



...sustainable building services solutions

reading international business park

energy and sustainability statement – november 2020



...sustainable building services solutions

issue information and contents...

issue information...

CURRENT ISSUE			
Author:			
Name:	Martin Lawless	File reference:	1264.003.009
Signature:		Status:	Issue Three
Position:	Technical Director	Date of issue:	4th November 2020
Checked by		Comments:	
Name:	Clark Leake-Lyall		
Signature:			
Position:	Associate Director		

PREVIOUS ISSUES				
ISSUE	DATE	STATUS	AUTHOR	CHECKED BY

DISCLAIMER

This document has been prepared by MTT Ltd for Tristan Capital Partners and Alchemy Asset Management for their sole benefit. By receiving the document and acting on it, the client - or any third party relying on it - accepts that no individual is personally liable in contract, tort or breach of statutory duty (including negligence).

COPYRIGHT AND INTELLECTUAL PROPERTY

The information within this document is the intellectual property of MTT Ltd. This document contains confidential and commercially sensitive information, which shall not be disclosed to third parties in whole or in part without written permission from a director of MTT Ltd.

contents...

executive summary...

1.0 project background...

2.0 policy background...

3.0 energy review...

3.1 methodology...

3.2 'baseline' energy use...

3.3 'be lean' energy use...

3.4 'be clean' energy use...

3.5 'be green' energy use...

3.6 summary statement...

4.0 sustainability review...

appendices

a review of planning policy and good practice...

b detailed review of LZC technologies...

c BREEAM RFO 2014 pre-assessment – main office...

d BREEAM RFO 2014 pre-assessment – the dot...

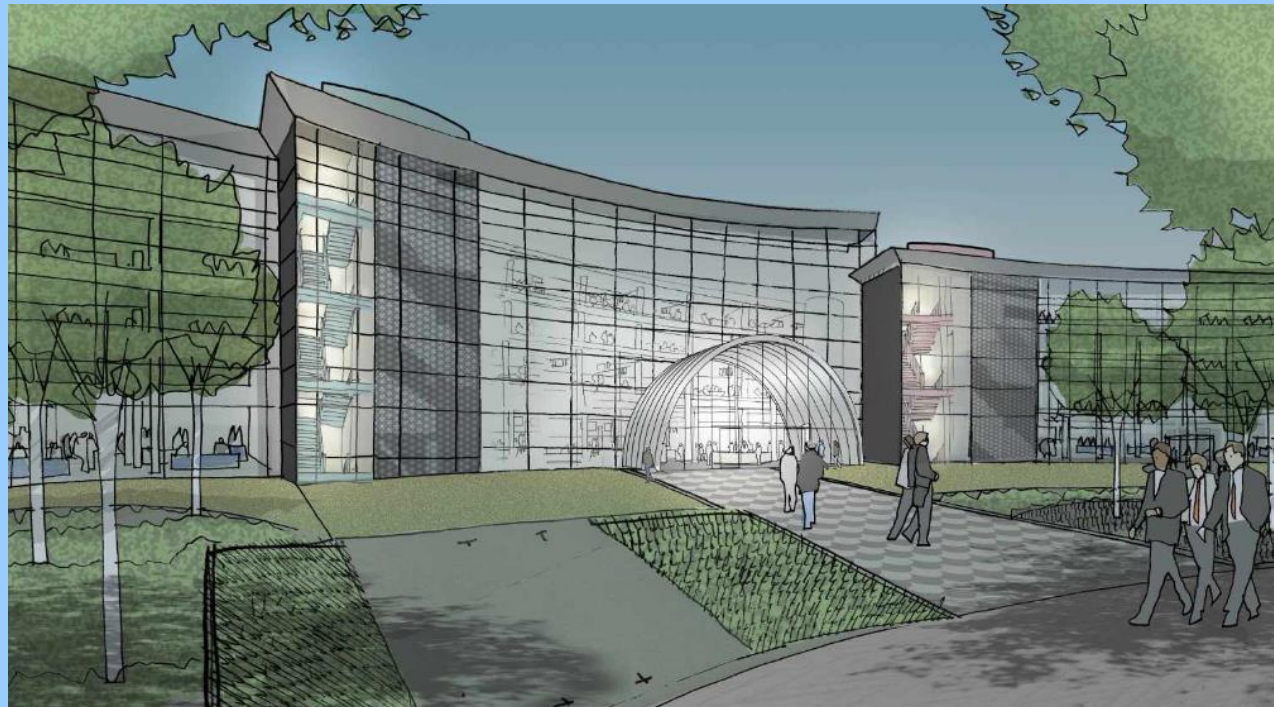
executive summary...

OBJECTIVE

This Energy and Sustainability Statement has been prepared by MTT Limited on behalf of Tristan Capital Partners and Alchemy Asset Management and forms part of a full, detailed planning application for the Reading International Business Park (RIBP) redevelopment, addressing energy and sustainable development policies of Reading Borough Council.

BACKGROUND

The proposed works encompass the refurbishment of vacant building elements to provide offices and co-working space, a range of amenities (cafe, shower/locker and cycling facilities), and improvements to external hard and soft landscaping. The redevelopment aims to transform the site by introducing high quality, prominent and contemporary architecture delivered to new environmental standards, promoting the health and well-being of the occupants.



Architects Sketch of Proposed Reading International Business Park Building

The scope of the refurbishment works encompasses the main office's vacant areas and its common areas and the Dot.

The proposed redevelopment of Reading International Business Park seeks to ensure that the highest levels of energy efficiency and sustainability (in a social, economic and environmental sense) are attained for a scheme of this nature. The works will also provide a range of economic, social benefits, will protect and enhance the environment, and will permit the mitigation and adaptation to the effects of climate change.

APPROACH

The proposed development supports the sustainability objectives of both local and national policy to address the Climate Emergency as declared by Reading Borough Council.

Planning Policy issues highlighted in the Reading Borough Council Local Plan (2019) and the Sustainable Design and Construction SDP (2019) indicate the Council's development aspirations on the subject areas of sustainable design and construction and energy and have informed the redevelopment proposals for RIBP and this energy and sustainability statement

This statement addresses the proposed refurbishment works to the main office and to 'the Dot' and considers how the objectives of sustainable development are addressed in the proposed development's design, construction and occupation, identifying measures proposed to prevent, reduce, and where possible, offset significant adverse effects on the environment.

FURTHER DETAILS

Key measures to be included as part of the Reading International Business Park development with respect to energy are summarised in **section 4.0 Energy Review** Sustainability and environmental impact measures are summarised in **section 4.0 Sustainability Review**, with relevant policy background being reviewed in **appendix a**.

The BREEAM process is reviewed (with a full Credit Trackers for the Design Stage assessments) in **appendices c (main office)** and **d (the Dot)**.

This statement should be read in conjunction with:

- Planning Statement - Carter Jonas
- Design and Access Statement - Buckley Grey Yeoman
- Landscape Report (included in DAS)- Churchman Thornhill Finch
- Waste Management Strategy, Travel Plan, Delivery and Servicing Plan and Transport Technical Note - Velocity
- Heritage Assessment – Bidwells
- Bat Survey, Preliminary Ecological Appraisal, Tree Surveys – Greengage

executive summary...

ENERGY STATEMENT

Overview

The structure of this statement and consideration of feasible measures follows the Energy Hierarchy (Use Less Energy - 'Be Lean', Supply Energy Efficiently - 'Be Clean' and Use Renewable Energy - 'Be Green') as an effective and robust framework for appraising appropriate measures to reduce carbon emissions and other climate impacts from the development.

At each stage, a full dynamic simulation model has been used to evaluate energy use and CO₂ Emissions.

Summary of Energy Strategy

ENERGY HIERARCHY STEP 1 - 'BE LEAN' - REDUCE ENERGY DEMAND

New building services plant will be provided for all refurbished areas, including high efficiency heating, cooling and ventilation systems and energy efficient lighting with occupancy/daylight control.

ENERGY HIERARCHY STEP 2 - 'BE CLEAN' - SUPPLY ENERGY EFFICIENTLY

There are no viable current or proposed community heating or cooling distribution networks near to the site. The use of CHP and CCHP has been discounted since these are not appropriate for the low overall heating and cooling demand and low seasonal heat demand within an office.

ENERGY HIERARCHY STEP 3 - 'BE GREEN' - RENEWABLE ENERGY

Various renewable energy systems have been reviewed for the redevelopment, but none were found to be technically or economically feasible. An integrated air source heat pumps (ASHP) system within the air handling units has been adopted as an appropriate strategy.

The project team are also reviewing opportunities to implement rooftop PV systems for the main office and water source heat pump integrated with the lake (as an alternative to air source heat pumps) for the Dot.

Results and Commentary

The cumulative effect of the final measures implemented is a saving of **7.2 tCO₂/m²/year** which equates to a **17.2%** reduction compared to the equivalent areas for the existing building.

This overall reduction demonstrates a significant commitment towards reducing the CO₂ emissions of the development through the incorporation of passive measures, other fabric performance improvements and efficient services.

It is considered that all feasible measures to reduce the scheme's CO₂ emissions have been implemented, particularly within the constraints of refurbishing and extending an existing building.

executive summary...

SUSTAINABILITY STATEMENT

Summary

The proposed redevelopment of Reading International Business Park seeks to ensure that the highest levels of energy efficiency and sustainability (in a social, economic and environmental sense) are attained for a scheme of this nature. The refurbishment of the main office areas and the Dot will also provide a range of economic, social benefits, will protect and enhance the environment, and will permit the mitigation and adaptation to the effects of climate change.

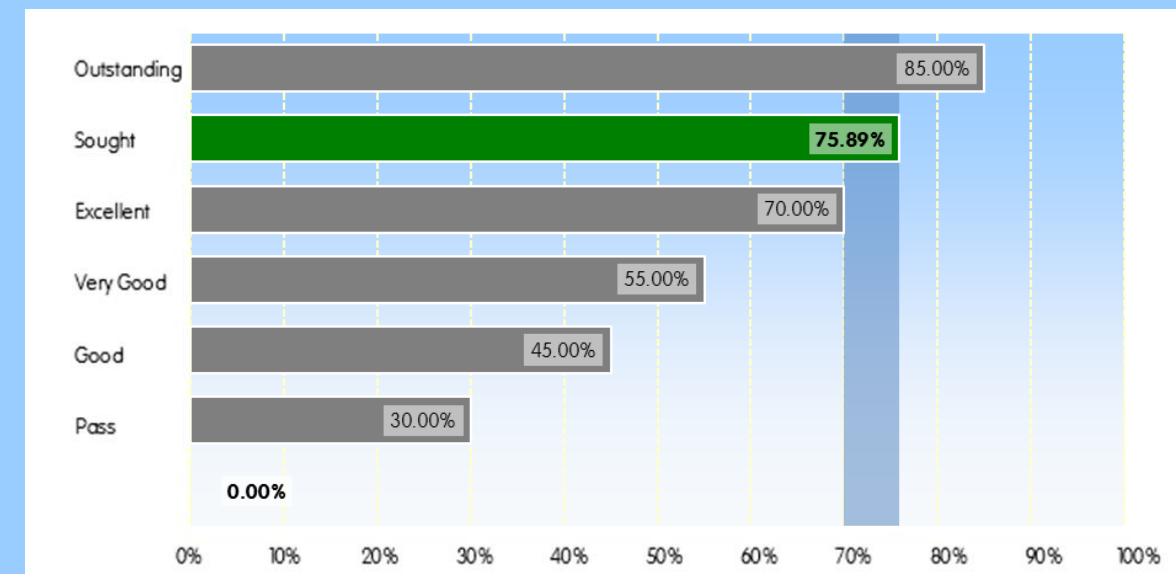
This statement addresses the relevant Planning Policy issues and accordingly follows the guidance in Reading Borough Council's Local Plan and supporting documents, which indicate the Council's development aspirations on the subject areas of sustainable design and construction and energy. It describes 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.

The project has also set a number of aims and specific goals beyond the requirements of the Reading Borough Council Local Plan/Sustainable Design and Construction SDP and BREEAM to support the global fight against climate change and provide a healthy and enjoyable environment for occupants and visitors to RIBP.

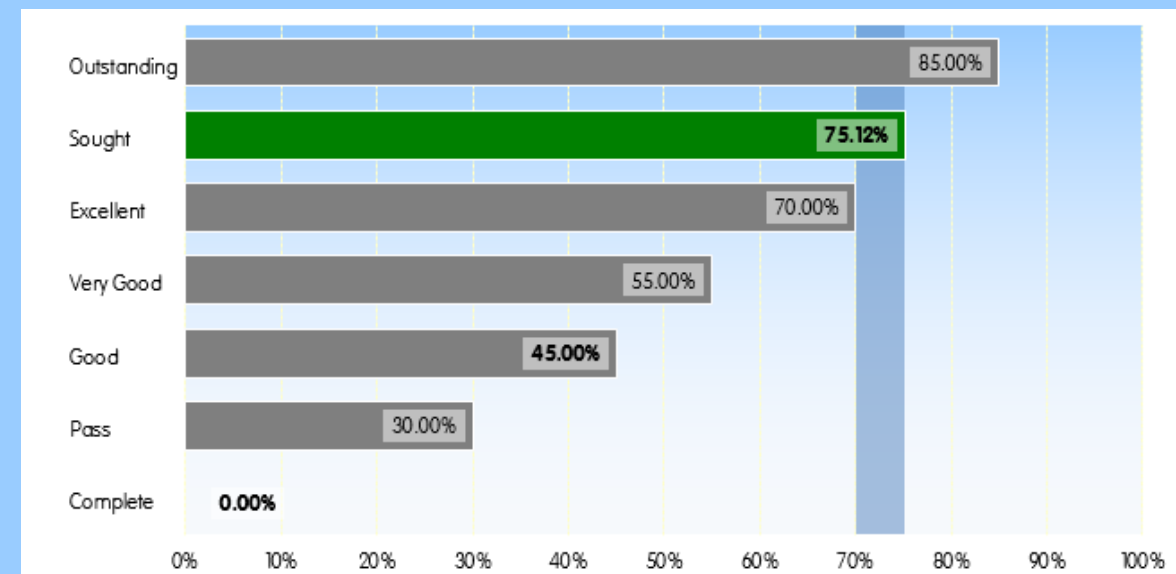
Sustainability Benchmarking

In order to evaluate the overall sustainability and measures included to mitigate the development's environmental impact, BREEAM Refurbishment and Fit Out 2014 assessments are being undertaken for the main office areas and the Dot with formal certification sought. The assessment is currently at the Design Stage, with MTT acting as BREEAM Assessor and AP.

This demonstrates that 'Excellent' ratings are achievable in each assessment, with a potential overall Credit score of 75.89% for the main office and 75.12% for the Dot, both significantly above the BREEAM threshold for 'Excellent'. Additional appointments and actions expected at the Concept Design Stage have been undertaken.



