clearing of the site or erection of temporary site facilities).	2 to 3	A copy of letter confirming all existing features of ecological value within and surrounding construction zone and site boundary are protected in line with BS42020: 2013. And A copy of the commitment to construct the ecological protection recommended by the SQE.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the site is very likely to be designated as 'land of low ecological value' and therefore no or minimal protection measures would be required. ___ Additional Team Appointment - A Suitably Qualified Ecologist must to be appointed. ___ Time Critical Action - RIBA Stage 5 - The Suitably Qualified Ecologist needs to undertake an ecological survey before demolition and clearing of the site. ___	**ARCAD ECO**	
LUE 03	Minimising Impact On Existing Site Ecology	**2**	**2**			Two Credits - Change in ecological value 1 - Requirement 1 1. The change in ecological value of the site is equal to or greater than zero plant species, i.e. no negative change, using the methods outlined in either (a) or (b) below: a. Determine the following information and input this data in to the BREEAM LE 03/LE 04 calculator i. The broad habitat type(s) that define the landscape of the assessed site in its existing pre-developed state and proposed state. ii. Area (m2) of the existing and proposed broad habitat types. OR b. Where a Suitably Qualified Ecologist (SQE) has been appointed and, based on their site survey, they confirm the following and either the assessor or ecologist inputs this data in to the BREEAM LE 03/LE 04 calculator i. The broad habitat types that define the landscape of the assessed site in its existing pre-developed state and proposed state. ii. Area (m2) of the existing and proposed broad habitat plot types. iii. Average total taxon (plant species) richness within each habitat type.	1	Design drawings including proposed and existing (pre-development) site plan/survey. A copy of report/letter confirming the broad habitat type that define the landscape of the assessed site in its existing pre-developed state and proposed state. And the area of the proposed broad habitat types. A copy of Ecologist's report highlighting information required in BREEAM criteria AND written confirmation from the client/Design Team detailing how the Suitably Qualified Ecologist's recommendations will be implemented.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS note that either 2 Credits are achievable for compliance with criterion 1 or 1 Credit for demonstrating compliance with criterion 2 (below). ___ 140416 (Pre Assessment Review) MTTS recommend that two Credits are sought as part of the 'Baseline' score as the site was very likely to be designated as 'land of low ecological value' and therefore - even if additional species were not introduced to the site - there would be minimal impact on the existing site ecology. ___ Note - To achieve an 'Excellent' rating, it is mandatory to achieve 1 Credit. ___	**ARCAD ECO**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %:	Req. Rating:	Sought %:	Sought Rating:	Complete %:	Complete Rating:	Risk %:
>70%	Excellent	76.68%	Excellent	0.00%	N/A	15.74%

Sought Margin %:	Complete Margin %:
6.68%	0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
						One Credit - Change in ecological value 2 - requirement 2 2. Where the change in ecological value of the site is less than zero but equal to or greater than minus nine plant species i.e. a minimal change, using the methods outlined in either 1(a) or (b) above.	2	A copy of the calculation of the ecological value in line with the BREEAM method. Or A copy of the Ecologist's report confirming the change in ecological value in line with the BREEAM method	If the above is not achieved, then MTT 1 Credit as part of the 'Baseline' scoring as it is expected that the change ecological will be between -9 and 0, i.e. a small negative change in ecological value. Additional Team Appointment - A Ground Investigation Consultant / Contaminated Land Professional must be appointed. Note - To achieve an 'Excellent' rating, it is mandatory to achieve 1 Credit.	ARCAD ECO	
LUE 04.1	Enhancing Site Ecology (Ecologists Report and Recommendations)	1	1			Ecologists report and recommendations (Except buildings on HM Prison-sites where two Credits are available for compliance with criteria 1, 2 and 3) 1. 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. 2. 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. 3. The early stage advice and recommendations of the Ecology Report for the enhancement of site ecology have been, or will be, implemented in the final design and build.	1 to 3	A copy of the Ecologist's report confirming: - The ecologist qualification in compliance with the BREEAM requirement. - The ecologist recommendations for the enhancement of the site's ecology. A copy of relevant specification or letter confirming that the Suitably Qualified Ecologist's recommendations will be implemented for the development. A marked-up design drawing/site plan highlighting the implementation of the Suitably Qualified Ecologist's recommendations	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as part of the 'Baseline' scoring. as the advice of a Suitably Qualified Ecologist could be sought and their recommendations implemented. Additional Team Appointment - A Suitably Qualified Ecologist must be appointed. Time Critical Action - RIBA Stage 1 - 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.	ARCAD ECO	
LUE 04.2	Enhancing Site Ecology (Increase in Ecological Value)	1	1			Increase in ecological value 4. The criteria of the first Credit are met. 5. The recommendations of the Ecology Report for the enhancement of site ecology have been implemented in the final design and build, and the SQE confirms that this will result in an increase in ecological value of the site, with an increase of six plant species or greater (refer also to Compliance Note: CN8 for alternative means of compliance). 6. The increase in plant species has been calculated using the BREEAM LE 03/LE 04 calculator, using actual plant species numbers.	4 to 6	A copy of relevant specification or letter confirming that at least six plant species will be provided. A copy of the Suitably Qualified Ecologist's report confirming that the implementation of at least six plant species will result in an increase in ecological value of the site. A marked-up design drawing/site plan highlighting the implementation of the Suitably Qualified Ecologist's recommendations	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit is to be reviewed as part of the 'shopping list'. 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score as it cannot be determined at this stage whether the Ecologists recommendations will increase the plant species on site. It may be sought as part of the 'Enhanced' score, as it is likely that the Ecologists recommendations will have a positive impact. Time Critical Action - RIBA Stage 1 - 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.	ARCAD ECO	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %:	Req. Rating:	Sought %:	Sought Rating:	Complete %:	Complete Rating:	Risk %:
>70%	Excellent	76.68%	Excellent	0.00%	N/A	15.74%

Sought Margin %:	Complete Margin %:
6.68%	0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
LUE 05	Long Term Impact On Biodiversity	**2**	**2**			1. Where a Suitably Qualified Ecologist (SQE) is appointed prior to commencement of activities onsite and they confirm that all relevant UK and EU legislation relating to the protection and enhancement of ecology has been complied with during the design and construction process. 2. 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 42020:2013 Section 11.1. This is to be handed over to the building owner/occupants for use by the grounds maintenance staff. 3. Where, in addition to criteria 1 and 2, measures to improve the assessed sites long term biodiversity are adopted, according to Table - 58 of the BREEAM Guidance Manual.	1 to 3	Ecologist's report highlighting information required: – All relevant UK and EU legislation has been and will be complied. AND A copy of the site's landscape and habitat management plan. Or A letter from the client confirming a commitment to produce the management plan and its' scope. A copy of relevant specification or letter confirming that additional measure for the improvement of long term biodiversity will be provided. And A marked-up design drawing/site plan showing the measures provided.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that two Credits are sought as part of the 'Baseline' scoring. as the advice of a Suitably Qualified Ecologist could be sought to ensure that measures to improve the site's long term biodiversity are adopted in addition to ensuring all relevant UK and EU legislation relating to the protection and enhancement of ecology has been complied with and provide a landscape management plan. ___ Additional Team Appointment - A Biodiversity Champion must be appointed. ___ Time Critical Action - RIBA Stage 2 - The Suitably Qualified Ecologist must be appointed undertake an ecological survey before demolition and clearing of the site. A Landscape and habitat management plan must be completed by the Suitably Qualified Ecologist at RIBA Stage 6. ___	**ARCAD ECO**	
Pol 01.1	Impact of Refrigerants - Impact of Refrigerant	**2**	**0**			1. Where the building does not require the use of refrigerants within its installed plant/systems. OR alternatively, where the building does require the use of refrigerants, the three Credits can be awarded as follows: 2. 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. 3. Where the systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELC CO2e) of ≤ 100 kgCO2e/kW cooling/heating capacity. To calculate the DELC CO2e please refer to the Relevant definitions in the Additional information section and the Methodology section. OR 4. Where air-conditioning or refrigeration systems are installed the refrigerants used have a Global Warming Potential (GWP) ≤ 10. OR 5. Where the systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELC CO2e) of ≤ 1000 kgCO2e/kW cooling/heating capacity. OR		Communication records, Construction specification, Other third party information, Completed copy of the Pol01 calculator tool	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should not be sought. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' or 'Enhanced' scores as the presence of non compliant refrigerants (R410) is anticipated for the project. ___		
Pol 01.2	Impact of Refrigerants - Leak Detection and Containment	**1**	**0**			1	6 to 7	A copy of the specification clause or letter from the M&E engineer/system manufacturer confirming relevant refrigerant leak detection type, system information and performance in compliance with BREEAM criteria.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should not be sought. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' or 'Enhanced' scores as VRF systems are likely to be specified and therefore the Credit is not achievable, as the specification of appropriate refrigerant leak detection and containment equipment is not possible for VRF systems. ___		