Main Office ■ Sought Score and Rating 75.89%, 'Excellent' – with ■ Margin



The Dot ■ Sought Score and Rating 75.12%, 'Excellent' – with ■ Margin

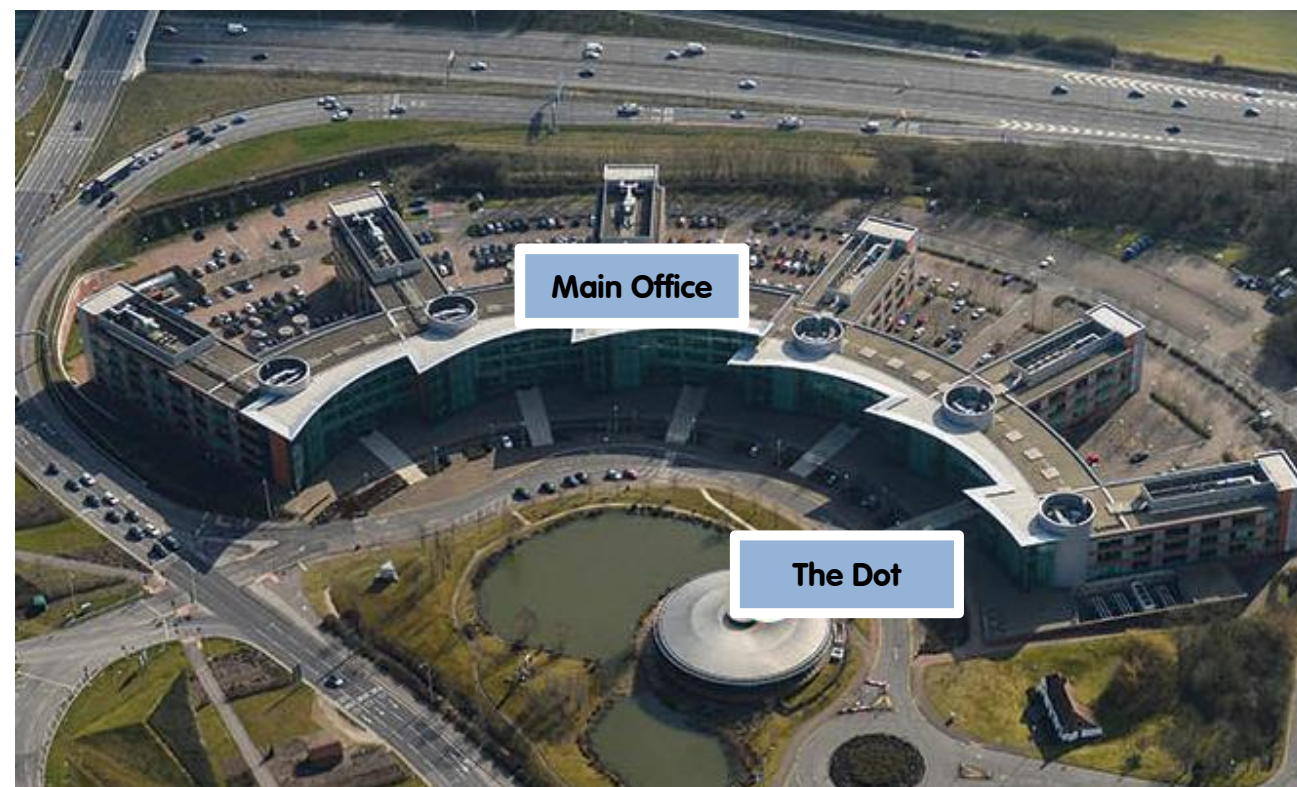
1.0 project background...

SITE BACKGROUND

This document has been prepared to review the sustainability and energy issues associated with the proposed redevelopment of the Reading International Business Park, Basingstoke Road, Reading, Berkshire, RG2 6DA. The local planning authority is Reading Borough Council.

Reading International Business Park is based around an iconic shaped office building configured in 6 blocks, designed flexibly to operate either as a landmark headquarters facility or a multi-let office campus. The property was developed over two phases, achieving practical completion in 2000 and 2001. The existing site covers an area of approximately 8 hectares. The remainder of the site comprises external ground level parking with three amenity buildings, and extensive landscaping.

The 376,587 sq. ft office is currently let to six occupiers, with around 165,000 sq. ft vacant awaiting refurbishment.



Aerial View of the Existing Site

LOCATION

Reading International Business Park is located to the South / South West of Reading Town Centre within a wider area of development around and along the A33 Basingstoke Road. It is adjacent to and to the south of Junction 11 of the M4, the key east-west motorway corridor for the region, providing access to the M25, M40 and M3 national motorway network one of the main arteries into Reading via the A33 relief road.

To the west of the Site is an undeveloped industrial plot which was originally due to be a third and final phase of Reading International Business Park. Beyond is Tesco's regional distribution depot. To the north is a built area along the A33 comprising mostly of warehouse buildings, offices, retail parks and a hotel. These developments continue along the A33 towards Reading Town Centre. Further east across the A33 is a large residential area known as Whitley Wood.

A bus stop is located on the door step at Reading International, providing a regular service from Reading town centre arriving and departing every 15 minutes at peak times (including on-ward connection to Mere Oak Park & Ride located south of the Site).



Site Location Map

1.0 project background...

EXISTING READING INTERNATIONAL BUSINESS PARK SITE DESCRIPTION

The existing Reading International Business Park site consists of a main office building with associated car parking and plant spaces. The site has been flexibly designed to operate either as a landmark headquarters facility or a multi-let office campus.

The main office is crescent-shaped building providing 376,587 sq. ft of office and storage accommodation configured in 6 blocks. The property was developed over two phases- Phase I (completed 2000): Blocks A to C arranged over ground and 2 upper floors and Phase II (completed 2001): Blocks D to F arranged over ground and 3 upper floors. The office suites are connected by 'The Street', a full height glazed curved atrium which also provides amenity outlets (cafés and convenience store). A small gymnasium is located in the basement.

Three additional buildings are incorporated in the campus: The Dot (Amenity Building): centrally located and currently offering restaurant/café facilities with a lakeside setting, a Crèche: located to the rear of the site and the Farmhouse: located adjacent to the property and currently vacant.

The property is multi let to six occupiers, with the largest tenant being Verizon, together with a number of further tenants including Investec and Aspentech. Approximately 165,000 sq. ft of the office space is vacant awaiting refurbishment.



Existing Site View

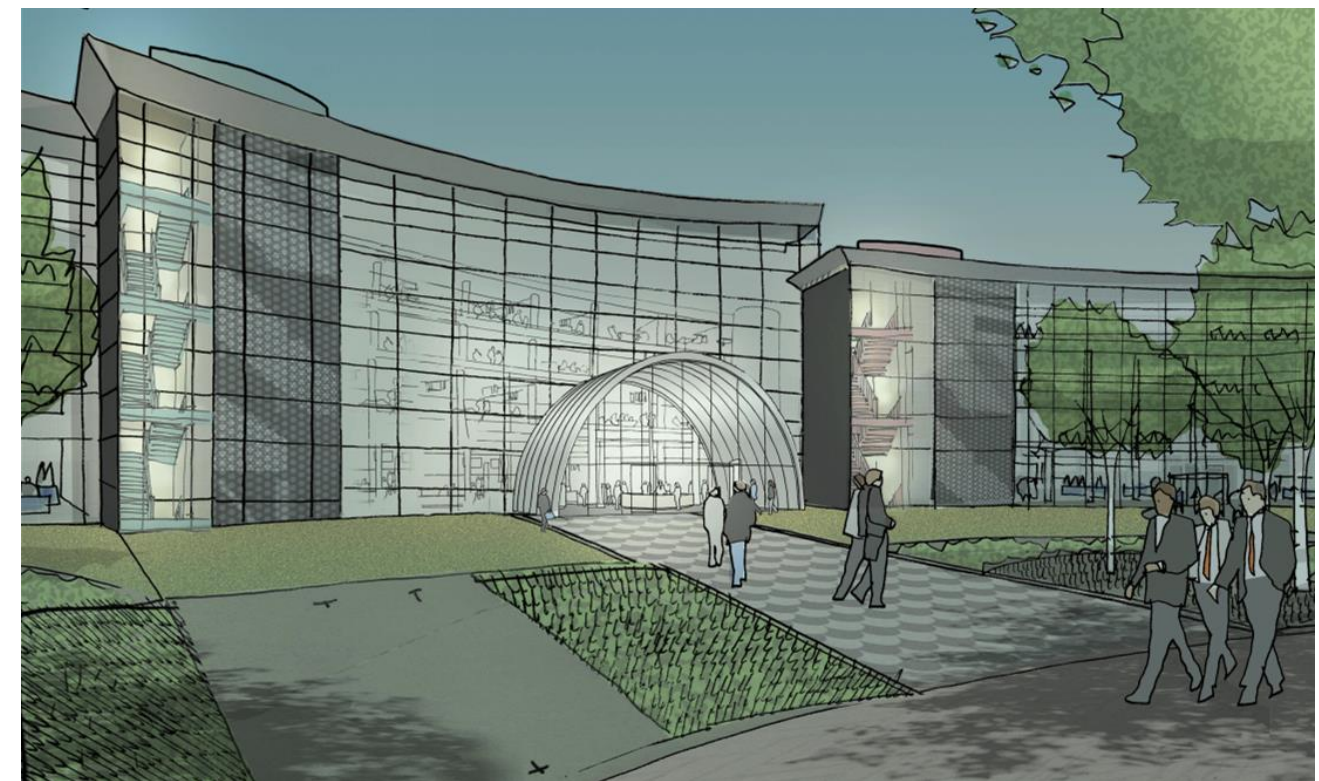
PROPOSED READING INTERNATIONAL BUSINESS PARK DEVELOPMENT DESCRIPTION

Tristan Capital Partners' and Alchemy's vision for the proposed redevelopment is to turn Reading International into the premier multi-let office building on the M4 corridor - an aspirational place to work and a 'home from home' for some 4,000 or so workers.

Alongside the major refurbishment of the offices to provide modern, contemporary space, a range of amenities such as a new workplace café, new retail provision within the street, cycling facilities, shower/locker and changing facilities, multi-purpose studio(s) suitable for events, tenant health and fitness programmes etc. will be introduced. Improvements to external hard and soft landscaping are also proposed.

The development team, is committed to ensuring that high sustainability standards are integrated into any scheme through assessing, identifying and setting objectives to improve the sustainability profile of any project over and above that of any statutory requirement. A key aim for the proposed redevelopment is meeting aspirational sustainability, wellness and energy performance targets.

All building services systems in the refurbished main office/common areas and the Dot will be replaced to provide low-energy, high quality buildings to facilitate the business operational needs of prospective tenants.



Proposed Main Office View, Showing Proposed New Entrance

2.0 policy background...

OVERVIEW

Objective

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.' (Office of the Deputy Prime Minister, 2007).

Review of Policy and Good Practice Guidance

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

The most important policies/guidance for Reading International Business Park are:

- National Planning Policy Framework and National Planning Policy Guidance - Department for Communities and Local Government (NPPF) (2019)
- Reading Borough Council's Local Plan 2019 and Sustainable Design and Construction SPD (2019)

KEY POLICIES

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

The National Planning Policy Framework (NPPF), updated in February 2019, 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 requirements.

The NPPF provides a revised and condensed approach to national planning centred on a presumption in favour of sustainable development, through three overarching objectives (para. 8):

- Economic - to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth, innovation and improved productivity; by identifying and coordinating the provision of infrastructure.
- Social – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations: To foster a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being.
- Environmental – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution and mitigating and adapting to climate change, including moving to a low carbon economy.

The NPPF is supported by The National Planning Practice Guidance (NPPG), as a resource replacing almost all previously recognised planning guidance documents with a web-based resource.

2.0 policy background...



...sustainable building services solutions

Local - Reading Borough Council's Local Plan and Related Documents

LOCAL PLAN ADOPTED NOVEMBER 2019

Overview

The Local Plan is the main planning document for Reading and replaces all three previous development plan documents. This means that the Core Strategy (adopted 2008, amended 2015), Reading Central Area Action Plan (adopted 2009) and Sites and Detailed Policies Document (adopted 2012, amended 2015) cease to be used now that this Local Plan is adopted.

This Local Plan has been prepared in accordance with the National Planning Policy Framework (NPPF), which sets out the overall national approach to planning. The Local Plan should be consistent with the principles and policies in the NPPF, including the presumption in favour of sustainable development.

Key Policies

Key policies relating to energy and sustainability are:

- CC2: Sustainable Design and Construction
- CC3: Adaptation to Climate change
- CC4: Decentralised Energy
- CC5: Waste Minimisation and Storage
- EN18: Flooding and Drainage
- TR5: Car and Cycle Parking and Electric Vehicle Charging

Policy CC2: 'Sustainable Design and Construction'

Proposals for new development, including the construction of new buildings and the redevelopment and refurbishment of existing building stock, will be acceptable where the design of buildings and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.

Policy CC3: Adaptation to Climate Change

All developments will demonstrate how they have been designed to incorporate measures to adapt to climate change. The following measures shall be incorporated into development:

- Wherever possible, new buildings shall be orientated to maximise the opportunities for both natural heating and ventilation and reducing exposure to wind and other elements.
- Proposals involving both new and existing buildings shall demonstrate how they have been designed to maximise resistance and resilience to climate change for example by including measures such as solar shading, thermal mass, heating and ventilation of the building and

appropriately coloured materials in areas exposed to direct sunlight, green and brown roofs, green walls, etc.

- Use of trees and other planting, where appropriate as part of a landscape scheme, to provide shading of amenity areas, buildings and streets and to help to connect habitat, designed with native plants that are carefully selected, managed and adaptable to meet the predicted changed climatic conditions.
- All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change

Policy CC4: Decentralised Energy

In meeting the sustainability requirements of this plan, developments of the sizes set out below shall demonstrate how consideration has been given to securing energy for the development from a decentralised energy source.

Any development of more than 20 dwellings and./ or non-residential development of over 1,000 sq. m shall consider the inclusion of decentralised energy provision, within the site, unless it can be demonstrated that the scheme is not suitable, feasible or viable for this form of energy provision.

Where there is existing decentralised energy provision present within the vicinity of an application site, further developments of 10 dwellings or more or non-residential development of 1,000 sq. m or more will be expected to link into the existing decentralised energy network or demonstrate why this is not feasible.

Policy CC5: Waste Minimisation and Storage

Development should demonstrate measures to minimise the generation of waste in the construction, use and life of buildings and promote more sustainable approaches to waste management, including the reuse and recycling of construction waste and the promotion of layouts and designs that provide adequate, well-designed space to facilitate waste storage, reuse, recycling and composting.

Policy EN18: Flooding and Drainage

Development will be directed to areas at lowest risk of flooding in the first instance, following the Sequential and Exceptions Test set out in the NPPF, and taking into account the effects of climate change. It will consider flooding from all sources, including fluvial, surface water, groundwater and sewer flooding. Where development in areas at risk of flooding is necessary, it will not reduce the capacity of the flood plain to store floodwater, impede the flow of floodwater or in any way increase the risks to life and property arising from flooding. Wherever possible, development should be designed to reduce flood risk, both on- and off-site.

All major developments must incorporate sustainable drainage systems (SuDS) as appropriate and in line with the Government's Technical Standards⁶⁴. Smaller schemes are encouraged to incorporate SuDS, where possible. Runoff rates should aim to reflect greenfield conditions and, in

2.0 policy background...

any case, must be no greater than the existing conditions of the site. Schemes should ensure that the movement of water through vertical infiltration as well as horizontal run-off does not worsen contamination effects.

Wherever possible, SuDS provision should maximise ecological benefits, link into the existing Green Network, incorporate tree planting and landscaping and avoid damage to existing significant trees, including through changes to the site hydrology. All new developments in areas of flood risk should give priority to SuDS.

Policy TR5: Car and Cycle Parking and Electric Vehicle Charging

Development should provide car parking and cycle parking that is appropriate to the accessibility of locations within the Borough to sustainable transport facilities, particularly public transport. Development should make the following provision for electric vehicle charging points:

All new houses with dedicated off-street parking should provide charging points;
Within communal car parks for residential or non-residential developments of at least 10 spaces, 10% of spaces should provide an active charging point.



...sustainable building services solutions

SUSTAINABLE DESIGN AND CONSTRUCTION SUPPLEMENTARY PLANNING DOCUMENT

Overview

The Sustainable Design and Construction SPD explains planning requirements with regards to energy, climate change, water management and waste reduction. It is intended to supplement the policies of the Local Plan, particularly those listed above.

The SPD provides a sustainable design and construction checklist that should be completed and submitted as part of the planning application in order to demonstrate how the proposals respond to a range of sustainability issues including energy/CO₂, water, materials surface water run-off, waste, pollution, health and well-being, management ecology and transport.

Energy Efficiency

This section of the SPD outlines some of the methods that may be used to meet the requirements of policies CC2, CC3, CC5 and H5. The following elements noted in the SPD are not absolute requirements, but are expected to be considered by applicants.

- Fabric Improvements
- Solar Gain
- Natural Day Lighting
- Ventilation
- Thermal Mass
- Insulation
- Green and Brown Roofs
- Green Wall and Living Walls
- Landscaping and Energy Efficiency
- Energy Efficiency Appliances

Decentralised Energy and District Heating

The SPD notes that such systems are typically applicable for proposals over 20 dwellings.

Sustainable Design and Construction Checklists

This SPD provides a sustainable design and construction checklist that should be completed and submitted as part of the planning application in order to demonstrate how the proposals respond to a range of sustainability issues including:

- Energy / CO₂
- Water
- Materials
- Surface Water Run-off
- Waste
- Pollution
- Health and Well-being
- Management
- Ecology

2.0 policy background...

READING CLIMATE EMERGENCY STRATEGY 2020-25

Reading Borough Council declared a Climate Emergency in February 2019 in recognition of the urgent actions required to prevent and mitigate further impacts of climate change. And committed to becoming a carbon neutral town by 2030.

RBC released the draft Reading Climate Emergency Strategy 2020-25 in March 2020, which has undergone public consultation. The Strategy includes the target to achieve carbon neutrality by 2030 through the following principles:

- Retrofitting and building new homes and other buildings to low/zero carbon standards
- Generating more energy from renewable sources
- Reducing the need to travel, promoting walking, cycling and public transport, and phasing out petrol/diesel in favour of electric vehicles
- Buying and using less 'stuff', reducing waste and developing Reading's 'circular economy'
- The Strategy also identifies that annual energy demands will need to be wholly met by renewable generation



...sustainable building services solutions

SUMMARY OF APPROACH

A number of policies within the Local Plan (2019) have informed the Reading International Business Park design and the development of this energy and sustainability statement as follows:

- CC2: Sustainable Design and Construction - please refer to **section 4.0 sustainability review**
- CC3: Adaptation to Climate change - please refer to **section 3.0 energy review**
- CC4: Decentralised Energy - please refer to **section 3.0 energy review**
- CC5: Waste Minimisation and Storage - please refer to **section 4.0 sustainability review**
- EN18: Flooding and Drainage - please refer to **section 4.0 sustainability review**
- TR5: Car and Cycle Parking and Electric Vehicle Charging
- Completion of Reading Borough Council's Sustainability Checklist.

The requirements of the 'Sustainability Checklist' have also been addressed within other documentation supporting this application.

3.1 methodology...

OBJECTIVE

The purpose of this section of the Sustainability and Energy Statement is to set out the considerations and methodology used in the production of the energy strategy, which have been implemented to inform design decisions for the proposed scheme.

The energy strategy responds to the Reading Borough Council Local Plan (2019) and the Sustainable Design and Construction SPD (2019)

It follows the Energy Hierarchy (Use Less Energy - 'Be Lean', Supply Energy Efficiently - 'Be Clean' and Use Renewable Energy - 'Be Green') as an effective and robust framework for appraising appropriate measures to reduce carbon emissions and other climate impacts from the development.

THE ENERGY HIERARCHY

Energy Hierarchy stage	Typical measures to be investigated
Use Less Energy - 'Be Lean'	• Reduce demand via 'fabric first' approach by improving thermal performance of envelope. • Incorporate passive heating and cooling and reduce cooling loads • Install Energy Efficient lighting and appliances. • Reduce use through behaviour change.
Supply Energy Efficiently - 'Be Clean'	• Use existing heating and cooling networks. • Facilitate future use of proposed Community Heating and cooling networks. • Use site-wide heating networks.
Use Renewable Energy - 'Be Green'	• Install renewable energy technologies on site. • Import renewable energy from off-site.

Although the development is not within London, the detailed guidance of the GLA Energy Team's Guidance Note 'Energy Assessment Guidance' April 2020 (representing best practice) has been used to establish appropriate energy performance parameters for the 'baseline' case for the building thermal model used in the hierarchy.

APPROACH

Overview

At each stage of the Energy Hierarchy consideration is given to measures which improve the energy/CO₂ emissions performance of the buildings.

Be Lean

Means of reducing energy demand energy by maximising passive and energy efficiency design measures have been reviewed and selected. This included 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, means to reduce gains and cooling energy use has 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, via connection to viable existing district heating and cooling networks are considered. This is followed by installing local community heating and cooling networks if an existing network is not available, then implementation of alternative viable low carbon technologies in a hierarchical approach.

Be Green

Low and zero carbon (renewable energy) technologies have been reviewed in detail for feasibility within the scheme, relating to the 'Be Green' element of the Energy Hierarchy.

This section is also structured to respond to the requirements for BREEAM Credit Ene 04 'Low and Zero Carbon Technologies'.

BACKGROUND

To address the requirement for a 'statement to demonstrate how the proposal will maximise energy conservation', an approach which optimises the performance of the scheme against BREEAM Credit Ene 01 Reduction of Energy Use and Carbon Emissions has been reviewed.

The calculation process for this Credit reflects improvements made at the whole building level, using building energy modelling.

3.1 methodology...

THERMAL MODEL

Overview

MTT have produced a full dynamic thermal model for the development to understand the issues around the building's energy consumption and associated CO₂ emissions and optimise the performance of the building fabric and services in this regard. This has been undertaken in accordance with the methodology for Energy Performance Certificates (EPCs) and Building Regulations Part L2 2016, by a Level 5 Energy Assessor using an accredited Dynamic Simulation Modelling compliance tool, Tas.

Regulated energy demand and consumption and the associated CO₂ emissions for the proposed development have been calculated using Dynamic Simulation Modelling ('DSM') 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 building's 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.

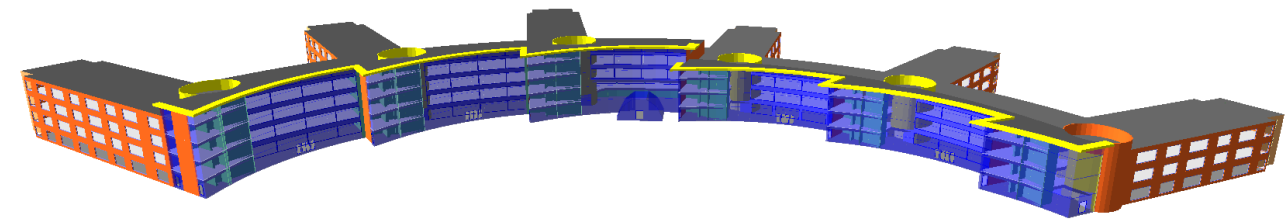
DSM uses zone specific operational profiles (occupancy, lighting, ventilation, and DHW demand) and building services performance data along with 3D building geometry and appropriate weather data to effectively model and predict the energy performance of a building.



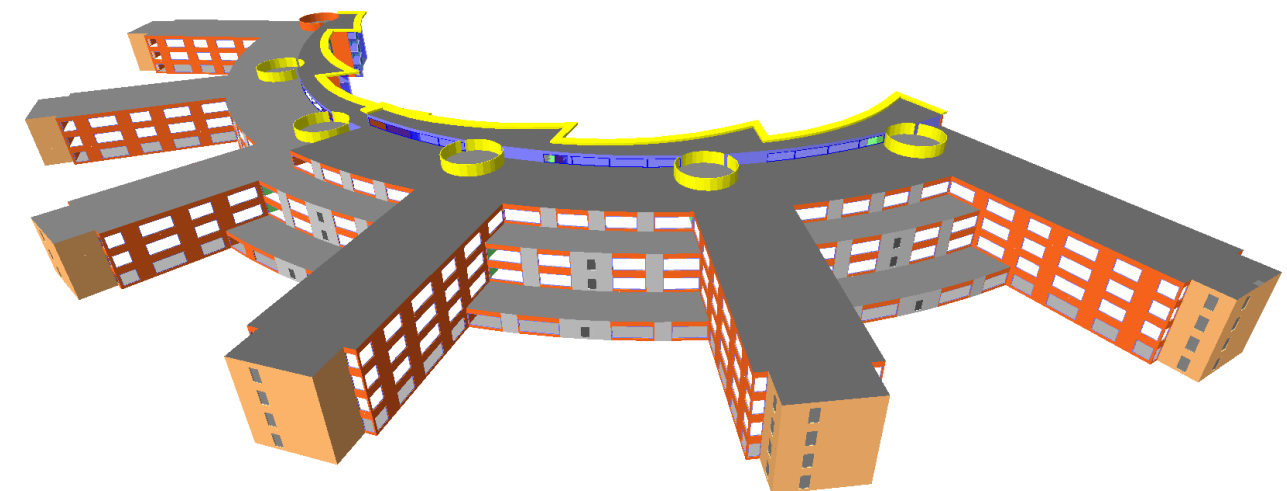
...sustainable building services solutions

Reading International Business Park Thermal Model Images

The main office building and areas under assessment 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. The images below are extracted from the Tas model demonstrating the 3D building model's indicative geometry:



Thermal Model – Whole Building Perspective Image (front)



Thermal Model – Whole Building Isometric Image (rear)



...sustainable building services solutions

3.1 methodology...

Weather Data

To accurately model the dynamic nature of the building's 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 L2 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 the case of Reading International Business Park the London TRY was applied as it is the most appropriate for the site's location.

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 v9.5.1. The version of the National Calculation methodology used was NCM v5.2.7.

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 were used to calculate the equivalent CO₂ emissions associated with different fuels. For example, 1 kWh of power from grid-supplied electricity will be associated with significantly higher CO₂ 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 2016 have been adopted throughout.

Further Details

The results presented in this document are based on the proposed building services strategy applied with the geometry shown on the architectural general arrangement and façade drawings.



...sustainable building services solutions

3.2 'baseline' energy use...

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

Existing Building Refurbishment

The CO₂ emission baseline performance has been estimated of the unrefurbished condition of the building using Building Regulations (2010 as amended) approved compliance software. The baseline for change of use applications should be estimated assuming the existing building is the same as the proposed end use.

Energy Uses

All energy uses, and not just the conventional 'regulated' loads i.e. those considered by the Building Regulations (lighting, heating, cooling and ventilation) and energy loads associated with the function of the site have been considered in the establishment of the energy profile, to ensure the optimal selection of the building services strategy and any renewable energy technology.

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

- Space heating
- Water heating
- Ventilation
- Fans, pumps and controls
- Lighting (internal)

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

- Small power (plug-in loads, such as computers, photocopiers etc.)
- Cooking and 'process' Loads (where present)
- Lighting (external)
- Lifts

To establish details of the building services systems, Building Regulations Part L refers to the Non-Domestic Building Services Compliance Guide. This document sets out the minimum requirements for items such as plant efficiencies; these have been assumed in the baseline calculations.

Regulated Energy Use

Baseline CO₂ emissions related to regulated energy use in the existing building have been established based on the current specifications of the existing building, specifically based on the Tas thermal model applying the National Calculation Methodology.

The baseline energy analysis shows that regulated energy use in the existing building is dominated by heating, lighting and ventilation.

Unregulated Energy Use

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

3.3 'be lean' energy use...

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

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

- Building orientation and shading
- Building air tightness
- Building fabric performance

The performance of the façade, especially the glazing, has a significant impact on the measures selected to improve building performance related to the building services strategy, particularly in terms of the heating and cooling systems and lighting.

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 appropriate sustainability targets - especially BREEAM
- achieving environmental comfort conditions and occupant wellbeing, buildability and avoiding unnecessary costs of construction

As the majority of the unregulated loads arise from the use of the building by the incoming tenants, the applicant has limited scope to reduce the associated energy consumption and CO₂ emissions.

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.

PASSIVE MEASURES

This is predominantly an existing building with retention of the majority of building fabric. Therefore, the scope for upgrades to building fabric are limited.

Building Orientation and Shading

The existing building will remain in situ, so passive design opportunities related to building orientation are not available.

The existing main façades will not be altered, and windows are remaining in situ, meaning the daylighting levels will be maintained as existing.

Building Fabric Performance

There are no alterations proposed for the existing building fabric other than the new office entrance arch structure. High performance façade and roof elements have been proposed for this.

FAÇADE

Glazed Elements

The façade to the new entrance to the office will target new-build standards of performance as indicated in the table below:

Element	Glazing Type	Centre pane U-value W/m ² K	g-value	Light Trans.
New façade (new entrance to office)	Solar control double glazed	1.5	0.3	62%

A good U-value and high-performance solar glazing is proposed to minimise the proportion of solar radiation admitted into the space whilst maximising the visual light transmittance. Summer heat gains will therefore be mitigated (thereby reducing cooling energy use) without compromising the potential for daylight, whilst heat losses in the winter shall be limited by improved thermal performance.



...sustainable building services solutions

3.3 'be lean' energy use...

Opaque Elements

In respect of the opaque elements of the façade the following thermal performance is proposed:

Element	Centre pane U-value W/m ² K
Curtain walling non-vision elements (excluding frames)	Overall Glass + Opaque = 1.6. Glass Only centre pane = 1.1 G-value 0.4, light transmittance 60%

Thermally broken frames should be used for the new curtain walling with a U-value no lower than 1.6 W/m²K.