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %:	Req. Rating:	Sought %:	Sought Rating:	Complete %:	Complete Rating:	Risk %:
>70%	Excellent	76.68%	Excellent	0.00%	N/A	15.74%

Sought Margin %:	Complete Margin %:
6.68%	0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Pol 02	NOx Emissions	**3**	**0**			1. Where the plant installed to meet the building's delivered heating and hot water demand has, under normal operating conditions, a NOx emission level (measured on a dry basis at 0% excess O2) as follows: NOx Emission levels for heating and hot water: ≤ 100 mg/kWh for 1 Credit ≤ 109 mg/kWh for 2 Credits ≤ 40 mg/kWh for 3 Credits Two Credits (Industrial building types only) NOx Emission levels for heating and hot water: Office and associated areas ≤ 109 mg/kWh for 1 Credit Operational areas ≤ 109 mg/kWh for 2 Credits 2. Report via the BREEAM scoring and reporting tool the direct and indirect NOx emissions in mg/kWh and energy consumption in kWh/m2/yr. arising from systems installed to meet the building's space heating, cooling and hot water demands.	All	A copy of relevant section/clauses of the building specification confirming the performance of the heating and hot water plant/systems. A copy of the manufacturer's product details confirming the performance, type, system information for the heating and hot water plant/systems. A copy of the calculations from the project team.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should not be sought. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' or 'Enhanced' scores as it is anticipated that all heating will be via the VRF system, rather than by a boiler. ___		
Pol 03.1	Surface Water Run-off - Flood Risk	**2**	**2**			**Two Credits** - Low flood risk - Requirements 1 1. Where a site specific flood risk assessment (FRA) confirms the development is situated in a flood zone that is defined as having a low annual probability of flooding (in accordance with current best practice national planning guidance). The FRA must take all current and future sources of flooding into consideration. **OR** **One Credit** - Medium/high flood risk - Requirements 2-3 2. Where a site specific FRA confirms the development is situated in a flood zone that is defined as having a medium or high annual probability of flooding and is not in a functional floodplain (in accordance with current best practice national planning guidance). The FRA must take all current and future sources of flooding into consideration (see CN5). 3. To increase the resilience and resistance of the development to flooding, one of the following must be achieved: a. The ground level of the building and access to both the building and the site, are designed (or zoned) so they are at least 600 mm above the design flood level of the flood zone in which the assessed development is located (see CN8); OR b. The final design of the building and the wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach outlined in section 5 of BS 8533:2011	1 to 3	A copy of the flood risk assessment in line with BREEAM requirement confirming the development is situated in a low flood risk zone. A copy of the relevant flooding map (if available). A copy of the Flood risk assessment in line with BREEAM requirement confirming the development is situated in a medium or high flood risk zone and is not in a functional floodplain. A copy of the relevant flooding map (if available). A copy of the relevant specification and design drawing confirming that the ground level of the building and access to both the building and the site are at least 600 mm above the design flood level of the flood zone. Or A copy of a letter confirming that an appropriate consultant in accordance with the hierarchy approach outlined in section 5 of BS 8533:2011 has been consulted. And A copy of relevant report / meeting minutes / design drawing confirming that the recommendations made by the appropriate consultant have been implemented for the project.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as the site is believed to be in area of low flood risk according to the Environment Agency's Flood Map. If the site is deemed not to be in a area of low flood risk, then it may be assumed that 1 Credit can be sought as a Flood Risk Consultant would be able provide a FRA with appropriate flood mitigation measures. ___ Additional Team Appointment - A Flood Risk Assessor must be appointed in order to produce a Flood Risk Assessment report. ___ Time Critical Action - RIBA Stage 4 - The Flood risk assessment should be undertaken at RIBA Stage 4. ___	**HTS**	
Pol 03.2	Surface Water Run-off - Surface Water Run Off	**0**	**0**			**Pre-requisite** 4. An appropriate consultant is appointed to carry out, demonstrate and/or confirm the developments compliance with the following criteria	4	A letter confirming that an appropriate consultant has been appointed to demonstrate the compliance with the relevant BREEAM criteria.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS note that to achieve either of the following Credits it is a pre-requisite to appoint an Appropriate Consultant. ___ Additional Team Appointment - A Appropriate Consultant must be appointed in order to produce a Surface Water Run-off report. ___ Time Critical Action - RIBA Stage 4 - It is recommended that the Surface Water Run-off report is undertaken by the end of RIBA Stage 4. ___	**HTS**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
		1	1			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. 6. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place. 7. Calculations include an allowance for climate change; this should be made in accordance with current best practice planning guidance (see definitions).	5 to 7	A copy of the relevant report or calculation confirming that drainage measures specified to ensure that the peak rate of run-off from the site to the watercourses is no greater after the development than it was before and comply with the one year and hundred year return period events. In addition calculation confirming that an allowance for climate change has been included in accordance with the best practice planning guidance. A copy of the relevant specification/design drawing confirming the type, information details and performance of the drainage system installed. A copy of the relevant specification of letter confirming that a maintenance agreement for the ownership, long term operation and maintenance of all specified SuDS will be in place.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as part of the 'Baseline' score as an Appropriate Consultant can provide design solutions to ensure the rate of run-off does not increase. ___	HTS	
		1	1			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, including an allowance for climate change. 10. Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other Sustainable Drainage System (SuDS) techniques. OR (only where criteria 9 and 10 for this Credit cannot be achieved) 11. Justification from the Appropriate Consultant indicating why the above criteria cannot be achieved, i.e. where infiltration or other SuDS techniques are not technically viable options. 12. Drainage design measures are specified to ensure that the post development peak rate of run-off is reduced to the limiting discharge. The limiting discharge is defined as the highest flow rate from the following options: a. The pre-development 1-year peak flow rate; OR b. The mean annual flow rate Qbar; OR c. 2L/s/ha. Note: that for the 1-year peak flow rate the 1-year return period event criterion applies (as described in the peak run-off criteria above). 13. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place. 14. For either option, above calculations must include an allowance for climate change; this should be made in accordance with current best practice planning guidance.	8 to 14	A copy of the relevant report or calculation confirming that drainage measures specified to ensure that the peak rate of run-off from the site to the watercourses is no greater after the development than it was before and comply with the hundred year 6 hours return period events. In addition calculation confirming that an allowance for climate change has been included in accordance with the best practice planning guidance. A copy of the relevant specification/design drawing confirming the type, information details and performance of the drainage system installed. A copy of the relevant specification of letter confirming that a maintenance agreement for the ownership, long term operation and maintenance of all specified SuDS will be in place.	120716 HTS confirmed that this Credit can be difficult and risky as it depends on the local sewers and whether they have any known issues. HTS should confirm whether this Credit should be sought once details of the local sewers are know and whether they have any issues. ___ 200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit is to be reviewed as part of the 'shopping list'. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' score, but it may be sought as part of the 'Enhanced' score where an Appropriate Consultant can produce a report to confirm compliance with the BREEAM criteria. ___	HTS	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% Req. Rating: Excellent Sought %: 76.68% Sought Rating: Excellent Complete %: 0.00% Complete Rating: N/A Risk %: 15.74%

Sought Margin %: 6.68% Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Pol 03.3	Surface Water Run-off - Minimising Water Course Pollution	**1**	**0**			15. 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. 17. Where there is a high risk of contamination or spillage of substances such as petrol and oil (see Compliance notes for a list of areas), separators (or an equivalent system) are installed in surface water drainage systems. 18. Where the building has chemical/liquid gas storage areas, a means of containment is fitted to the site drainage system (i.e. shut-off valves) to prevent the escape of chemicals to natural watercourses (in the event of a spillage or bunding failure). 19. All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as Pollution Prevention Guideline 3 (PPG 3) and/or where applicable the SUDS manual. For areas where vehicle washing will be taking place, pollution prevention systems must be in accordance with Pollution Prevention Guidelines 13. 20. A comprehensive and up-to date drainage plan of the site will be made available for the building/site occupiers. 21. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place. 22. Where present, all external storage and delivery areas designed and detailed in accordance with the current best practice planning guidance (see Other information for further information).		Professional specialist report, Communication records,	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should not be sought. ___ 140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' or 'Enhanced' scores as it is considered likely that there would be discharge from the developed site for rainfall up to 5mm No Credits are sought at present as this Credit is deemed to be very challenging, HTS to confirm. ___	**HTS**	
Pol 04	Reduction of Night Time Light Pollution	**1**	**1**			1. Where external lighting pollution has been eliminated through effective design that removes the need for external lighting without adversely affecting the safety and security of the site and its users. OR alternatively, where the building does have external lighting, one Credit can be awarded as follows: 2. The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the ILP Guidance notes for the reduction of obtrusive light, 2011. Buildings located in Scotland must comply with the light pollution criteria in the guidance note 'Controlling Light Pollution and Reducing Lighting Energy Consumption' This can be demonstrated via completion of the checklists in Annexes B and C of the guidance note by a relevant member of the Design Team. 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 Advertisements.	All	A copy of the relevant specification clause or letter confirming that external lighting has been designed in compliance with Table 2 of the ILP Guidance notes for the reduction of obtrusive light, 2011. A copy of the relevant specification confirming that all external lighting can be switched off between 23.00 and 07.00. A copy of relevant specification clause or letter confirming that security and safety lighting will be used during the night complies the lower levels of lighting recommended during these hours in Table 2 of the ILP's Guidance notes. A copy of relevant specification clause or letter confirming that Illuminated advertisements will be designed in compliance with ILE Technical Report 5 – The Brightness of Illuminated Advertisements.	200416 (Pre Assessment Workshop) - The Design Team confirmed that this Credit should be sought. ___ 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as compliant external lighting in accordance with the relevant standards can be specified. It should be noted that where external lighting is not specified the Credit can be awarded by default. ___	**MTT**	