ROOF

Opaque Elements

The roofs of the new entrance and the terraces will target a U-value of 0.18W/m².K, in line with Part L2A (new build) standards.

Glazed Elements

The skylights and basement gym glazing to the lightwell will target standards of performance as indicated in the table below:

Element	Glazing Type	Centre pane U-value W/m ² K	g-value	Light Trans.
Skylights	Solar control double glazed	1.1	0.4	60%
basement gym glazing to lightwell	Solar control double glazed	1.1	0.58	70%

Thermally broken frames should be used for the new curtain walling with a U-value no lower than 1.5 W/m²K.

3.3 'be lean' energy use...



...sustainable building services solutions

3.3 'be lean' energy use...

Cooling Hierarchy

OVERVIEW

The range of measures available in the building fabric is restricted for the existing building due to the minimal scope of works proposed. In contrast, the refurbished services, such as lighting replacement and inclusion of heat recovery in HVAC can contribute to the reduction in the demand.

A range of measures have been adopted in the building fabric and services design proposals to reduce the cooling demand.

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 (passive infra-red 'PIR' occupancy control) 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 very limited refurbishment works intended to the existing façade and windows
- A balance is required between the need to maximise daylighting, which has proven wellbeing benefits to occupants.
- The high-performance glazing for the new entrance will reduce the heat entering the building and the heat generated inside the building, reducing the cooling demand.

REDUCTION OF THE AMOUNT OF HEAT ENTERING THE BUILDING IN SUMMER

- The works to the new entrance of the office will include good U-values and g-values new entrance feature.

PASSIVE VENTILATION

- Due to the nature of the use of the spaces it is not feasible to allow for passive measures such as cross ventilation and passive stack ventilation.

EFFICIENT SPACE-CONDITIONING DESIGN

- A high-level Building Management Strategy is proposed for future occupants, particularly with respect to optimising the building's operation, small power loads and equipment.
- Provision will be made for different building areas to be metered and billed separately in order to encourage operational energy efficiency and responsible use of heating/cooling.
- All mechanical and electrical systems shall be specified to accommodate changing occupancy and equipment densities.

EFFICIENT MECHANICAL VENTILATION DESIGN

- Low specific fan powers are proposed for the main ventilation plant (AHUs) to improve the efficiency and reduce energy consumption from the ventilation system.



...sustainable building services solutions

3.3 'be lean' energy use...

ACTIVE MEASURES

Overview

Based on the initial 'baseline' energy calculations from the model, the project's characteristics, and operational requirements, active design measures have also been considered.

The majority of these measures relate to the building services design and the regulated loads in particular, but unregulated uses such as lifts and external lighting have also been considered. Given many of the energy end uses can only be served by electrical means, they represent significant potential for CO₂ emissions savings.

The proposed building services strategy is set out below.

Ventilation

LOW SPECIFIC FAN POWER AIR HANDLING PLANT

The current Building Regulations Part L sets stringent efficiencies for the fans used in all air conditioning systems. Recent advances in fan motor technology have resulted in substantial reductions in energy consumption, an otherwise significant proportion of building energy use.

To reduce the energy associated with the mechanical ventilation system, high efficiency fans will be incorporated into the air handling units.

The office space will be provided with minimum fresh air via the use of a single roof mounted supply and extract air Handling Unit (AHU). The external façade will be sealed with no ability for users to open windows. The AHU shall incorporate heat recovery allowing heating/cooling to be provided via the air stream. The new high-efficiency air handling units for the building shall be designed to achieve a specific fan power (SFP) of around 2.0 W/l/s.

HEAT RECOVERY

The air handling units will incorporate heat recovery systems, which transfer waste heat from the exhaust air stream to the supply air stream with a minimum efficiency of 60%.

Heating

The heat profile is as expected for an existing office, characterised by negligible heating loads in summer and relatively low loads in winter, offset by internal gains from office equipment and occupants.

The low heating demand in the offices will be provided by local electric means, via the air source heat pumps within the displacement air handling units (with heat recovery system). This is considered an appropriate means of addressing the low demand as it recognises the higher efficiency of electric heat vs gas boilers. This will be supplemented with electric perimeter heating.

Furthermore, it eliminates the distribution losses associated with pumping LTHW around the building from the boilers and will benefit from the decrease in the carbon intensity of grid electricity now and in the future as the grid continues to decarbonise.

The systems will comprise of a dedicated air handling unit located at roof level within the respective plant enclosure. The displacement AHUs will comprise of intake and exhaust air motorised dampers, fresh air intake panel and bag filter, return air filter, inverter driven twin supply and extract fans, thermal wheel heat recovery, integral reversible heat pump complete with heating/cooling coil, compressors and bypass.

Future space provision will be included in all AHUs for additional filters to achieve the relevant WELL assessment indoor air quality requirements if necessary.

Water Heating

The hot water requirements for the building will be generated from localised electric unvented hot water heaters.

Cooling

Due to the commercial demands of an office scheme such as this, the cooling strategy is to deliver occupant comfort at all times via active cooling. The only areas that are not currently expected to require mechanical cooling are toilets and plant/equipment rooms.

A number of options exist to provide mechanical cooling to buildings efficiently. The cooling requirements of Reading International Business Park shall be served via the integrated air source heat pump system within the air handling units. The mechanical services are being designed to a Cat A fit-out. installed and commissioned based on a notional open plan layout.

The reception and other common areas shall be provided with a mixture of trench heating and two pipe fan coil units to maintain temperature during the winter and to condition the occupied zone during the summer months.

Thermal Zoning and Controls

The building services strategy will incorporate appropriate thermal zoning allowing for individual temperature control for different areas of the building as required. In particular, different temperature set points will be available for internal and perimeter zones of the building.



...sustainable building services solutions

3.3 'be lean' energy use...

Lighting

Lighting to all spaces will be replaced with LED. The best available technology will be specified considering the whole life cost of the system (i.e. low energy, low maintenance, and long-life fittings). The lighting should be designed to achieve a lighting efficacy of around 2.0 W/m²/100 lux. Lighting levels will be specified in line with the recommendations of CIBSE and BREEAM, which lower the levels of lighting required compared to the previous standards.

Lighting zones and controls will be provided as appropriate to cater for different operational needs throughout the building, to allow an appropriate level of lighting to be selected at different periods in order to minimise energy consumption.

Lighting in office areas will be controlled via a programmable lighting control system with daylight control. Lighting in back of house areas will be controlled via local manual light switches and/or presence detectors (Passive Infra-Red, 'PIR' sensors).

External lighting, where provided car park/external areas, will be specified to use energy efficient fittings with metering and timers/controls to allow optimal energy management.

Building Management System

A Building Management System (BMS) shall be provided to control and monitor all building services. The BMS will allow energy monitoring and efficient control of the mechanical and electrical services systems.

The BMS will highlight any 'out of range' consumption figures and readings, allowing a preventative approach through interrogation and resolution of potential problems. The central energy generation and distribution systems will include continuous monitoring and reporting of the operating parameters to ensure that the systems are running to their peak 'as designed' efficiencies.

All relevant building staff will be appropriately trained on how to efficiently monitor and operate the BMS (please refer to the commentary below on Occupant Training and Awareness).

Sub-Metering of High Energy Consuming Uses and Zones

Energy metering of high consuming loads – heating and cooling, fans and pumps, lighting and small power etc. shall be provided throughout the building to allow for efficient management. All sub-meters shall be connected to the BMS.

The services strategy will include sub-metering of energy usage on all floors (per future tenancy/functional area). This will allow building the occupants and facilities managers to view and interrogate where potential energy savings can be made throughout the building.

Other unregulated but high consuming loads such as lifts and external lighting shall also be metered and monitored by the BMS.

Project Completion and Handover

OVERVIEW

Beyond the specification of specific systems, to ensure long-term energy efficient operation of the building, there is a need to ensure that the building services systems are delivered to the incoming occupant in fully commissioned order and the occupant has a good understanding of the systems and their maintenance needs.

COMMISSIONING

A full commissioning process will be undertaken and incorporated into the project programme, with time allowed for adjusting and monitoring equipment as necessary, to ensure that the building services systems and their controls are configured and tuned to operate at their maximum efficiency.

OCCUPANT TRAINING AND AWARENESS

This Energy Statement proposes a number of technologies, which may be unfamiliar to the staff responsible for daily operation of the building. To realise the potential of the design fully, a good and complete initial asset handover to occupants and/or their facilities managers is essential.

To achieve an efficient handover, the contractor will be required to identify a schedule of training for the relevant operational staff covering:

- The design strategy
- Installed systems and key features (maintenance, operation, replacement, and repair)
- Training responsibilities.

3.3 'be lean' energy use...

KEY ISSUES

The following tables summarise the review of potential 'Be Lean' energy efficiency technologies which will be incorporated into the proposed refurbishment of the existing building as well as the proposed new entrance.

It indicates whether they are considered viable and summarises reasons for either discounting them or recommending them for the proposed development.

Energy Hierarchy Stage	Technology	Viability	Commentary	CO ₂ reduction Tonnes/annum	CO ₂ Reduction %
Be Lean	Orientation and Shading	ALREADY PRESENT/FIXED	The orientation of the building is fixed and solar control shall be achieved highly performing solar control glazing reducing the heat gains while simultaneously allow visible light to penetrate through high light transmittance.	SEE TOTAL BELOW	SEE TOTAL BELOW
	Building Fabric	ALREADY PRESENT/FIXED	For the new entrance to the office, high performance building fabric with high performance solar double glazing, low U-values and low air permeability rates, which exceed the Part L 2016 requirements, will minimise uncontrolled heat losses and gains.	SEE TOTAL BELOW	SEE TOTAL BELOW
	Ventilation Efficiency	YES	High efficiency AHUs shall be provided to achieve a specific fan power (SFP) of 2.0 W/l/s or lower. Air handling systems will incorporate heat recovery systems. These transfer waste heat from the exhaust air stream to the supply air stream resulting in energy savings. Heat recovery with a minimum efficiency of 80% shall be specified. Air handling systems will incorporate heat recovery systems. These transfer waste heat from the exhaust air stream to the supply air stream resulting in energy savings.	SEE TOTAL BELOW	SEE TOTAL BELOW
	Heating Efficiency	YES	An integrated air source heat pump system within the air handling units shall be specified. For the purposes of the 'Be Lean' analysis, the proposed heating system shall be gas boilers, as in the existing services installation. This is also in accordance with the GLA Guidance Note section 8.8.	SEE TOTAL BELOW	SEE TOTAL BELOW
	Cooling Efficiency	YES	For the purposes of the 'Be Lean' analysis the assumed cooling system for the building shall be 'electrically powered equipment', i.e. a conventional chiller, as in the existing services installation. This is in accordance with the GLA Guidance Note section 8.8.	SEE TOTAL BELOW	SEE TOTAL 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 building.	SEE TOTAL BELOW	SEE TOTAL BELOW
	Metering	YES	The services strategy will include metering of end energy uses for the whole building.	SEE TOTAL BELOW	SEE TOTAL BELOW
	Unregulated Loads	YES	Energy efficient lifts and external lighting.		
	TOTAL		Note – This total does not include for energy efficiency measures for unregulated loads	7.2 Tonnes/m²/Ann.	17.2%

3.4 'be clean' energy use...

OBJECTIVE

This section of the energy strategy reviews 'Be Clean' low carbon energy supply opportunities in order to provide further reduction in the building's CO₂ 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 CO₂ 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
- District heating networks
- Community (site wide) heating networks

Since the development will include no demolition, and no changes to the basement structures, with limited works to the facades, there is very limited opportunity to provide connections to the 'Be Clean' options above.

WASTE HEAT SUPPLY

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

As no local source of waste heat from buildings or industrial processes has been identified for the site, the use of waste heat is not feasible.

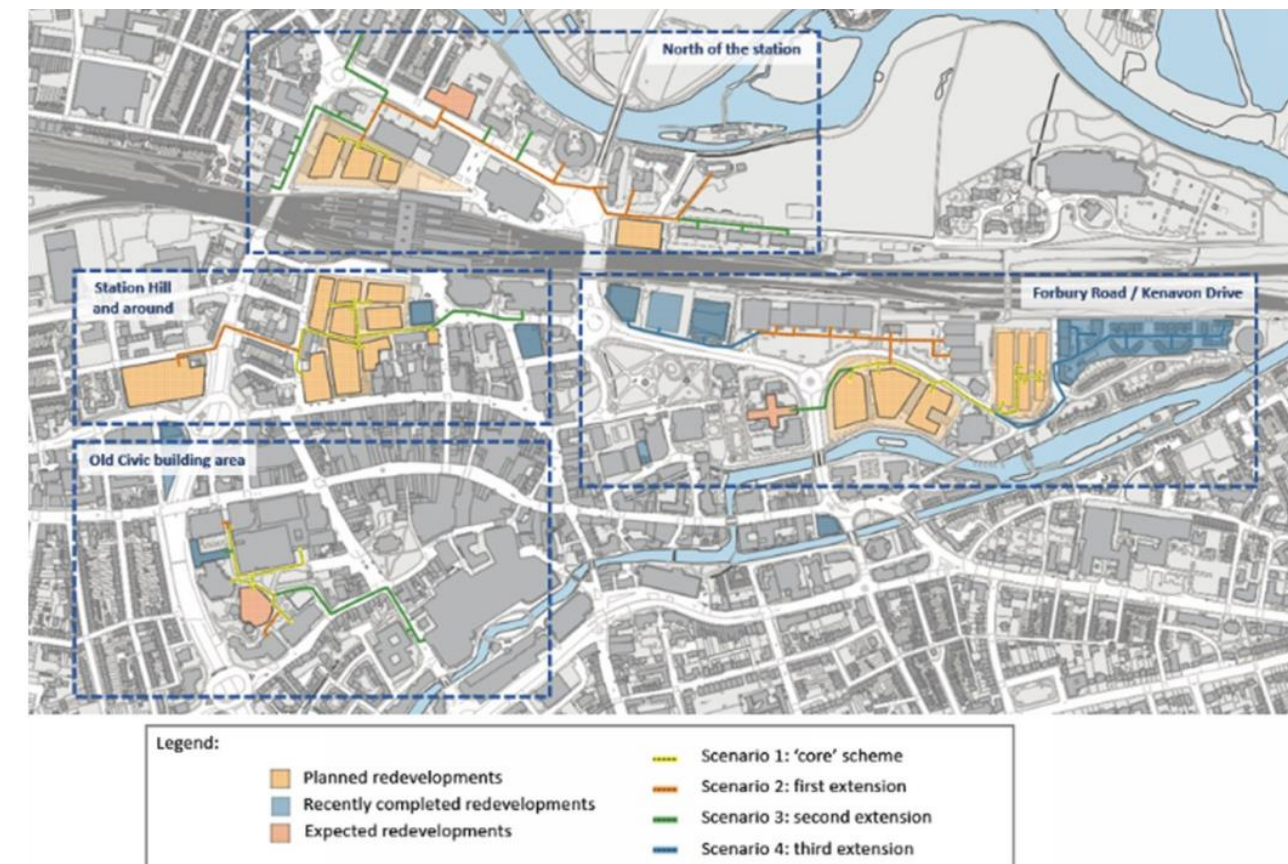
DISTRICT HEATING NETWORKS

Potential approaches include connecting the scheme to existing (mostly CHP-led) 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.

A preliminary review to assess the feasibility of connecting into a local district heat network has been undertaken. An existing office building's energy demand profile has a relatively low heating demand (for hot water as well as space heating) and so connection into a local district heat network, even if potentially feasible, would not provide an effective way to lower carbon emissions of the scheme.

Existing and Future Heat Networks

A preliminary assessment of the site and surrounding area has not identified any existing or future heat networks in proximity to the site.



Based on this the low heat demand in this existing building, and the limited scope of works to the basement, it is not considered feasible to connect to a heat network and further consideration is not proposed.

3.5 'be green' energy use...

OBJECTIVE

This section of the Energy Statement reviews 'Be Green' renewable technologies in order to provide further reduction in the building's CO₂ 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 within this section, considering the technology's technical background and its potential for integration within the development, alongside the overall CO₂ emissions savings possible.

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

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
- Photovoltaic panels
- Solar thermal hot water heating
- Wind power
- Micro hydro

DETAILED FEASIBILITY STUDY

To provide further background on renewable (or 'Low and Zero Carbon' – 'LZC') technologies and support the BREEAM RFO 2014 assessments, a detailed assessment has been carried out to determine which technologies are technically feasible on the site. This may be found in **appendix b**, 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 application in the development:

- 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

The author of the feasibility study fulfils the requirements of BRE's definition of 'appropriately qualified' energy expert.



...sustainable building services solutions

3.5 'be green' energy use...

PROPOSED APPROACH

Background

Technologies eligible to contribute to achieving the requirements of this issue must produce energy from renewable sources and meet all other ancillary requirements as defined by Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC www.eur-lex.europa.eu/en.

Air source heat pumps can be considered as a renewable technology when used in heating mode, as detailed in Annex VI of Directive 2009/28/EC for more detail on accounting for energy from heat pumps.

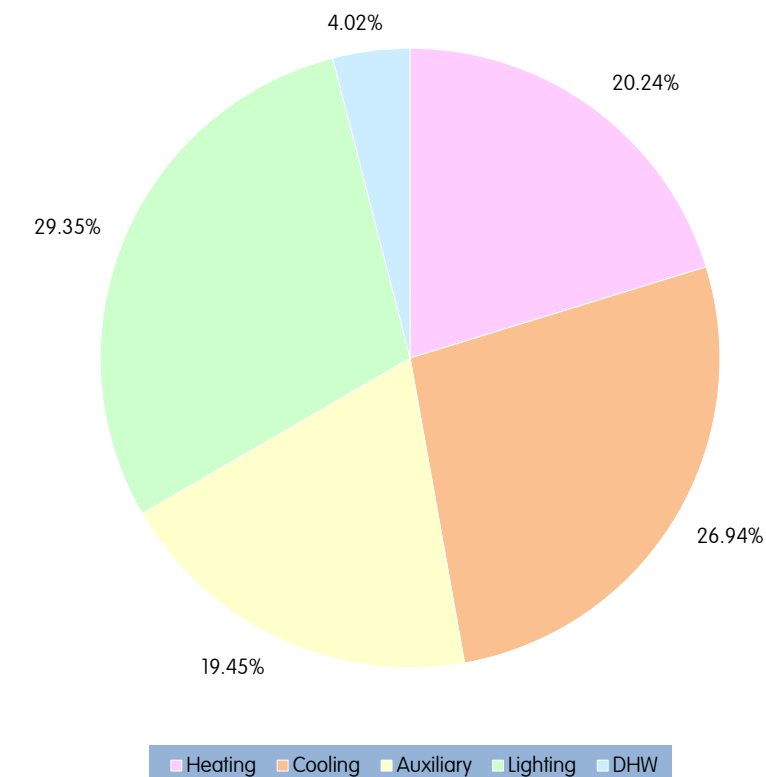
Since the services strategy for Reading International Business Park is based on a VRF heating and cooling system, the total heating end energy use in the building may be attributed to renewable energy.



...sustainable building services solutions

Analysis Undertaken

To establish the proportion of the energy requirement provided by renewable sources, the heating, cooling and auxiliary (i.e. fans, pumps and controls) energy demands have been identified in the thermal model:



Energy Demand, kWh/m² for Different End Energy Uses in a Typical Office *Source CIBSE Guide F(

As it has been shown that the heating element of the air source heat pump system accounts for over a quarter of the building's energy demand (and more when the heating contribution to the pumps and controls auxiliary energy are taken into account, it may be concluded that the proposed works maximise renewable energy use.



...sustainable building services solutions

3.5 'be green' energy use...

SUMMARY

The following tables summarise the review of potential 'Be Green' renewable energy technologies for the proposed refurbishment of the existing buildings and the new office entrance in the detailed feasibility study (in **appendix b**). It indicates whether they are considered viable and summarises reasons for either discounting them or recommending them for the proposed development.

Energy Hierarchy Stage	Technology	Viability for Inclusion	Commentary	CO ₂ reduction Tonnes/annum	CO ₂ Reduction %
Be Green	Fuel Cells	NO	Fuel cells may be considered to be a renewable energy technology if the equipment is operated using fuel generated renewably (e.g. from a geothermal source, or Community Heating network, or from process waste heat). Since no process waste heat is available on or near to the site, fuel cells would not be an energy-efficient technology for the proposed development. Fuel cells are not considered a technically feasible or economically feasible technology for this type of development and are not recommended.	n/a	n/a
	Ground Source Heating and/or Cooling	NO	Ground source heat pumps can be used in a range of building types to provide low-carbon heating (and/or cooling). Since the site is landlocked and has a relatively small footprint, there shall be insufficient space for a horizontal ground loop and insufficient capacity from vertical ground loop and so the technology is not recommended. In addition, no below ground works are proposed as part of this project.	n/a	n/a
	Air Source Heating	YES	Integrated air source heat pump (within the air handling units) will serve the heating requirements of the buildings.	Included in 'Be Lean'	Included in 'Be Lean'
	Photovoltaic Panels	YES	Solar photovoltaic systems can be installed on the roofs of buildings to make a contribution to the energy demand from electrical systems, in particular common areas lighting and office equipment.	To be confirmed	To be confirmed
	Solar Thermal Hot Water Heating	NO	Solar thermal hot water systems can be installed on the roofs of buildings to make a significant contribution towards energy demand from domestic hot water systems. Due to the reasons mentioned for photovoltaic panels, solar thermal panels are also discounted for the development.	n/a	n/a
	Wind Power	NO	Wind turbines, in the right setting, can be an effective and highly visual contributor to electrical energy demand, providing a significant carbon saving. There is considerable evidence of urban wind turbines failing to perform to manufacturer's output estimates. Significant integration issues also exist and consequently wind turbines are not recommended.	n/a	n/a
	Micro Hydro	NO	Where a local watercourse exists on or near the site, the energy dissipated by falling water can provide a significant contribution to electrical energy demand. Micro-hydro generation is not appropriate for this urban development due to a lack of hydro resource and is not feasible.	n/a	n/a
	TOTAL		Note – This total does not include for energy efficiency measures for unregulated loads	Included in 'Be Lean'	Included in 'Be Lean'

CONCLUSION

From the analysis set out in **appendix b**, it has been identified that integrated air source heat pumps within the air handling units are the most appropriate low or zero carbon/renewable technology for the refurbishment of Reading International Business Park. These have already been included in the 'Be Lean' stage.



...sustainable building services solutions

3.6 summary statement...

ENERGY PERFORMANCE FOR BREEAM

Analysis Undertaken

In BREEAM RFO 2014, the score for Credit Ene 01 reflects how much of a building's potential for improvement is achieved. The building thermal model is used to generate building energy performance data for three parameters:

- Heating and cooling energy demand
- Primary energy consumption
- CO₂ emissions

The design team modelled the refurbished area of the building 'as is' prior to the proposed works, as would be done to generate an EPC rating. This exercise was repeated for the refurbished area using the proposed building specification.

The 'before' and 'after' performance against each of the three parameters was above combined to determine the Energy Performance Ratio for Non Domestic Refurbishment (EPR_{NDR}) against which Credit Ene 01 is scored.

The process of generating the EPR_{NDR} takes into account:

- The potential for improvement by comparing the existing building performance to the average performance of the existing building stock
- The potential for improvement to be achieved by undertaking the proposed refurbishment works

The methodology is intended to recognise that there is a large variation in the performance of the existing building stock, and as such, it will be easier to make improvements in energy performance for some buildings and more difficult for others.

Conclusion

It has been shown that an overall area-weighted score of 7 Credits – (exceeding the mandatory requirement of 6 Credits to achieve a BREEAM 'Excellent' rating) is achievable for both the main office areas and the Dot. It may be concluded that the proposed works maximise energy conservation.

This demonstrates that appropriate measures are being applied to optimise energy use and reduce CO₂ emissions in each part of the main office areas and the Dot.



...sustainable building services solutions

4.0 sustainability review...

OVERVIEW

MTT 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 proposed redevelopment of Reading International Business Park seeks to 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.

This review seeks to demonstrate to Reading Borough Council that planning policies relevant to sustainability have been addressed in a structured and comprehensive manner by the proposals in the planning application.

The scheme responds to a number of sustainability drivers, including national and local planning policies but also encompassing the applicant's own Sustainability aspirations. The environmental and sustainability credentials of the proposals are verified by the predicted BREEAM Refurbishment and Fit Out 2014 'Excellent' ratings for the main office areas and the Dot, as reviewed in **section 4.0** and **appendices c** and **d**.

KEY INITIATIVES

Management

- The construction will be managed in an environmentally and socially considerate manner, mitigating environmental impacts.
- Compliance with the Considerate Constructors scheme will help to ensure on-site environmentally responsible behaviour.
- Construction related transport will be managed through a Construction Environment Management Plan.

Energy

- As it has been shown that a score of 6 BREEAM Energy 01 Credits – mandatory to achieve a BREEAM 'Excellent' rating – is achievable for the scheme it may be concluded that the proposed works maximise energy conservation.
- It has been shown that the heating energy use (served by the air source heat pump system) accounts for over a quarter of the building's energy demand
- Cooling and Heating will be provided using air source heat pump systems with block by block air handling units.
- The potential for incorporating renewable technologies has been investigated in line with the methodology of the RBC Sustainable Design and Construction SPD.

Transport

- The site is supported by good transport links including numerous bus stops and railway stations, within reasonable walking distance of the site.
- The provision of cycle storage spaces in excess of the expectations of BREEAM RFO 2014 (174 long stay cycle parking spaces (75% two-tier racks, 5% enlarged cycle spaces, 10% foldable bike lockers, 10% Sheffield stands) and electric cycle parking is proposed to encourage the use of this more sustainable form of transport.
- 60 electric vehicle charging points (over 5% of the total car parking) are to be provided, with a further 60 spaces identified for passive provision for future conversion.

Water

- Water meters shall be installed for the main office and the Dot and sub-meters for any area of high water use to help monitor and potentially reduce operational water use.
- Water efficient fittings are proposed throughout including the installation of dual flush WCs, spray taps and low flow showers - Water consumption shall be reduced in line with the BREEAM's recommendations.
- Light fittings in toilets controlled by PIR sensors and linked to a solenoid valve to prevent waste water from minor leaks.

Materials

- The majority of building materials shall 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 also have a global warming potential (GWP) of less than 5 and an ozone depleting potential (ODP) of zero.
- Responsible sourcing of materials shall be encouraged throughout the development; 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.
- Consideration will be given to locally sourcing materials where possible to reduce site related transport emissions.

Waste

- Construction site waste shall be reduced through the formulation and implementation of a construction Site Waste Management Plan. This will include procedures and targets for reducing the overall amount of waste generated and recycling a high proportion of the waste that is generated.
- Construction waste, where possible, shall be segregated into at least five categories for recycling in line with the requirements established by WRAP.
- Recycling by occupants during occupation shall be encouraged through the provision of dedicated central recyclable waste storage facilities

Land Use and Ecology



...sustainable building services solutions

4.0 sustainability review...

- There will be no loss in the quality and quantity of biodiversity by this development as the site was previously developed, planting trees and making communal garden. And, the development will make a contribution to biodiversity on the site in the course of design development.
- 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 guidance.

Pollution

- Measures shall be implemented on site during demolition and construction to prevent air and water pollution, to include such measures as regular damping down of roads and the use of dustsheets.
- Artificial light pollution shall be prevented through compliance with the Institute of Lighting Engineers guidelines.

Innovation

WIDER SUSTAINABILITY AIMS

- The project has set a number of aims and specific goals beyond the requirements of the Reading Borough Council Local Plan/Sustainable Design and Construction SDP and BREEAM to support the global fight against climate change and provide a healthy and enjoyable environment for occupants and visitors to RIBP.
- Please refer to the 'Wider Sustainability Aims' commentary in this report for details
- The themes and aims of these initiatives are:
 - Transport - To promote more sustainable forms of transport, and futureproof the development for expected uptake in electric vehicle use
 - Health and Wellbeing - To ensure that best practice comfort levels are provided, and wellbeing is promoted for building users.
 - Environmental Certification - To meet sustainability aims beyond those captured within other sections.
 - Energy and Carbon Reduction - To reduce the operational carbon emissions associated with the main office areas and the Dot and to contribute to the route to net zero carbon.
 - Circular Economy - To reduce waste and the embodied carbon emissions over the buildings' life cycles.
 - IT and Digitalisation - To Ensure best-practice levels of connectivity, energy efficiency and user comfort.
 - Ecology - To protect and enhance the ecological value of the site
 - Social Value - To incorporate social value within the design, construction, and operation of the development to improve societal outcomes.

4.0 sustainability review...

SUSTAINABILITY CHECKLIST

Overview

Reading Borough Council's Sustainable Design & Construction SPD (2019) includes a 'Sustainable Design Checklist' for non-residential developments that is expected to be completed and submitted with planning applications to demonstrate how the proposals respond across a range of sustainability issues.

The requirements of this checklist have been addressed within this Energy and Sustainability Statement and other documentation supporting this application, however, a summary of the responses is presented below. A number of these responses refer to Credits sought as part of the BREEAM assessments being undertaken for the main office areas and the Dot.

Management

AIM

To recognise and encourage environmentally and socially considerate development.

QUESTIONS

1. Will guidance for the non-technical building user be provided so they can understand and operate the building efficiently and understand how the design reduced the overall environmental impact of the building and raise environmental awareness?

Yes, a Building User Guide shall be provided in accordance with BREEAM Credit Man 04 'Building User Guide' for each element of the redevelopment.

2. What consideration has been given to resource use, energy consumption and pollution in terms of the construction site impacts?

A Construction Environmental Management Plan (CEMP) will be developed by the Main Contractor(s) once appointed.