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% | Req. Rating: Excellent | Sought %: 76.68% | Sought Rating: Excellent | Complete %: 0.00% | Complete Rating: N/A | Risk %: 15.74%

Sought Margin %: 6.68% | Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Pol 05	Reduction of Noise Pollution	**1**	**1**			1. Where there are, or will be, no noise-sensitive areas or buildings within 800m radius of the assessed development. OR 2. Alternatively, where the building does have noise sensitive areas or buildings within 800 m radius of the development, one Credit can be awarded as follows: a. Where a noise impact assessment in compliance with BS 7445 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 CN5). 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 (01090 to 2300) and +3dB at night (2300 to 01090) 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.	1 to 5	Design drawings highlighting all existing and proposed noise-sensitive buildings local to, and within, the site boundary and proposed sources of noise from the new development and distance (m) from these buildings to the assessed development. A copy of a letter confirming that a suitably qualified acoustic consultant has been appointed to carried out a noise impact assessment in compliance with the relevant standards. A copy of the acoustician's noise assessment report confirming the acoustician's qualifications and professional status and the compliance with the relevant standards and BREEAM criteria. A copy of relevant specification clause or letter confirming that the acoustic recommendations will be implemented for the project. And A marked-up drawing highlighting the acoustician's recommendations provided.	200416 (Pre Assessment Workshop) - The Design Team confirmed that the responsibility of this Credit should be changed from MTT to ACO (John Lloyd). 140416 (Pre Assessment Review) MTTS recommend that the Credit is sought as a noise impact report in accordance with BS 7445 can be produced to ensure reductions in the noise pollution from the site to neighbouring properties. Additional Team Appointment - A Suitably Qualified Acoustician must be appointed. Time Critical Action - RIBA Stage 4 - Noise sensitivity should be mapped, and where appropriate, it is recommended that the noise impact assessment is undertaken by the end of RIBA Stage 4.	**ACO**	
Exe Man 01	Project Brief and Design - Stakeholder Consultation (Project Delivery)	**1**	**0**			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' or 'Enhanced' scores as it is not expected that this Credit will be achieved and is therefore not sought.		
Exe Man 03	Responsible Construction Practices	**1**	**0**			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	140416 (Pre Assessment Review) MTTS do not recommend that this Credit is included as part of the 'Baseline' or 'Enhanced' scores as the Contractor cannot be guaranteed to achieve exemplary performance CCS scores.		
Exe Man 05	Aftercare	**1**	**0**			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	It is not expected that this Credit will be achieved and is therefore not sought.		
Exe Hea 01.4	Visual Comfort - Internal and external lighting	**1**	**0**			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	It is not expected that this Credit will be achieved and is therefore not sought.		
Exe Hea 02	Indoor Air Quality	**2**	**0**			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	It is not expected that this Credit will be achieved and is therefore not sought.		
Exe Ene 01	Reduction of CO2 Emissions	**1**	**0**			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	It is not expected that this Credit will be achieved and is therefore not sought.		
Exe Wat 01	Water Consumption	**1**	**0**			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	It is not expected that this Credit will be achieved and is therefore not sought.		
Exe Mat 01	Life Cycle Impacts	**1**	**0**			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	It is not expected that this Credit will be achieved and is therefore not sought.		
Exe Mat 03	Responsible Sourcing of Materials	**1**	**0**			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	It is not expected that this Credit will be achieved and is therefore not sought.		

PRE-ASSESSMENT - SUMMARY AND MAIN TABLE

DESIGN STAGE

Req. %: >70% Req. Rating: Excellent Sought %: 76.68% Sought Rating: Excellent Complete %: 0.00% Complete Rating: N/A Risk %: 15.74%

Sought Margin %: 6.68% Complete Margin %: 0.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Evidence ID	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Exe Wst 01.1	Construction Waste Management	1	0			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	It is not expected that this Credit will be achieved and is therefore not sought.		
Exe Wst 01.2	Construction Waste Management	1	0			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	It is not expected that this Credit will be achieved and is therefore not sought.		
Exe Wst 02	Recycled Aggregates	1	0			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	It is not expected that this Credit will be achieved and is therefore not sought.		
Exe Wst 05	Adaptation to Climate Change	1	0			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	It is not expected that this Credit will be achieved and is therefore not sought.		
Exe Pol 03	Surface Water Run-Off	1	0			Refer to BREEAM NC 2014 Scheme Document	All	Refer to BREEAM NC 2014 Scheme Document	It is not expected that this Credit will be achieved and is therefore not sought.		

appendix c – thermal model summary sheet…

…sustainable building services solutions

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Calculation Sheet - Summary

MTT/SUSTAIN

Project:	3-6 Spring Place	**Job Number:**	8081
Subject:	Thermal Modelling Results Summary		
Engineer:	Pushkin Passey	**Date:**	1st September 2016
Checked By:	Lorees Arakelian	**Date:**	1st September 2016

RESULTS SUMMARY

REVISION 1

PLANNING

	Parameter	Unit	Notional Building for Planning .	Run 1 Be Lean	Run 2 Be Clean	Run 3 Be Green
S	**Building fabric and services summary**			**Demand reduction**	**Provision of clean energy**	**Provision of renewable energy solutions**
Part L	**Building Emission Rate (BER)**	$kgCO_2/m^2$	-	20.7	20.7	17.9
	Target Emission Rate (TER) [BRUKL]	$kgCO_2/m^2$	**-**	21.4	21.4	20.2
	% Improvement BER/TER	%	-	3.5%	3.5%	11.2%
	Criterion 1	BER<=TER	-	**PASS**	**PASS**	**PASS**
Planning	**Building Emission Rate (BER)**	$kgCO_2/m^2$	-	20.7	20.7	17.9
	Target Emissions [for En. Hier.]	$kgCO_2/m^2$	**21.4**	21.4	21.4	21.4
	% Improvement on Target Em. [for En. Hier.]	%	-	3.5%	3.5%	16.5%
EPC	**EPC rating (Asset Rating)**		-	33	33	29
	EPC band		-	**B**	**B**	**B**
	Target	**B**		**PASS**	**PASS**	**PASS**
BREEAM	**BREEAM NC 2014 Credit Ene 01**	EPR_{NC}	n/a	3	3	5
	Target	5		**FAIL**	**FAIL**	**PASS**
R	**Run**		8081 - spring place (la test).tplp2013	8081 - spring place (la test).tplp2013	8081 - spring place (la test).tplp2013	8081 - spring place (la test).tplp2013

Calculation Sheet - Summary

MTT/SUSTAIN

Project:	3-6 Spring Place	**Job Number:**	8081
Subject:	Thermal Modelling Results Summary		
Engineer:	Pushkin Passey	**Date:**	1st September 2016
Checked By:	Lorees Arakelian	**Date:**	1st September 2016

RESULTS DETAIL

REVISION 1

PLANNING

	Parameter	Unit	Notional Building for Planning .	Run 1 Be Lean	Run 2 Be Clean	Run 3 Be Green
S	**Building fabric and services summary**			**Demand reduction**	**Provision of clean energy**	**Provision of renewable energy solutions**
Demand (kWh/m²)	**Heating**	kWh/m²	2.2	4.9	4.9	4.9
	Cooling	kWh/m²	38.1	27.7	27.7	27.7
	Auxiliary	kWh/m²	10.1	11.5	11.5	10.8
	Lighting	kWh/m²	19.3	14.3	14.3	14.3
	DHW	kWh/m²	4.0	4.0	4.0	4.0
	Equipment (not in total)	kWh/m²	44.2	44.2	44.2	44.2
	Displaced electricity	kWh/m²	0.0	0.0	0.0	-2.1
	Total	**kWh/m²**	73.6	62.3	62.3	59.5
Consumption (kWh/m²)	**Heating**	kWh/m²	2.6	5.2	5.2	1.7
	Cooling	kWh/m²	10.1	9.2	9.2	7.5
	Auxiliary	kWh/m²	10.1	11.5	11.5	10.8
	Lighting	kWh/m²	18.3	13.6	13.6	13.6
	DHW	kWh/m²	4.3	4.0	4.0	4.0
	Equipment (not in total)	kWh/m²	44.2	44.2	44.2	44.2
	Displaced electricity	kWh/m²	0.0	0.0	0.0	-2.1
	Total	**kWh/m²**	45.4	43.5	43.5	35.5
Emissions ($kgCO_2/m^2$)	**Heating**	$kgCO_2/m^2$	0.6	1.3	1.3	0.9
	Cooling	$kgCO_2/m^2$	5.1	4.7	4.7	3.8
	Auxiliary	$kgCO_2/m^2$	5.1	5.8	5.8	5.5
	Lighting	$kgCO_2/m^2$	9.3	6.9	6.9	6.9
	DHW	$kgCO_2/m^2$	1.4	2.0	2.0	2.0
	Equipment (not in total)	$kgCO_2/m^2$	22.4	22.4	22.4	22.4
	Displaced electricity	$kgCO_2/m^2$	0.0	0.0	0.0	-1.1
	Total (BER)	**$kgCO_2/m^2$**	**-**	**20.7**	**20.7**	**17.9**
	Total (TER)	**$kgCO_2/m^2$**	**21.4**	**21.4**	**21.4**	**20.2**
A	**Total floor area**	m^2	**4,399**	**4,399**	**4,399**	**4,399**
R	**Run**		8081 - spring place (la test).tplp2013	8081 - spring place (la test).tplp2013	8081 - spring place (la test).tplp2013	8081 - spring place (la test).tplp2013

Calculation Sheet - Summary

MTT/SUSTAIN

Project:	3-6 Spring Place	**Job Number:**	8081
Subject:	Thermal Modelling Results Summary		
Engineer:	Pushkin Passey	**Date:**	1st September 2016
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MODEL PARAMETERS

REVISION 1 | PLANNING

	Parameter	Unit	Notional Building for Planning .	Run 1 Be Lean	Run 2 Be Clean	Run 3 Be Green
S	**Building fabric and services summary**		Only notional values listed; actual as per Run 1	**Demand reduction**	**Provision of clean energy**	**Provision of renewable energy solutions**
Building Fabric	**U-values**		NCM compliant	As brief	as 'Be Lean'	as 'Be Clean'
	Walls make-up (and U-value)	W/m^2K	0.26	Brickwork = 0.3 Metal cladding = 0.3	as 'Be Lean'	as 'Be Clean'
	Curtain wall make-up (and U-value)	W/m^2K	-	-	as 'Be Lean'	as 'Be Clean'
	Window make-up (Type) U-value / g-value / LT	W/m^2K	(NCM compliant) 1.8 / 0.40 / 71	North Façade: (Clear LE) 1.3 / 0.61 / 78% East, South and West: (Solar HP) 1.3 / 0.37 / 70%	as 'Be Lean'	as 'Be Clean'
	Rooflight make-up (Type) U-value / g-value / LT	W/m^2K	-	To the west wing, Solar HP, 1.4 / 0.33 / 61%	as 'Be Lean'	as 'Be Clean'
	Solar shading device	W/m^2K	-	Perforated metal panels where applicable in front of the clear or solar glazing. 50% perforation (thus clear glazing = 1.3 / 0.3 / 33% and solar glazing = 1.3 / 0.2 / 30%)	as 'Be Lean'	as 'Be Clean'
	Internal blinds		-	-	as 'Be Lean'	as 'Be Clean'
	Roof make-up (and U-value)	W/m^2K	0.18	0.25	as 'Be Lean'	as 'Be Clean'
	Ground floor make-up (and U-value)	W/m^2K	-	0.25	as 'Be Lean'	as 'Be Clean'
	Internal floors	W/m^2K	1.21	1.34	as 'Be Lean'	as 'Be Clean'
	Air permeability	$m^3/m^2.hr$	10	7	as 'Be Lean'	as 'Be Clean'

Calculation Sheet - Summary

Project:	3-6 Spring Place	**Job Number:**	8081
Subject:	Thermal Modelling Results Summary		
Engineer:	Pushkin Passey	**Date:**	1st September 2016
Checked By:	Lorees Arakelian	**Date:**	1st September 2016

MODEL PARAMETERS

REVISION 1 | PLANNING

	Parameter	Unit	Notional Building for Planning .	Run 1 Be Lean	Run 2 Be Clean	Run 3 Be Green
Building Services	**M&E standards limits**		NCM 2013	Enhanced values on NDBSCG 2013 limits	as 'Be Lean'	as 'Be Clean'
	Services strategy		FCU	FCU	as 'Be Lean'	as 'Be Clean'
	Pump drive		Constant	Variable drive	as 'Be Lean'	as 'Be Clean'
	Power factor correction (whole bldg.)		>0.95	>0.95	as 'Be Lean'	as 'Be Clean'
	DHW source and efficiency		Fuel oil, 86.45%	Electric (100%)	as 'Be Lean'	as 'Be Clean'
	Heating source		Natural Gas	Gas boiler	as 'Be Lean'	Electric High CoP VRF Heat Pumps
	Heating CoP / efficiency		81.9%	91%	as 'Be Lean'	3.9
	Cooling source		Electric chiller	Chiller	as 'Be Lean'	Electric High CoP VRF Heat Pumps
	Cooling EER / efficiency		3.6	3.0	as 'Be Lean'	3.7
	Heat recovery efficiency	%	70%	PHE, 55%	as 'Be Lean'	as 'Be Clean'
	Daylight link control		Dimming	(offices and events) Photocell on/off - whole floor (café) Manual on/off (reception, circulation, toilets) None	as 'Be Lean'	as 'Be Clean'
	Lighting control		None	Auto On/Off (offices, circulation, toilets, store)	as 'Be Lean'	as 'Be Clean'
	Light fittings and power density	$W/m^2/100lx$	60 lm/W Display lighting: 15-22 lm/W	(offices) 1.8 (reception) 7.5 (circulation) 3 (toilets) 3	as 'Be Lean'	as 'Be Clean'
	Light metering		Yes	Yes	as 'Be Lean'	as 'Be Clean'
	S+E SFP and mechanical limits	W/l/s	1.8 W/l/s	(Offices) Floor by floor AHUs with a combined S+E SFP = 1.6 W/l/s WCs or Extract onle zones = 0.6 W/l/s	as 'Be Lean'	as 'Be Clean'
	Terminal AC units SFP	W/l/s	0.3 W/l/s	0.2 W/l/s (EC motored)	as 'Be Lean'	as 'Be Clean'
	CHP efficiency, heat to power ratio		-	-	as 'Be Lean'	as 'Be Clean'
	PV panels, area and efficiency	m^2, %	-	-	as 'Be Lean'	64 m^2 panel area, 20% (high efficiency) (equiv. to 40 panels at 1.6 m x 1.0 m)
Other	**Software version**		Tas v9.3.3 - NCM v5.2.4	Tas v9.3.3 - NCM v5.2.4	as 'Be Lean'	as 'Be Clean'
	NCM activity		B1 (Offices - 2013)	B1 (Offices - 2013)	as 'Be Lean'	as 'Be Clean'

ABBREVIATIONS

HP = High Performance / Heat pump. LE = Low Emissivity. DG = Double Glazing. U = U-value. g = g-value (Total Solar Transmittance) . SFP = Specific Fan Power.
EPC = Energy Performance Certificate. CoP = Coefficient of Performance. SEER = Seasonal Energy Efficiency Ratio. PHE = Plate Heat Exchanger.

appendix d – 'be green' – renewable energy…

…sustainable building services solutions

FUEL CELLS

Technology Background

A fuel cell is an electrochemical device that produces electricity by using hydrogen or other hydrogenous compounds as a fuel. Heat is generated as a by-product of the process and can be used for other purposes such as heating and hot water generation. Fuel cells using hydrogen are considered a locally clean technology, but if running on other fuels, a fuel cell will emit CO_2. Currently, most fuel cells use hydrogen derived on-site from carbon based fuels (primarily natural gas) via a reformer.

Fuel cells come in a variety of forms and run on variety of fuels, with the primary fuel source being hydrogen.

This can be obtained (using a reformer) from a wide range of fuel supplies including natural gas, coal gas, methanol, landfill gas and other fuels containing hydrogen.

Benefits

Fuel cells produce zero emissions (at the point of use) when run on pure hydrogen. When a reforming process is used, CO_2 emissions do arise, although the net emissions from a fuel cell installation remain lower than conventional combustion processes due to the higher operational efficiency of the fuel cell.

Environmental performance will greatly vary depending on the fuel production processes, but the following positive aspects are common to all fuel cells:

- NO_X and PM_{10} emissions are much lower than any other combustion based process;
- Higher availability (time between maintenance) than CHP systems;
- Potential to modulate quickly to adapt electricity generation to demand, with affecting efficiency
- The efficiencies of fuel-cell plants are in the range of 40 to 55% (electrical power generation) and waste heat is generated making it a co-generation energy source.