Construction site impacts will be monitored and reported in accordance with BREEAM Credit Man 03, with the Main Contractor expected to operate an environmental management system (EMS) covering their main operations (to ISO 14001/EMAS or equivalent standard in compliance with BS 8555: 2003). The site will also be registered with the Considerate Contractors Scheme and target a score of at least 40.

3. Will site investigation and appropriate remedial action be undertaken?

This consideration is not applicable to the redevelopment of RIBP, as the works consist of the internal refurbishment of existing buildings.



...sustainable building services solutions

4. Will the community and stakeholders be involved in the design process encouraging flexibly designed buildings which cater for shared use with the local community?

This consideration is not fully applicable to the redevelopment, as the works consist of the refurbishment of existing buildings on a business park site. However, the facilities in the landscaping and the Dot will be enhanced to allow flexible use, catering for the various needs of staff and visitors to the business park.

5. How has the building been designed to reduce the opportunity for and the fear of crime?

Building-specific Security Needs Assessments (SNAs) have been undertaken in support of the BREEAM assessments (For Credit Hea 06 Security) for the main office areas and the Dot, undertaken by an independent and suitably qualified security specialist. The SNAs are intended to identify effective measures to promote safe and secure use and access to and from the buildings and site.

6. What consideration has been given to the maintenance of the building?

A full Planned Preventative Maintenance regime exists for all elements of the site and the design process has worked to extend the scope of this to suit the refurbished elements.

Health and Well-being

AIM

To ensure a good quality amenity level is afforded to occupants of buildings.

QUESTIONS

7. How has the development been designed to ensure users have sufficient daylight, an external view, adequate and appropriate lighting, ventilation, air quality and drinking water?

This consideration is not applicable to the redevelopment of RIBP, as the works consist of the internal refurbishment of existing buildings with fixed floor plate sizes and window provision. Ventilation provision will be in accordance with best-practice guidance (CIBSE and British Council for Offices) to ensure a high quality internal environment.

4.0 sustainability review...

Energy

AIM

To conserve energy and maximise the use of energy efficiency techniques.

QUESTIONS

8. How has the building been designed to minimise CO₂ emissions associated with their operational energy consumption?

The refurbishment works proposed for the main office areas and the Dot incorporate a number of fabric and energy efficiency measures and ASHP to minimise carbon emissions. Please see **Section 3** (energy review) for further details. The project team are also reviewing opportunities to implement rooftop PV systems for the main office and water source heat pump integrated with the lake (as an alternative to air source heat pumps) for the Dot

9. How has the development been designed to optimise the use of the energy from the sun, natural daylighting and controlled natural ventilation?

This consideration is not applicable to the redevelopment of RIBP, as the works consist of the internal refurbishment of existing buildings with mechanical ventilation required due to the intensity of occupation and depth of floor plates.

10. How will the design of the building make efficient use of energy? (e.g. use of thermally massive materials, levels of insulation and use of green/brown roofs etc.).

This consideration is not applicable to the redevelopment of RIBP, as the works consist of the internal refurbishment of existing buildings with existing fabric and insulation provision. In predominantly cooled building, additional insulation will not necessarily result in lower energy use.

11. Have renewable energy sources or decentralised energy been considered for this development and if so, how would they be incorporated within the development?

Yes, a full formal assessment of renewable energy sources or decentralised energy has been included within please see Section 3.5 of this document. This concludes that Air Source Heat Pumps and solar PV panels are the most appropriate technology for the redevelopment.

Transport

AIM

To reduce the need to travel through appropriately located development.

QUESTIONS

12. How has the design and layout incorporated measures to reduce the need to travel, especially by car, and promote alternative and sustainable modes of transport such as walking, cycling and the use of public transport?

The Travel Plan prepared by Velocity (which forms part of this planning application) sets out a variety of measures to promote alternative and sustainable transport modes, promote active travel, with a number of improved facilities proposed.

The site is served by a number of bus services (with a stop immediately outside the main office building). High quality and secure cycle storage and facilities such as showers, changing space and lockers will be provided to encourage cycling to the site. The redevelopment of the RIBP site will include enhancement of the landscaping to encourage activity during lunchbreaks and before and after work.

In addition, as shown in the BREEAM pre-assessments in **appendices c** and **d**, Credit Tra 03.1 Cyclist Facilities is sought, indicating the design has been developed with a view to providing cycle storage spaces which are compliant with the requirements of BREEAM (i.e. the cycles can be secured within spaces in rack(s) which are covered overhead and these cycle racks shall be set in or fixed to a permanent structure with adequate lighting).

13. How have public transport networks been considered in terms of the location of the development and proximity to local amenities?

The Travel Plan prepared by Velocity (which forms part of this planning application) details public transport networks and local amenities on site and in close proximity to the site.

The site is within close proximity to a number of public transport nodes and local amenities, achieving maximum BREEAM credits available for accessibility index and provision of facilities. No further consideration has therefore been given.

The refurbishment of the office will provide a yoga facility and café for use by the RIBP occupants. See Section 4.3.3 for further details.

14. How have deliveries and the manoeuvring of delivery vehicles been considered?

Vehicle access has been retained as the existing arrangements have been found to work well.



...sustainable building services solutions

4.0 sustainability review...

Water

AIM

To improve efficiency in the use of water, conserve water resources and minimise vulnerability to flooding.

QUESTIONS

15. How will the development incorporate the use of water saving devices to achieve a maximum consumption of 5.5 cubic m per year per person for office developments? (or the most appropriate benchmark for other types of development).

The development is targeting an improvement of at least 50% over the BRE benchmark for BREEAM Credit Wat 01 Water Consumption, equivalent to a score of 4 out of a possible 5 Credits. This is achieved through the specification of low-flow/aerating taps and showers, dual flush WCs

16. Will the development and access to and from it such as roads and paths be located away from areas of potential flooding?

The site is within Flood Zone 1 and is therefore at low risk from surface water flooding.

17. How will the development incorporate harvesting and re-use of rainwater?

Given the constraints in the available ground floor plant space due to the layout of the existing building (and the very good water consumption performance noted above), greywater recycling and rainwater harvesting has not been pursued as an appropriate consideration for the redevelopment.

18. Does this development meet the requirements of EN18?

The site is within Flood Zone 1 and at low risk of surface water flooding. As the proposed redevelopment works will not increase the extent of impermeable area of the site, the rate and quantity of surface water run-off is not anticipated to increase.



...sustainable building services solutions

Materials

AIM

To retain local character and promote the use of materials with a low environmental impact.

QUESTIONS

19. How will the selected materials help retain local character, ensure long life and ensure a low environmental impact?

With the exception of the relatively small new entrance feature, the redevelopment works consist of the internal refurbishment of existing buildings and therefore the impact on local character is not an appropriate consideration.

BREEAM Credit Mat 01 is being pursued.

20. What consideration has been given to reusing materials in-situ, responsibly sourcing materials and re-using existing structures?

As shown in the BREEAM Credit Trackers, Credit Mat 03 Responsible Sourcing of Materials is sought. Accordingly, the formal audit shall be carried out by a competent person who is independent of the project, has appropriate knowledge of buildings, waste and options for the reuse and recycling of different waste streams.

The audit will establish predicted waste arisings and waste management and cover Identification and quantification of key materials, potential applications and for the reuse and recycling of the key materials in accordance with the waste hierarchy, Identification of local reprocessors or recyclers for recycling of materials. Targets for overall recycling rate, reuse and landfill diversion rate for all key materials shall be established.

4.0 sustainability review...

Waste

AIM

To minimise the production of waste and maximise re-use and recycling.

QUESTIONS

21. Has an audit of the materials present on the site been conducted with an assessment of the extent to which materials could be re-used?

A pre-refurbishment audit in accordance with BREEAM Credit Wst 01.1 will be undertaken at the appropriate stage (prior to any strip-out works) to identify any materials suitable for reuse on or off-site.

22. How will the development make the maximum use of construction, demolition waste and recycled materials?

The pre-refurbishment audit as noted above, will consider the reuse of materials onsite/in situ prioritised opportunities in line with the Waste Hierarchy and circular economy principles.

The audit results will be used to guide the detailed design and consideration of materials that can be reused, and to set targets for waste management and ensure all contractors are engaged in the process of maximising high grade reuse and recycling opportunities.

23. How will provision be made for the storage and recycling of waste for all users of the site?

Recyclable waste storage provision is indicated in the application drawings and, as noted in the BREEAM Credit Trackers in **appendices c** and **d**, Credit Wst 03 operational waste is sought, indicating the design has been developed with a view to providing waste storage which is compliant with the requirements of BREEAM (i.e. dedicated space for the segregation and storage of operational recyclable waste volumes generated by the buildings' operations, with clear signage (to assist with segregation, storage and collection) of the recyclable waste streams and accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractors)

The detailed strategy for commercial refuse collection in terms of frequency will be subject to confirmation of the final use of the workspace.

Land Use and Ecology

AIM

To retain, protect and enhance wildlife habitats and natural features.

QUESTIONS

24. How have the wildlife habitats and natural features on and adjacent to the site been considered and how will they be retained, protected and enhanced?

Please refer to the Preliminary Ecological Appraisal, Tree Surveys prepared by Greengage and the Landscape Report prepared by Churchman Thornhill Finch (which form part of this planning application) sets out the established wildlife habitats and natural features on the site and proposals to enhance the hard and soft landscaping with new planting, 'productive gardens', dwell spaces in the context of retaining and protecting existing habitats and features.

In the BREEAM pre-assessment in **appendices c** and **d**, maximum scores are sought for all applicable Credits in the Land Use and Ecology Category (LUE 02.1 Protection of Ecological Feature and LUE 05.1 Long Term Impact on Biodiversity, demonstrating the design has been developed with a view to protecting existing biodiversity and pursuing opportunities for biodiversity net gain and urban greening compliant with the requirements of BREEAM.

25. What consideration has been given to not using previously undeveloped land?

This consideration is not applicable to the redevelopment works at RIBP, as the works consist of the internal refurbishment of existing buildings. The proposed new entrance feature sits above the existing undercroft slab created which was created when the main office was developed and therefore is on previously developed land.

26. What consideration has been given to the removal of contamination from the land?

The proposed works consist of the internal refurbishment of existing buildings, the construction of which occurred in the past 20 years. Accordingly, it is not anticipated that there will be significant excavation or landscaping works which could disturb any contaminated land

Any hazardous waste discovered within the buildings during the strip-out works will be dealt with appropriately.



...sustainable building services solutions

4.0 sustainability review...



...sustainable building services solutions

Pollution

AIM

To minimise damage to the environment through air, ground/surface water, land, noise or light pollution.

QUESTIONS

27. What measures have been incorporated to ensure that noise and light pollution plus pollution transported through surface water runoff will be minimised through the development?

It is not anticipated that the proposals will result in significant external noise impacts as conventional building services plant (with attenuation measures) are proposed within plant enclosures that will be specified limit the break out of noise to an acceptable level.

As shown in the BREEAM Credit Trackers, Credit Pol 05 Noise Attenuation is sought, indicating the design has been developed with a view to reducing noise breakout in accordance with the requirements of BREEAM (i.e. a requirement for a noise impact assessment in compliance with BS 7445 by a suitably qualified acoustic consultant, to establish and incorporate measures ensuring the noise level from the buildings (main office and the Dot) is no greater than +5dB compared to the background noise level).

It is not anticipated that the proposals will give rise to adverse impacts on air quality (including sources of odour or fumes). It is noted that the site is around 100m to the north of the centre of the M4, and within the Reading Air Quality Management Area.

Space and water heating will be provided through a combination of air source heat pumps and local electric water heaters. No new combustion sources of heating plant are proposed for the development and therefore there will be no local nitrogen dioxide or other emissions associated with these.

28. What measures have been incorporated to ensure that light pollution will be minimised through the development?

The lighting scheme shall be designed to industry standards (in particular SLL Lighting Guide 6: The Exterior Environment (2016)) and light levels shall not exceed the minimum necessary for their purpose.

In addition, as shown in the BREEAM Credit Trackers, Credit Pol 04 Reduction of Night Time Light Pollution is sought, indicating the design has been developed with a view to reducing spill beyond the area intended for illumination. The design has been developed in accordance with the requirements of Table 2 (and its accompanying notes) of the ILP Guidance Notes for the Reduction of Obtrusive Light, (2020).

29. What consideration has been given to reducing refrigerants and minimising nitrogen oxide emissions?

As space and water heating will be provided through electrically powered plant and no new combustion-based plant is proposed for the redevelopment, there will be no local nitrogen dioxide emissions arising from the plant.

30. How has the development been sited to minimise the impact of flooding?

This consideration is not appropriate for RIBP as it is a refurbishment project, and so the opportunity to select the location of the buildings and landscaping with respect to flooding is not possible. Almost the whole of the site is located in Flood Zone 1 and extensive flood risk assessment and mitigation activities were undertaken for the original development's as documented in its planning application.

31. How has the design considered the use of sustainable drainage systems (SuDS) and how will they be incorporated within the development?

The existing surface water drainage system will be retained. No increase in impermeable area is proposed and it is not therefore appropriate or necessary to incorporate new sustainable drainage systems (SuDS) within the development?

Innovation

AIM

To recognise innovation in the field of sustainability.

QUESTIONS

32. What consideration has been given to innovative sustainability measures in terms of a procurement strategy, design feature, management process or technological development?

Beyond the requirements of the Reading Borough Council Local Plan/Sustainable Design and Construction SDP and BREEAM, the project has set a number of ambitious and innovative aims and goals to support the global fight against climate change and provide a healthy and enjoyable environment for occupants and visitors to RIBP. These encompass transport, health/wellbeing, certification, energy and carbon, circular economy, IT & digitalisation, ecology and social value

These aspirational initiatives are summarised in the 'wider sustainability aims' commentary in this report, with as many as possible to be delivered within the redevelopment's scope and budget constraints.

Furthermore, the design achieves a 17.2% reduction in operational carbon emissions compared against the existing building baseline.

4.0 sustainability review...

SUSTAINABILITY BENCHMARKING

Introduction

THE NEED FOR SUSTAINABILITY BENCHMARKING

The redevelopment of Reading International Business Park 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 allow design teams 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 benchmarks 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.

APPLICATION AT READING INTERNATIONAL BUSINESS PARK

Policy CC2 of Reading Borough Council's Local Plan requires non-residential refurbishment projects over 1,000 sq. m of floorspace to achieve a BREEAM rating of 'Excellent' and smaller projects to achieve a BREEAM rating of 'Very Good'. Although the Dot at RIBP is within the smaller area bracket, BREEAM ratings of 'Excellent' are sought both the main office areas and the Dot.

BREEAM Assessment

BACKGROUND TO BREEAM

For over 20 years, the BRE's Environmental Assessment Method (BREEAM) has been used to assess the environmental performance of both new and existing buildings. It is a performance based assessment method and certification scheme which seeks to improve the environmental performance of buildings whilst promoting a healthy indoor environment for occupants. The issues reviewed by the BREEAM assessment help inform decision-making from concept design to completion, enabling continual monitoring and improvement in sustainability performance, and assisting in the delivery of sustainability objectives.

METHODOLOGY

An initial assessment is undertaken at the design stage and this is verified post construction to ensure proposed measures have been included in the completed development. At each stage 'Credits' are awarded for achieving specified levels of performance set by BRE under issues within nine categories of sustainable design and construction: Management, Health and Well-Being, Energy, Transport, Water, Materials, Land Use and Ecology, and Pollution.

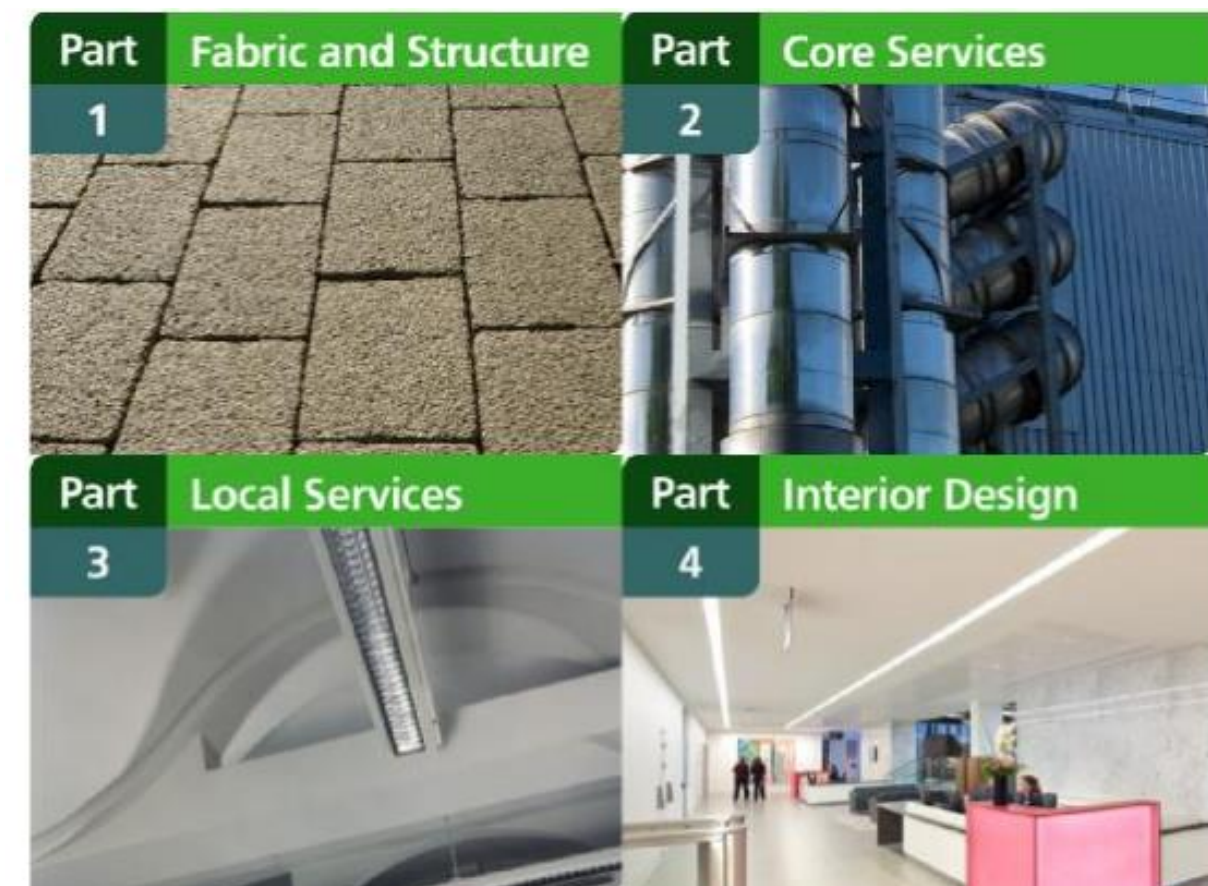
A set of environmental weightings then enables the Credits to be added to produce an overall score, which is translated into a rating of Pass, Good, Very Good, Excellent or Outstanding.

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 associated evidence package from the Assessor.

BACKGROUND TO BREEAM RFO 2014

BREEAM Refurbishment and Fit Out 2014 (RFO 2014) has been identified as the most appropriate sustainability benchmark for these works. This is the current version of BREEAM for the refurbishment and fit-out of non-domestic buildings and provides a modular set of criteria that are applied depending upon the scope of works for a particular project type.

The scheme is split into four assessment 'Parts' (shown below) to allow the scheme to reflect the aspects of a building that are tenant or landlord responsibilities, as well as the varied life cycle stages that each component or element is upgraded. Parts assessed (and not assessed) are clearly labelled on the BREEAM Certificate



It is possible to target all or any combination of parts of the assessment, and the decision of which parts to use are informed by the BRE and the BREEAM Assessor.

Both assessment are pursuing 'Parts' 2 (Core Services), 3 (Local Services) and 4 (Interior Design) of BREEAM RFO – Part 1 (Fabric and Structure) is not appropriate to the scope of works planned.

4.0 sustainability review...

ANALYSIS UNDERTAKEN

Background

MTT/SUSTAIN, a licensed BREEAM Assessor organisation, have been appointed to undertake the formal BREEAM Refurbishment and Fit Out 2014 assessments at RIBP, with a target rating of 'Excellent' sought for each element.

Currently, the Design Stage assessment is at an early stage. The Design Team have participated in pre-assessment workshops to establish the optimal measures for the redevelopment, under the guidance of a BREEAM Assessor and BREEAM AP. These assessment are reviewed on the following pages and full Design Stage Credit Tracker are provided in **appendices c** (main office) and **d** (the Dot).

The scoring presented represents the potential score for these 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.

The Credits achieved in the final assessment may vary, as is the norm as the design development progresses.

BREEAM RFO Assessment 'Parts'

A 'Parts 2, 3 & 4' assessment is being pursued as this is the most appropriate combination of parts, based on the scope of the refurbishment.

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 Workshops held with the Design Team, general Design Team Meetings and subsequent input from the team.

The scoring shown in this document is based on commitments made during these meetings and further dialogue with members of the team (client, architect, engineers, landscape architect, and other specialists).

The Design Stage Credit Tracker has been issued to the Design Team, setting out the BREEAM performance and evidence criteria which will be used to assess this project; together with the current predicted scores under each issue, the parties responsible for ensuring compliance and the provision of appropriate supporting evidence.

Notes

MANDATORY REQUIREMENTS

The mandatory requirements for an 'Excellent' rating are all considered to be achievable and, as shown on the Credit Trackers, have been included in the sought Credits in each assessment.

These are:

- Ene 02 Energy Monitoring
- Wat 01 Water Consumption
- Wat 02 Water Monitoring
- Mat 03 Responsible Sourcing of Materials

TIME CRITICAL ACTIONS

As shown on the Credit Trackers, actions necessary to be initiated at Concept Design Stage (RIBA Stage 2) have been undertaken for the sought Credits in each assessment.

These are:

- Man 01.1 Project Brief and Design - Stakeholder Consultation (Project Delivery)
- Man 01.2 Project Brief and Design - Stakeholder Consultation (Third Party)
- Man 01.3 Project Brief and Design - Sustainability Champion (Design)
- Man 02.1 Life Cycle Cost and Service Life Planning - Elemental LCC Plan
- Man 04.2 Commissioning and Handover - Commissioning Building Services
- Hea 06 Safety and Security - Security of Site and Building
- Ene 04.1 Low Carbon Design - Passive Design Analysis
- Ene 04.3 Low Carbon Design - Low and Zero Carbon Technologies
- Tra 05 Travel Plan - Travel Plan
- Wst 06 Functional Adaptability

SCORING PREDICTION

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.



...sustainable building services solutions

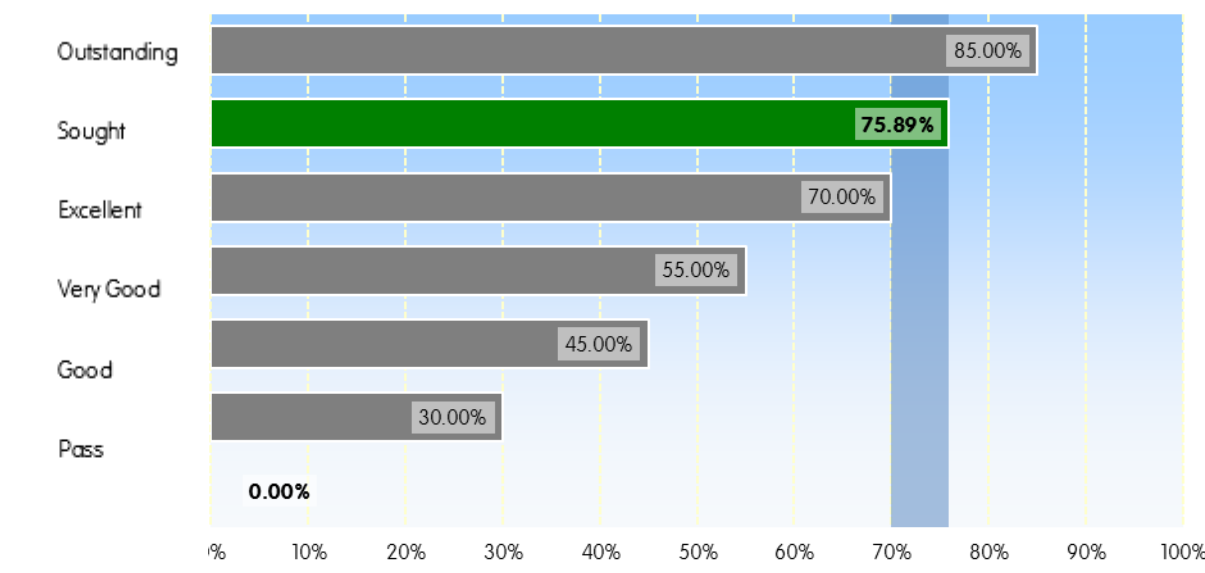
4.0 sustainability review...

BREEAM RFO 2014 ASSESSMENT OF RIBP – MAIN OFFICE

Current Position

TARGET SCORE AND RATING

The current Design Stage Credit Tracker shows a sought target score of **75.89%** 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 good margin of 5.89% available over the 'Excellent' threshold.



■ Sought Score and Rating 75.89%, 'Excellent' – with ■ Margin

Please refer to **appendix c** for a full copy of the current Design Stage Credit Tracker report with a description of each Credit for the Main Office.

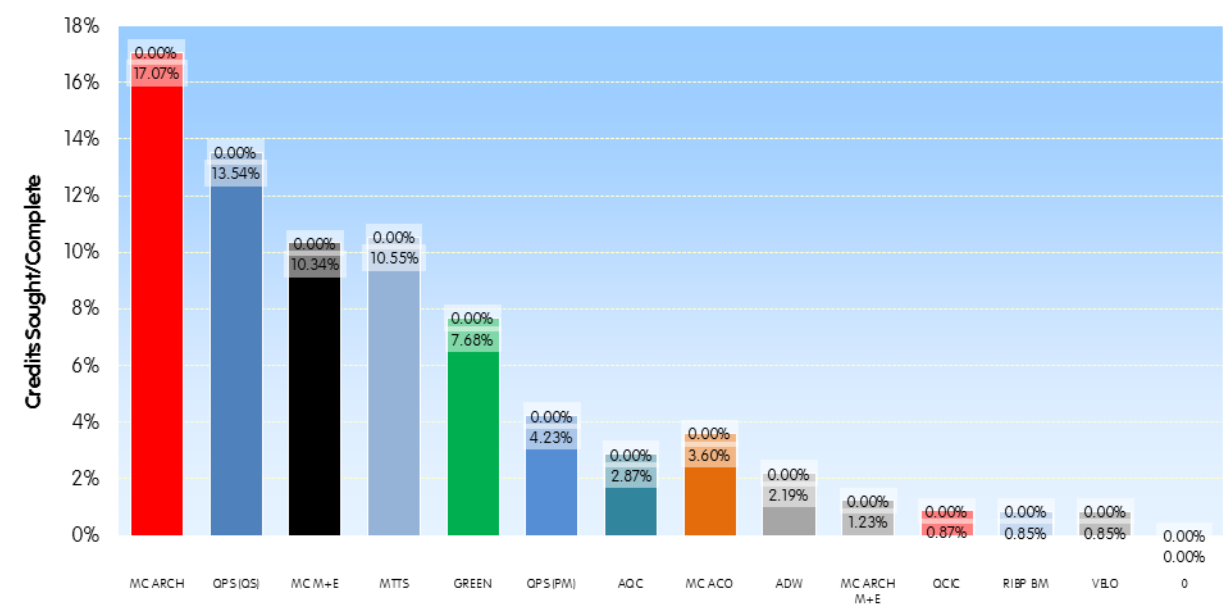
Predicted Rating

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	17	17	100.00%	12.43%	12.43
Health and Wellbeing	19	11	57.89%	16.57%	9.59
Energy	25	13	52.00%	18.41%	9.57
Transport	4	4	100.00%	3.41%	3.41
Water	9	8	88.89%	7.68%	6.83
Materials	13	9	69.23%	15.99%	11.07
Waste	10	8	80.00%	8.00%	6.40
Land Use and Ecology	3	3	100.00%	7.68%	7.68
Pollution	10	6	60.00%	9.84%	5.90
Exemplary/Innovation					3.00
Total BREEAM Score					75.89%

SUMMARY GRAPHS



Credit Scores by Responsible Party – Complete (Light) and Remaining (Dark)

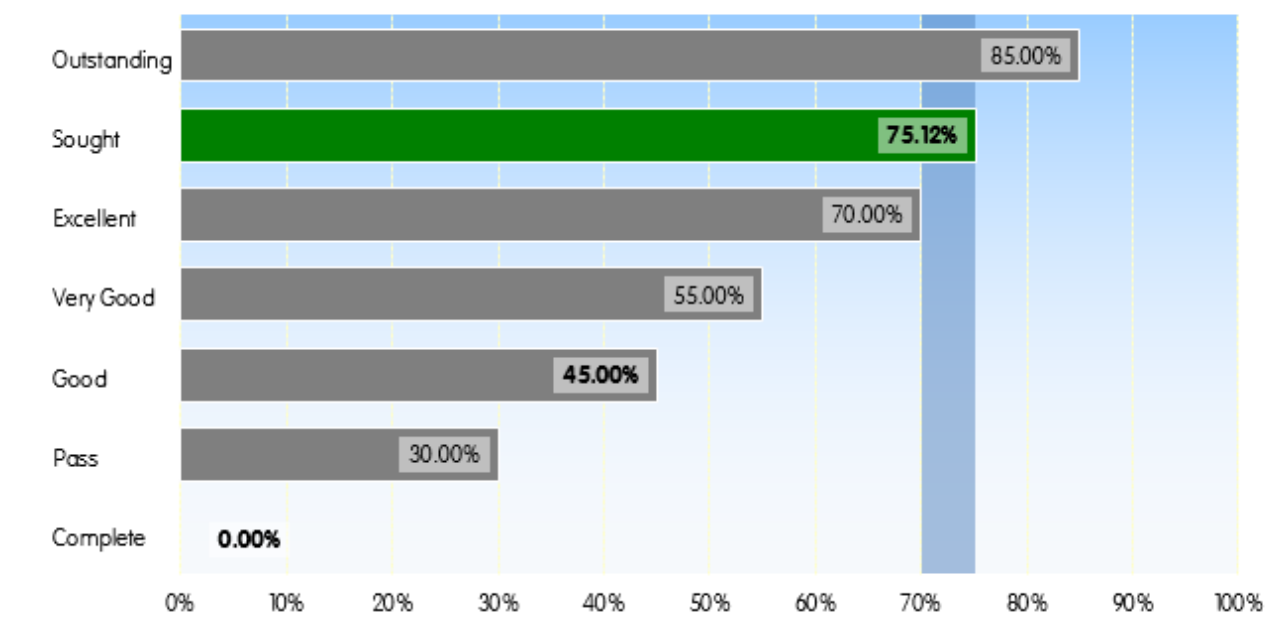
4.0 sustainability review...