Technical Considerations

Fuel cells have a number of technical limitations at present, most of which are related to the relative immaturity of the technology and may be reduced in the future. These include the need for a higher level of maintenance expertise and input and the need for larger plant room provision due to ancillary plant requirements (e.g. water treatment systems, backup gas tanks, etc.).

Economic Considerations

Fuel cells have significantly higher capital and infrastructure costs than more conventional systems.

Applicability at 3-6 Spring Place

DISCUSSION

Fuel cells are a novel and expensive technology for implementation at the building-scale in the UK and are best suited to applications where a gas fired CHP unit might be considered (i.e. consistent year round heating and power load).

They also rely on hydrogen fuel supply, either from directly supplied hydrogen itself or from hydrogen reformed/extracted from natural gas. There is not currently a hydrogen network in Camden, although the established natural gas infrastructure nationwide means the majority of UK-based fuel cells are operated using natural gas. Analysis has shown that the carbon savings realised from gas fired CHP outweigh those from a hydrogen fuel cell that is powered by natural gas due to the conversion process from gas to hydrogen.

DECISION TABLE

Issue	Consideration	Response for The Quay Club
Fuel supply	Is a source of hydrogen available	**NO**
Fuel supply	Is an alternate fuel source available?	**YES**
Plant room	Is there space allowance for a fuel cell and associated auxiliary equipment?	**NO**

RECOMMENDATION

The lower operation efficiencies of fuel cells connected to mains gas and operated using a reformer when compared to a gas-fired CHP unit, alongside the higher capital and operational costs mean that fuel cell technology is not recommended for 3-6 Spring Place.

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…sustainable building services solutions

AIR SOURCE HEAT PUMPS

Technology Background

Air source heat pumps work by converting the energy of the outside air into heat, creating a comfortable temperature inside the building as well as supplying energy for the hot water system. As with all heat pumps, air source models are most efficient when supplying low temperature systems such as underfloor heating.

An air source heat pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside. It can extract heat from the air even when the outside temperature is as low as minus 15° C. Cold water or another fluid is circulated through pipes, picking up the ambient temperature and then passing through the heat exchanger (the evaporator) in the heat pump unit.

The heat exchanger extracts heat from the fluid, using a refrigerant compression cycle to upgrade the heat to a usable temperature (+55°C). This heat is then transferred to the heating system via another heat exchanger, the condenser of the heat pump.

Accordingly, ASHP heating systems generally run at a lower temperature than conventional heating systems.

There are two main types of air source heat pumps. An air-to-water system uses the heat to warm water. Heat pumps heat water to a lower temperature than a standard boiler system would, so they are better suited to underfloor heating systems than radiator systems. An air-to-air system produces warm air, which is circulated by fans to heat the building.

Whilst heat pumps are not a wholly renewable energy source due to use of electricity, the renewable component is considered as the heat extracted from the air. It is measured as the difference between heat outputs, less the primary electrical energy input.

Using this heat, for every Watt of electrical energy supplied to the system, 4 Watts or more of heating energy can be supplied to a heating system. This 'Coefficient of Performance' (CoP) of 4 is effectively an 'efficiency' of 400% for the system and compares very favourably with even the best gas condensing boiler's efficiency of around 85%.

The smaller the temperature difference between the source and the output temperature of the heat pump (i.e. the temperature of the distribution system) the higher the heat pump's CoP.

Benefits

Unlike boilers, there is no pollution on-site and as the mix of power stations used to supply the electricity grid gets 'cleaner', with more renewable electricity generation being brought on line, so the Carbon emissions from the heat pumps system will decrease even further.

The key operational benefit of air source heat pumps for the user is the reduction in fuel bills. In addition, space savings can be made over other plant types as an air source heat pump unit is compact, and requires no storage space for fuel.

Technical Considerations

Since air source heat pumps produce less heat than traditional boilers, it is essential that the building where the air source heat pump is proposed is well insulated and draught proofed for the heating system to be effective.

Fans and compressors integral to the air source heat pump unit generate some noise, but this is generally acceptable especially where outdoor units can be located away from windows and adjacent buildings. By selecting a heat pump with an outdoor sound rating of 76 dB or lower and mounting the unit on a noise-absorbing base these issues can be resolved for the site.

Economic Considerations

Costs for installing a typical system vary but they are considerably more economical to install than an equivalent capacity ground source heat system and can produce similar levels of energy and carbon savings.

Actual running costs and savings for space heating will vary depending on a number of factors - including the size and use pattern of the building and how well insulated it is.

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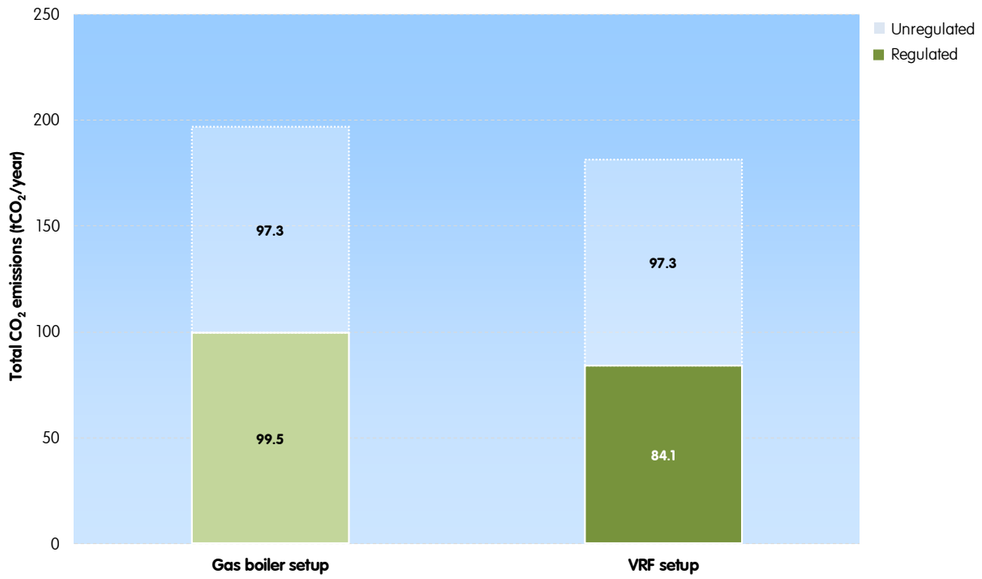
…sustainable building services solutions

Proposed Approach

DISCUSSION

In accordance with Section 13.5 of the GLA Guidance Note on Preparing Energy Assessments, the proposed VRF system (as a heat pump system) has been categorised as a 'be green' technology under the Energy Hierarchy for 3-6 Spring Place. The Guidance Note requires that a high efficiency gas boiler (91% efficiency) and chiller based energy strategy is adopted at the 'Be Lean' stage.

A preliminary analysis was undertaken to compare the performance of boiler/chiller based energy strategy with a VRF based system (all other factors being unchanged) showing the VRF system has significant energy efficiency/CO_2 emissions savings benefits over more conventional heating and cooling solutions.



Preliminary Comparison Between the 'Be Lean' High-Efficiency Gas Boiler System and the 'Be Green' Proposed VRF System

As per the requirement of section 3.18 of CPG 3, multiple design iterations were undertaken to optimise the heating system for the development. The proposed system shall be high efficiency VRF heat pump with a heating CoP of 3.9, and a cooling EER of 3.7. The system will be designed to achieve a specific fan power (SFP) lower than the Part L 2013 limiting SFP.

DECISION TABLE

Issue	Consideration	Response for 3-6 Spring Place
Roof Space	Is there sufficient roof space for air-source heat pumps?	**YES**

RECOMMENDATION

Based on the full analysis, the proposed VRF system utilising high CoP heat pumps achieves **7.8%** improvement on the BER (Building Emission Rate) over the 'Be Clean' emissions rate and is a preferred 'Be Green' option for the scheme.

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GROUND SOURCE HEATING

Technology Background

Heat pumps take in heat at a certain temperature and release it at a higher temperature to provide space and water heating, using a similar process to a refrigerator. Conversely the use of a reverse cycle heat pump can provide cooling capability within the same equipment. Heat pumps offer the lowest-carbon emission method of heating any building.

This technology is now in common use for installations up to 2-4MW capability. Preliminary investigations indicate the system has potential as the cooling and heating source to the scheme.

Ground Source Heat Pumps (GSHPs) extract heat from the ground to provide space and water heating for buildings. As the ground stays at a fairly constant temperature throughout the year heat pumps can use the ground as the source of heat. The ground temperature is not necessarily higher than ambient air temperature in winter but this temperature is more stable whereas air has a wide temperature range.

Benefits

Whilst a GSHP is not a wholly renewable energy source as it uses electricity, the renewable component is considered as the heat extracted from the ground, measured as the difference between heat outputs, less the primary electrical energy input.

Using this geothermal heat, for every Watt of electrical energy supplied to the system, 4 Watts or more of heating energy can be supplied to a heating system. This 'Coefficient of Performance' (CoP) of 4 is effectively an 'efficiency' of 400% for the system and compares very favourably with even the best gas condensing boiler's efficiency of around 85%.

Unlike boilers, there is no pollution on-site and as the mix of power stations used to supply the electricity grid gets 'cleaner', with more renewable electricity generation being brought on line, so the carbon emissions from the heat pumps system will decrease even further.

Technical Considerations

In a GSHP system cold water (or another fluid) is circulated through pipes buried in the ground (the 'ground loop') picking up temperature (from, say, -5°C to + 2°C) as it does so and then passing through the heat exchanger (the evaporator) in the heat pump unit.

There are two methods of extracting the heat from the ground – 'ground loop' or 'borehole'. With the ground loop system, lengths of plastic pipe are buried in the ground in a horizontal trench, usually approximately 1 to 2 metres below ground level. With the borehole system, the pipework is installed in relatively small diameter (150mm diameter) holes drilled anything between 15 to 100 metres into the ground depending on ground type and conditions. With both systems the pipe is a closed loop filled with a water/antifreeze mixture. This mixture circulates in the pipe, absorbing heat from the ground.

The heat exchanger extracts heat from the fluid, using a refrigerant compression cycle to upgrade the heat to a usable temperature (from say +2°C to +55°C) This heat is transferred to the heating (and sometimes the hot water) system via another heat exchanger, the condenser of the heat pump.

The smaller the temperature difference between the source and the output temperature of the heat pump (i.e. the temperature of the distribution system) the higher the heat pump Coefficient of Performance.

Accordingly, GSHP heating systems generally run at a lower temperature than conventional heating systems. In GSHP systems serving heating loads, water heating provides a year-round load and can improve the load factor for the heat pump. Hot water is usually required to be delivered from the tap at temperatures in the range 35°C to 45°C, which is within the thermal power output of a heat pump system.

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…sustainable building services solutions

Applicability at 3-6 Spring Place

DISCUSSION

Technical feasibility for a site generally depends on the ground loop with the ground conditions affecting both the ease of construction and performance of the system, with a need for appropriate soil and ground water conditions for the site. Geothermal heating systems are more expensive to install initially than traditional boiler or electric heating systems. However, as previously discussed they are significantly cheaper to run and maintain against traditional boiler solutions if the ground conditions are correct. As electrically run heat pumps, if the reservoir of energy in the ground requires excessive pumping to access, the energy and carbon emissions from the system rise significantly.

With the ground geology and site restrictions, it is considered that this technology presents a significant risk to the developer in respect of the need to pursue an open loop system. The location of the boreholes would compromise the site boundary and provide difficulty in installation with the buildings' basement.

These problems, along with the uncertain yield from the borehole, mean that the risk and large capital costs outweigh the advantages of ground source heat pumps.

DECISION TABLES

General Considerations

Issue	Consideration	Response for 3-6 Spring Place
Heat Demand	Is there a year-round heat demand?	**NO**
Heat Distribution System	Is it possible to incorporate a low-grade distribution system e.g. under floor heating?	**NO**
Cooling Distribution System	Is it compatible with the proposed cooling system?	**YES**

Ground-Source Heat Pumps

Issue	Consideration	Response for 3-6 Spring Place
Ground Conditions	Has a basic ground study concluded that the site is suitable for GSHP?	**NO**
Horizontal Piping	Is there a large area of open land where horizontal piping could be installed?	**NO**
Vertical Piping	Is the ground suitable for vertical piping?	**NO**
	Can underground obstacles be avoided?	**NO**
Plant Room	Is there space allowance for a GSHP and associated auxiliary equipment?	**YES**

Water-Source Heat Pumps

Issue	Consideration	Response for 3-6 Spring Place
Resource	Is an appropriate water source available close to the site?	**NO**

RECOMMENDATION

Due to the number of negative or undetermined responses in the Decision Tables and the proposed development's limited heating demand (Heat Pumps (Ground/Water/Air/Geothermal) not recommended for 3-6 Spring Place.

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BIOMASS HEATING

Technical Considerations

Wood chips / pellets would require a large number of deliveries and significant storage space, not compatible with a city centre location. Delivery logistics for liquid biofuel would pose similar issues, and require careful consideration;

Operational Considerations

Biomass systems typically require more frequent maintenance and greater operator attention than conventional systems. As a result, the degree of operator dedication to the system is critical to its success. They often require special attention to fire insurance premiums, air quality standards, ash disposal options and general safety issues.

Proposed Approach

DISCUSSION

The local sourcing of fuel for the heating system poses a challenge due to the site's location. With the location of the site, sourcing wood pellets/chips would have to occur from suppliers over 30 km from the site.

DECISION TABLE

Woody Biomass

Issue	Consideration	Response for 3-6 Spring Place
Heat Demand	Is there a year round heat demand?	**NO**
Supply Chain	Is there an established supply chain in the local area?	**NO**
Delivery Logistics	Is the site accessible for deliveries?	**NO**
Storage	Is there sufficient space for a supply vehicle to access a biomass storage hopper?	**NO**
	Is there sufficient space for fuel storage to allow a reasonable number of deliveries?	**NO**
Plant Room	Is there sufficient space for a biofuel boiler and associated auxiliary equipment?	**YES**
Flue	Can a flue be designed to meet air quality and dispersion requirements?	**YES**

Liquid Biofuel

Issue	Consideration	Response for 3-6 Spring Place
Heat Demand	Is there a year round heat demand?	**NO**
Supply Chain	Is there an established supply chain in the local area?	**NO**
Security of Supply	Is the future supply of biofuel guaranteed?	**NO**
Delivery Logistics	Is the site accessible for deliveries?	**NO**
	Is there sufficient space for a supply vehicle to access a biofuel storage tank?	**NO**
Storage	Is there sufficient space for fuel storage to allow a reasonable number of deliveries?	**NO**
Running Costs	Are the high running costs acceptable?	**NO**

RECOMMENDATION

Since there is a limited heating demand at the site, the fuel delivery and storage requirements and the complexity of implementation of a biomass heating would make biomass heating a technically and economically unfavourable renewable option for 3-6 Spring Place.

The local sourcing of fuel for the development presents an issue due to the urban location of the site. Being situated in Central London it is thought a Carbon burden would be added to the site as fuel suppliers sourcing wood pellets/chips from supplies would not have been sourced within 30 km of the site.

Air quality issues arising from exhaust emissions and transportation are also an issue for the application of biomass in this central London location.

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PHOTOVOLTAICS

Technology Overview

Solar photovoltaic (PV) technology is a semi-conductor based technology that converts the energy in sunlight into electricity. A PV system comprises the PV panel (generator) and the associated wiring and electronics or 'balance of system'. If the energy in the daylight is sufficient, it causes a flow of electrons across the junction of the semi-conductor: electricity is generated. A solar panel is made of cells, which are connected together in different configurations to give different voltage and current outputs.

The PV panel should be orientated between southeast and southwest (optimally south). The optimal tilt angle (inclination of panel from horizontal) should be calculated to ensure the best possible output of the system during the year. In the UK, the angles of most pitched roofs are suitable for mounting PV panels. Panels can also be mounted on A-frames on flat-roofed buildings. PV technology comes in a range of forms: PV panels that can be retrofitted to the roof of an existing building or equally, sunk to fit flush with the roof line; PV cells that are 'laminated' between sheets of glass to provide shading in a glazed area, and PV cladding.

PV systems are low maintenance as they have no moving parts and panels generally have 25-year warranties, although the lifetime of the panel can be expected to be beyond this time.

Technical Considerations

The PV systems should not be shaded. Shading caused by other buildings, greenery and roof 'furniture' such as chimneys or satellite dishes, even over a small area of the panel, can significantly reduce performance. Excess energy can be exported to the grid. Although the feed-in tariffs are generally not high, exporters can negotiate with their utility company.

Feasibility of PV is typically dependent on the availability of unshaded, south- facing locations for mounting an array of panels. In the London area there is an annual average solar energy availability of 1 MWh/m^2 at the optimum (south facing) angle of 30° from the horizontal plane. The amount of this energy that can be utilised is dependent upon the availability of un-shaded roof space and efficiency of the solar panels considered. Aesthetic, access and structural implications need to be considered in identifying panel locations.

Economic Considerations

Payback times for this technology are usually in excess of twenty years; but this is reducing year on year as the technology matures and are set to reduce further as fuel prices increase. Integrating PV into a building and replacing other building materials can further offset the cost.

Proposed Approach

DISCUSSION

Two key constraints will affect the extent of the east roof on to which PV panels can effectively be provided. These are the required area for access and maintenance and the need to minimise effects on the overall massing from the street. Access and maintenance requires an exclusion zone of 1500mm from the edge of the roof, which allows for minimum guardrail.

As shown above, to optimise the output, the panels would be inclined and at 15° around the perimeter of the array and 30° at the centre of the array to maximise the yield from the system whilst ensuring it is not visible above the roofline of the building from the ground.

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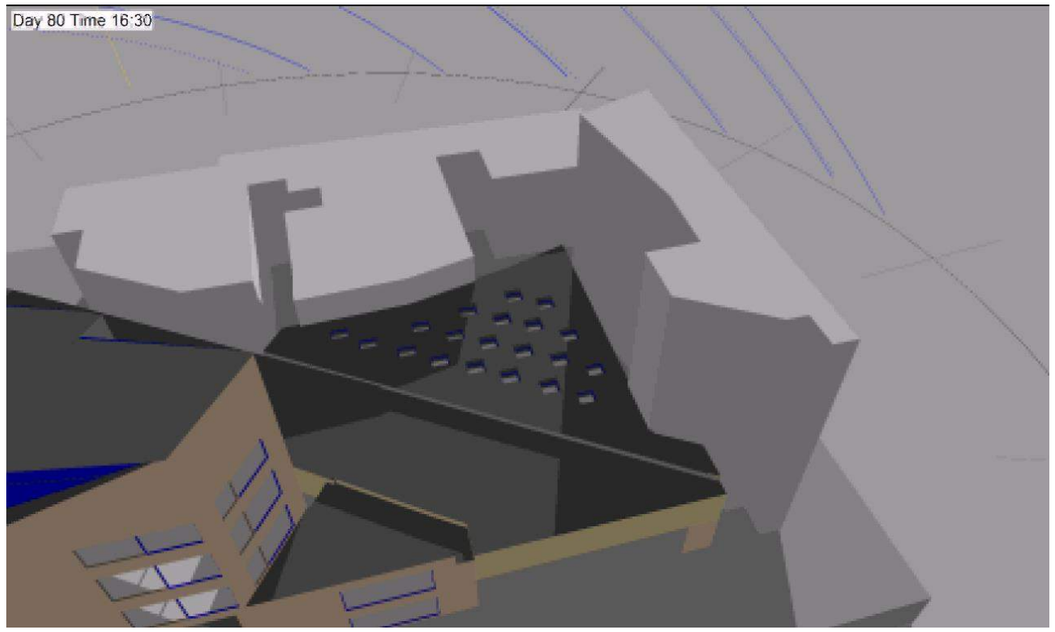
The flat roof to the west of the site is not suitable for the implementation of PV panels because it is overshaded by neighbouring buildings, as illustrated below:



Although panels cannot be accommodated over the full extent of the roof, a reasonably sized PV array can be accommodated on the main (east) roof area.

This location is therefore considered suitable for the implementation of PV arrays, and the opportunity to integrate a PV array into the roof layout shall be pursued.

DECISION TABLE

Issue	Consideration	Response for 3-6 Spring Place
Roof Orientation	Are available roofs facing south-west to south- east (through south), or flat?	**YES**
Roof Layout	Is there sufficient un-shaded roof area?	**YES**
Electrical Demand	Is there an electrical demand on site?	**YES**

RECOMMENDATION

After consideration of essential plant space, access requirements and shading, it is possible to accommodate an array of 40 PV panels (with a total effective panel area of around 64 m^2).

A total approximate output of 14,663 kWh/year would be achieved by such an array. This array is illustrated in detail in **section 9.0 be green energy use.**

The system achieves **5.2%** improvement on the BER (Building Emission Rate) over the 'Be Clean' emissions rate and is a preferred 'Be Green' option for the scheme.

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SOLAR WATER HEATING

Technology Overview

Solar water heating systems use the energy from the sun to heat water, most commonly in the UK for domestic hot water needs. The systems use a heat collector, generally mounted on the roof in which a fluid is heated by the sun. This fluid is used to heat up water that is stored in either a separate hot water cylinder or a twin coil hot water cylinder inside the building.

The heated carrier fluid circulates around the system, with a pump in an active system or by natural convection in a passive system, to the hot water cylinder, which ideally should be a twin coil cylinder.

Two types of collector exist: flat plate and evacuated tube. Flat plate collector can be mounted on or flush with the roof. The air in the collection tubes can be evacuated to reduce heat losses within the frame by convection. Evacuated tube collectors need to be re-evacuated every few years. They are more difficult to install but are more efficient and allow higher temperature heating.

Technical Considerations

Solar thermal systems should be sized to the hot water requirements of the user since any excess heat that is generated cannot be exported elsewhere. The optimal angle for mounting depends on when the water demand is greatest. Ideally, the collectors should be mounted onto a non-shaded, south-facing roof.

Solar thermal collectors offer a good price-performance ratio. Solar hot water systems are best suited to developments with high hot water requirements, such as hotels, care homes and leisure centres. Many systems have been installed in the UK and they work well, even without direct sunlight.

Economic Considerations

Solar thermal technology is a cost effective way to reduce Carbon emissions, especially if it is replacing electric water heating.

Proposed Approach

DISCUSSION

As discussed in the photovoltaic panels review, the upper roof area is accessible for maintenance, and has minimal shading.

DECISION TABLE

Issue	Consideration	Response for 3-6 Spring Place
Roof Orientation	Are available roofs facing south-west to south- east (through south), or flat?	**YES**
Roof Layout	Is there sufficient un-shaded roof area?	**YES**
Hot Water Demand	Is there a year round hot water demand?	**NO**
Hot Water Storage	Is there space allowance for a hot water storage vessel?	**YES**
Conflicts/Compatibility With Other Systems	Will solar thermal conflict with other systems (e.g. CHP) which are higher up the energy hierarchy?	**NO**
	Would a solar thermal collector be compatible with the proposed heating system?	**NO**

RECOMMENDATION

As the roof area is considered suitable for the implementation of PV arrays, the opportunity to place solar thermal panels into the roof layout here is not available. Solar thermal panels are not considered appropriate for the site due to the need to provide hot water pumps and a distribution pipework running up and down from the roof.

Since the available roof space will be taken up by the installation of PV, the use of solar water heating has not been considered further.

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WIND TURBINES

Technology Background

Wind power generation is the conversion of the kinetic energy in the wind to mechanical energy, which in turn is used to generate electricity.

The energy in the wind is captured by the blades of a wind turbine, which are normally mounted on a horizontal shaft (although vertical axis turbines also exist). The wind causes the shaft to turn, which drives the electrical generator.

The size of wind turbines varies greatly, from a few hundred watts to 3 MW. Wind turbines are sized according to their rated power, that is the power output at a given wind speed, usually 12 m/s.

The relation between wind speed and power output is not linear. The energy content of the wind varies with the cube of the wind speed - twice the wind speed would give eight times as much energy. The speed of the wind increases with height above the ground, so it is therefore important to have a good understanding of local wind conditions before specifying a turbine. For larger turbines, an anemometer will have to be mounted on a mast at the site of the proposed turbine in order to have reliable wind speed and direction data over the course of a year.

On average, a wind turbine generates electricity for 70-85% of the time, although not always at the rated power. Its load factor, the proportion of a turbine's theoretical energy output over a year, is around 30%, compared to 50% for a conventional power station.

Benefits

Wind power is one of the more cost effective renewable energy technologies. For grid-connected systems, any excess electricity that is produced can be sold back to the grid. If the site is well chosen, wind power can be a reliable source of power.

Technical Considerations

Most wind turbines start operating ('cut in') at around 3-4 m/s. Larger wind turbines are viable where the average wind speed is 6-7 m/s. Smaller turbines can still produce useful amounts of electricity at an average wind speed of 4 m/s.

Turbines should be sited away from obstacles that could disrupt the wind pattern e.g. buildings, trees etc. The wind regime in urban areas is also an area of concern due to the likelihood of high wind turbulence, which will potentially reduce electricity output.

Although there is some scope for the addition of larger wind generators in some urban sites, turbines of a capacity between 1 kW and 500 kW are best suited to these locations.

Local Considerations

Planning consent is required for the installation of a wind turbine. It is important to involve the public in the consultation process. The noise levels vary from machine to machine but roof-mounted turbines, which have been specially developed to operate at low noise levels and with low vibration are now available.

In a building integrated or building mounted wind turbine system, the turbine is connected through appropriate electrical switchgear to the building's electrical system and both of these are connected to the electricity grid such that all generated energy can be used regardless of the building demand fluctuations.

Turbines rely on a minimum wind speed to 'cut in' and start generating power, but from this minimum upwards, the output increases as a cube function of the wind speed. In periods of above average wind speed, the power generated increases significantly. Since wind resource varies all the time, it is difficult to make precise calculations of the power output of a turbine. However, average figures indicate that in reasonably windy areas (average wind speed of 6 m/s or higher - this figure being generally accepted as the minimum average local wind speed to make turbines feasible) the expected output from each 1kW installed turbine capacity is about 2500 kWh annually.

To investigate the potential of using wind turbines to provide an on-site renewable energy supply, the DECC/NOABL online wind speed tool has been used to determine the average wind speed at various heights above ground level at the site.

Although the data suggests that appropriate average wind-speeds may exist onsite, accurately predicting mean wind-speeds in urban locations is rarely possible without extensive on-site testing. Urban conditions are not ideal for energy generation from turbines which usually need to operate within both minimum and maximum wind speeds and far from sources of turbulence.

Additional issues which would require investigation include structural vibration and the risk of visual discomfort to neighbours and occupants through flicker.

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Proposed Approach

DISCUSSION

Wind turbines are not specified where average wind speeds are less than 6m/s. Data from the DTI's NOABL wind speed database shows that this speed is just likely to be present on or around the site, with 4.9 m/s, 5.6 m/s, and 6.1 m/s wind speeds predicted for 10m, 25m, and 45m from the ground respectively.

DECISION TABLE

Issue	Consideration	Response for 3-6 Spring Place
Wind Speed	Is the average wind speed greater than 6 m/s at hub height?	**YES**
Clear Air Flow to Turbine	Is the area free from obstructions or topography that may cause turbulence?	**NO**
Open Land Around Proposed Site	Is there sufficient open land for a turbine to be installed?	**NO**
Distance to Nearest Property	Are surrounding properties far away enough to avoid noise disturbance?	**NO**

RECOMMENDATION

There are low wind speeds recorded at the site at heights of 10 m and 25 m above ground in the vicinity of the site, which are likely to be worsened by local obstructions to wind flow from neighbouring buildings. There is considerable evidence of urban wind turbines failing to perform to manufacturer's output estimates.

In addition, it is anticipated that a wind turbine would face significant opposition from neighbours (including local residents and Network Rail) on grounds of visual and noise impacts.

Accordingly, wind turbines are not recommended for 3-6 Spring Place.

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COMPARISON TABLE

Technology	B. Payback (see 'Economic Considerations' above)	C. Land Use (see 'Local Considerations' above)	D. Local Planning Criteria (see 'Local Considerations' above)	E. Noise (see 'Local Considerations' above)	F. Feasibility Of Exporting Heat/ Electricity From The System (see 'Economic Considerations' above)	G. Life Cycle Cost/Impact (see 'Economic Considerations' above)	H. Available Grants (see 'Economic Considerations' above)
Biomass Heating	**Variable** More expensive than conventional boilers in capital cost and ongoing fuel costs. There is no payback applicable to biomass boilers versus conventional natural gas fired boilers.	**Medium** Direct combustion systems can replace gas/oil fired boilers. Requires large fuel storage facility.	**Medium** While Planning Permission is not required for a boiler, it may be required for a boiler house, fuel silo and flue (chimney). It may also be required for any aspect of an installation where historic buildings are involved or in sensitive locations. If there is likely to be an increase in the number of large vehicle movements for fuel delivery, or fuel delivery is likely to be noisy, e.g. when blowing woodchips, Planning Permission may be required.	**Medium** Noise associated with large vehicle access for the wood pellet deliveries.	**Good** Heat can directly be used in the building.	**Good** Neutral CO_2 emission impact. However, as the site is in central London, the wood pellets will need to be delivered which will cost CO_2 emissions in term of transport.	The Renewable Heat Incentive. Under this scheme it is proposed that, like Renewable Obligation Certificates (ROCs) and the Feed In Tariff (FIT) for renewable electricity generation, a payment will be made per kilowatt hour (kWh) of heat produced.
Biomass CHP	**Variable** Payback will vary depending on the size of the CHP and fuel availability.	**Medium** Direct combustion systems can replace gas/oil fired boilers. Requires large fuel storage facility.	**Medium** While Planning Permission is not required for a boiler, it may be required for a boiler house, fuel silo and flue (chimney). It may also be required for any aspect of an installation where historic buildings are involved or in sensitive locations. If there is likely to be an increase in the number of large vehicle movements for fuel delivery, or fuel delivery is likely to be noisy, e.g. when blowing woodchips, Planning Permission may be required.	**Medium** Noise associated with large vehicle access for the wood pellet deliveries.	**Good** Heat can directly be used in the building.	**Good** Neutral CO_2 emission impact. However, as the site is in central London, the wood pellets will need to be delivered which will cost CO_2 emissions in term of transport.	The Renewable Heat Incentive. Under this scheme it is proposed that, like Renewable Obligation Certificates (ROCs) and the Feed In Tariff (FIT) for renewable electricity generation, a payment will be made per kilowatt hour (kWh) of heat produced and also per kilowatt of electricity produced.
Combined Heat & Power	**Variable** Payback will vary depending on the size of the CHP unit, for the smallest micro-CHP it can be up to 30 years, for bigger systems it will be about 5 years.	**Low** Packaged CHP will fit into the existing boiler room in the case of retrofitting. However, it is necessary to ensure that there is room for additional equipment and pipework. In the case of new build projects, site layout needs to incorporate approximately 40m2 for the boiler house (based on a 60kW system). Packaged CHP can also come in a shipping container	**Low** No planning approval required	**Low** Unit is attenuated and silenced to meet statutory levels.	**Good** Heat and electricity can directly be used on site or exported to the grid	**Good** Low carbon technology that provides a good payback in the region of five years.	None at present.

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Technology	B. Payback (see 'Economic Considerations' above)	C. Land Use (see 'Local Considerations' above)	D. Local Planning Criteria (see 'Local Considerations' above)	E. Noise (see 'Local Considerations' above)	F. Feasibility Of Exporting Heat/ Electricity From The System (see 'Economic Considerations' above)	G. Life Cycle Cost/Impact (see 'Economic Considerations' above)	H. Available Grants (see 'Economic Considerations' above)
Ground Source Heat Pumps	**Medium to Poor** 14 years with RHI, 47 years without RHI	**High** Large site area required for horizontal or vertical closed loop pipework installation which is impractical for refurbished buildings. Open loop systems require the right geology and carry a high risk when considering yield. They also need to have 80m separation between boreholes, impossible on a constrained site.	**Medium** The installation of a ground source heat pump or a water source heat pump is usually considered to be permitted development, not needing an application for planning permission. If you live in a listed building or a conservation area you should contact your council to check on local requirements.	**Low** Heat Pumps make a slight humming noise much like refrigerator and so they are best located within a basement/utility room or away from occupants. Not a significant issue. Noise can be mitigated.	**Medium** Low temperature space heating system required.	**Average** High CoPs are dependent on relatively low supply temperatures in heating mode.	The Renewable Heat Incentive. Under this scheme it is proposed that, like Renewable Obligation Certificates (ROCs) and the Feed In Tariff (FIT) for renewable electricity generation, a payment will be made per kilowatt hour (kWh) of heat produced.
Photovoltaics	**Medium to Poor** On average 8 years with feed in tariffs, 25 years without.	**Low** Installed on roof or façade areas.	**Low** No planning permission required.	**Low** No noise associated	**Good** Electricity can be used on site and/ or exported to the grid.	**Good** It will on average take 8 years for PV to pay back their initial cost, assuming the Feed In Tariff applies at the time of installation. Considering that PVs have a life expectancy of 25 years, they could pay back the capital cost several times during their life span.	Feed In Tariff. This is assumed to remain in existence, however it is time limited.
Solar Thermal Panels	**Medium** On average 10 years	**Low** Installed on roof or façade areas.	**Low** No planning permission required.	**Low** No noise associated	**Low** Heat can directly be used by the existing/ new heating system.	**Good** The energy and emissions cost of a SHW system forms a small part of the life cycle cost and can be recovered fairly rapidly during use of the equipment. Their environmental impacts can be reduced further by sustainable materials sourcing, using non-mains circulation, by reusing existing hot water stores and, in cold climates, by eliminating antifreeze replacement visits.	The Renewable Heat Incentive. Under this scheme it is proposed that, like Renewable Obligation Certificates (ROCs) and the Feed In Tariff (FIT) for renewable electricity generation, a payment will be made per kilowatt hour (kWh) of heat produced.
Wind	**Good to Poor** The payback time will depend on the size of the wind turbine. For building mounted micro wind turbines, the turbine may not be paid back within its life time. Medium wind turbines (100-850kW) will have a payback of around 7 years and large wind turbines (1MW-2.5 MW) have a pay back of around 4 years.	**Variable** Best performance in open, non-urban locations. Can be installed on, or integrated into, a building.	**Variable** Doesn't require planning approval providing that conditions as set up in the planning portal are met.	**Medium** The average wind turbine is very quiet, with indicative noise levels set at around 35-45 dB from 350m, about the same as a road 5 km away. Noise from wind in trees is louder than wind turbines at 300m.	**Medium** Electricity can be used on site and/ or exported to the grid.	**Good** The wind turbine will payback its energy cost several times within its lifetime.	Feed In Tariff.