BREEAM RFO 2014 ASSESSMENT OF READING INTERNATIONAL BUSINESS PARK – THE DOT

Current Position

TARGET SCORE AND RATING

The current Design Stage Credit Tracker shows a sought target score of **75.12%** 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 good margin of 5.12% available over the 'Excellent' threshold.



■ Sought Score and Rating 75.12%, 'Excellent' – with ■ Margin

Please refer to **appendix d** for a full copy of the current Design Stage Credit Tracker report with a description of each Credit for the Dot.

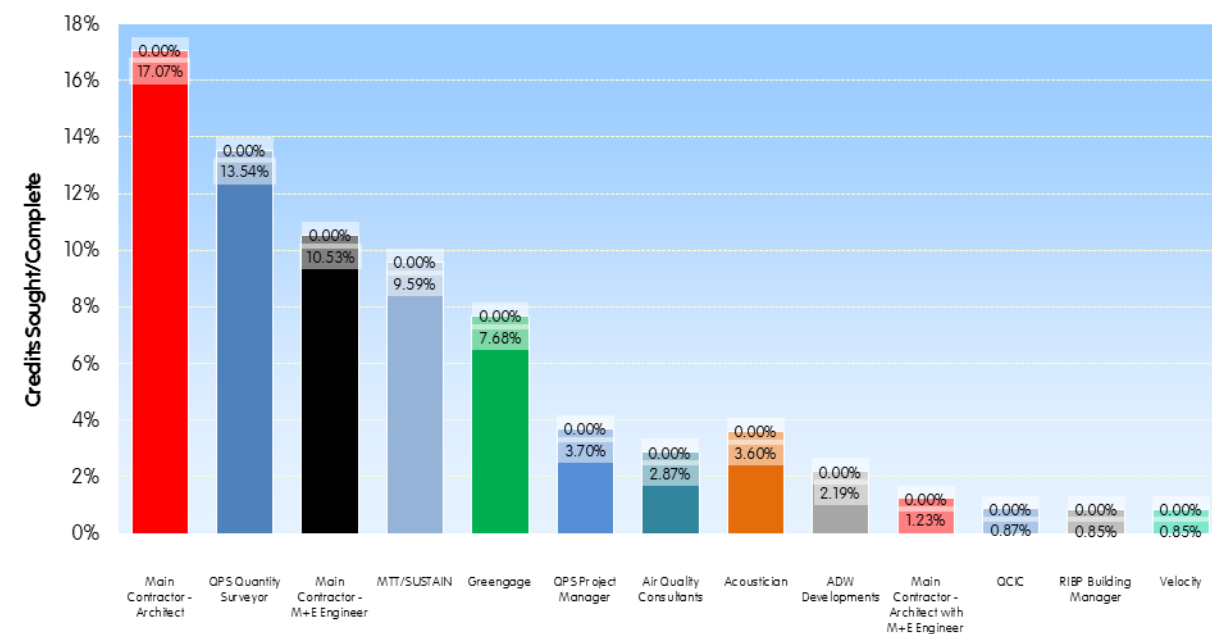
Predicted Rating

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	17	17	100.00%	12.43%	12.43
Health and Wellbeing	11	19	57.89%	16.57%	9.59
Energy	11	23	47.83%	18.41%	8.80
Transport	4	4	100.00%	3.41%	3.41
Water	8	9	88.89%	7.68%	6.83
Materials	9	13	69.23%	15.99%	11.07
Waste	8	10	80.00%	8.00%	6.40
Land Use and Ecology	3	3	100.00%	7.68%	7.68
Pollution	6	10	60.00%	9.84%	5.90
Exemplary/Innovation					3.00
Total BREEAM Score					75.12%

SUMMARY GRAPHS



Credit Scores by Responsible Party – Complete (Light) and Remaining (Dark)

4.0 sustainability review...



...sustainable building services solutions

WIDER SUSTAINABILITY AIMS

Overview

Beyond the requirements of the Reading Borough Council Local Plan/Sustainable Design and Construction SDP and BREEAM, the project has set a number of aims and specific goals to support the global fight against climate change and provide a healthy and enjoyable environment for occupants and visitors to RIBP. These initiatives are summarised below. They are outline goals to be kept under review as the design evolves, with as many as possible will be delivered as far as budgets allow.

Transport

Aim: To promote more sustainable forms of transport, and futureproof the development for expected uptake in electric vehicle use

- Achieve a minimum Cycling Score of Gold (Aspiration for Platinum)
- Provide active and passive infrastructure for EV charging
- Include sufficient cycle spaces and changing / shower facilities in line with BREEAM
- Provide weekly cycle servicing on site (paid service) – e.g. 'Pete's Bike Shed' Signup to the easiNETWORK to provide tenants with travel discounts, benefits schemes.
- Provide priority spaces for car sharing

Health and Wellbeing

Aim: To ensure that best practice comfort levels are provided, and wellbeing is promoted for building users.

- Achieve certification with WELL v2 (Core & Shell) - Target to be confirmed following pre-assessment
- Develop a Covid-19 strategy – based on guidance from: WELL, fitwel, BCO, MTT, BGY

Environmental Certification

Aim: To meet sustainability aims beyond those captured within other sections.

Achieve BREEAM Certification with a minimum rating of Excellent and aspirational rating of Outstanding

Energy and Carbon Reduction

Aim: To reduce the operational carbon emissions associated with the buildings and to contribute to the route to net zero carbon.

- Prohibit fossil fuel combustion in the main office areas and the Dot
- Consider opportunities for electric heat pumps
- Consider opportunities for PV and wind power
- Provide extensive submetering and a BEMS system

Circular Economy

Aim: To reduce waste and the embodied carbon emissions over the building's life cycle.

- Undertake an audit prior to strip out works to identify opportunities for re-use
- Engage with Globechain to identify opportunities for recycling of strip out materials
- At least 10% of the total value of materials used should derive from recycled and reused content in the products and materials selected.
- Implement design measures such as layer independence or a well-developed plant replacement strategy to improve future adaptability.
- Explore opportunities for performance economy through 'products as a service'.
- Undertake BREEAM studies relating to circular economy

IT and Digitalisation

Aim: To Ensure best-practice levels of connectivity, energy efficiency and user comfort.

- Explore opportunities for the implementation of Smart Spaces or equivalent, incl. a user 'app'
- Achieve WiredScore certification with a minimum rating of Gold and an aspiration for Platinum.

Ecology

To protect and enhance the ecological value of the site

- Appoint an ecologist and enhance the site's ecology in line with their recommendations
- Provide Gardening Space of at least 0.1 m2 per occupant *up to 70 m2 maximum. Can include a combination of the following: garden with food bearing plants, greenhouse, edible landscaping, fruit trees, herbs(Include garden – as per WELL Standard
- Include internal greenery as part of biophilic design strategy

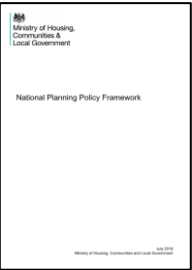
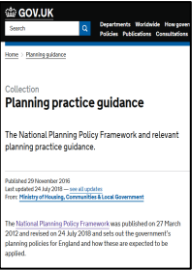
Social Value

Aim: To incorporate social value within the design, construction, and operation of the development to improve societal outcomes.

- Undertake pre-works occupancy assessment – identify operational offer
- Engage with third sector organisations and campaigns to evaluate how the development can benefit the wider community and implement viable solutions.
- All direct employees of the Principal Contractor (Tier 1) must pay the Living Wage. Tier 2 suppliers are to report the payment of the Living Wage.
- Organise site visits for the local schools to the development during construction
- Engage with local supply chain early on to identify how their services could be incorporated into the development process
- Develop mechanisms for local stakeholders to discuss the ongoing success of the development, such as community governance structures or forums
- Identify locations for additional opportunities within the public realm (e.g. farmer's markets, exhibitions) and develop strategy for implementation during operation.

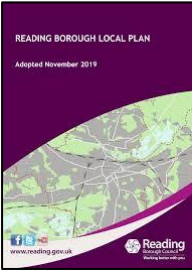
appendix a – review of planning policy and good practice...

NATIONAL POLICIES

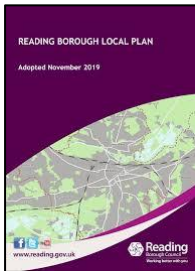
Image	Policy/Document	Objective	Key Policy and Targets Summary
	National Planning Policy Framework Ministry of Housing, Communities and Local Government February 2019	The National Planning Policy Framework (NPPF) sets out the Government's planning policies on the delivery of sustainable development through 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. The NPPF was updated in July 2018.	Key sections of the National Planning Policy Framework include 'Responding to Climate Change' and 'Conserving and Enhancing the Natural Environment'.
	National Planning Practice Guidance November 2016 (as amended)	The National Planning Practice Guidance (NPPG) is 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 - 6-001-20140306) 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 – review of planning policy and good practice...

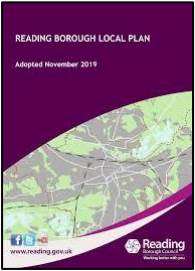
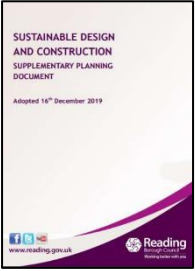
LOCAL POLICIES

Image	Policy/Document	Policy/Objectives	Key Policy Targets Summary
	Reading Borough Local Plan Reading Borough Council (Adopted November 2019)	CC2: SUSTAINABLE DESIGN AND CONSTRUCTION Proposals for new development, including the construction of new buildings and the redevelopment and refurbishment of existing building stock, will be acceptable where the design of buildings and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.	To meet these requirements: • All major non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Excellent' standards, where possible; • All minor non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Very Good' standard as a minimum; • All non-residential development or conversions to residential should incorporate water conservation measures so that predicted per capita consumption does not exceed the appropriate levels set out in the applicable BREEAM standard. Both residential and non-residential development should include recycling greywater and rainwater harvesting where systems are energy and cost effective.
		CC3: ADAPTATION TO CLIMATE CHANGE All developments will demonstrate how they have been designed to incorporate measures to adapt to climate change.	The following measures shall be incorporated into development: • New buildings shall be orientated to maximise the opportunities for both natural heating and ventilation and reducing exposure to wind and other elements; • Proposals involving both new and existing buildings shall demonstrate how they have been designed to maximise resistance and resilience to climate change for example by including measures such as solar shading, thermal mass, heating and ventilation of the building and appropriately coloured materials in areas exposed to direct sunlight, green and brown roofs, green walls, etc; • Use of trees and other planting, where appropriate as part of a landscape scheme, to provide shading of amenity areas, buildings and streets and to help to connect habitat, designed with native plants that are carefully selected, managed and adaptable to meet the predicted changed climatic conditions; and 40 • All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change
		CC4: DECENTRALISED ENERGY In meeting the sustainability requirements of this plan, developments of the sizes set out below shall demonstrate how consideration has been given to securing energy for the development from a decentralised energy source, including CHP.	Any development of more than 20 dwellings and/ or non-residential development of over 1,000 sq. m shall consider the inclusion of a CHP plant, or other form of decentralised energy provision, within the site, unless it can be demonstrated that the scheme is not suitable, feasible or viable for this form of energy provision. Where there is existing decentralised energy provision, including a CHP plant or a district energy network present within the vicinity of an application site, further developments of over 10 dwellings or non-residential development of 1,000 sq. m will be expected to link into the existing decentralised energy network or demonstrate why this is not feasible.

appendix a – review of planning policy and good practice...

Image	Policy/Document	Policy/Objectives	Key Policy Targets Summary
		CC5: WASTE MINIMISATION AND STORAGE Development should demonstrate measures to minimise the generation of waste in the construction, use and life of buildings and promote more sustainable approaches to waste management, including the reuse and recycling of construction waste and the promotion of layouts and designs that provide adequate, well-designed space to facilitate waste storage, reuse, recycling and composting.	Measures that applicants should consider to achieve the aims of policy CC5 could include: Reducing waste during construction: • A Site Waste Management Plan (SWMP) should be developed at the preapplication stage to inform the adoption of good practice waste minimisation in design. The SWMP sets targets for waste reduction and recovery based on an assessment of the likely composition and quantity of waste arising and identification of the most significant cost-effective options for improvements. This should be supplemented by information on how the targets would be achieved during construction activities and how the actual levels of waste reduction and recovery would be monitored for comparison with the targets set. • Re-use and refurbish buildings where possible and appropriate, rather than demolishing existing buildings and redeveloping them. • Re-use building materials where possible. This is already often done when works are carried out to historic buildings to ensure materials match and the character and appearance is conserved. This can reduce the environmental impact of new development through a reduced demand for new materials and reduced levels of waste to be disposed of in landfill sites. • Where demolition is appropriate, a strategy should be devised for the handling and re-use or disposal of demolition waste. This should include an audit of the materials present on site and an assessment as to the extent to which they could be put to use in the new development or in other developments elsewhere. By re-using demolition waste, the environmental impact of new development can be reduced and savings can be made on the costs of landfill. • Developers should outline where they will be transporting waste to in order to ensure they are considering the most appropriate option and transporting waste the minimum journey possible. • Developers should be encouraged to use recycled and secondary aggregates in construction, thereby reducing the demand for virgin material. This could help to secure a credit under the BREEAM standard. • New building materials should not be over-ordered. Better communication between building professionals should be developed to ensure exact calculations of required materials are made to help ensure waste is prevented. • Just-in-time delivery strategies can further reduce waste that is developed by improper storage and damage of materials. Materials that can be re-used or recycled need to be identified early on in the build process and segregated for easy storage, collection and transfer. Minimising waste during the use and life of buildings: • Submission of plans illustrating adequate space to facilitate waste storage, re-use, recycling and composting. This forms a mandatory element of the BREEAM standards. Residents must be provided with adequate storage for residential waste. • Appropriate development (e.g. residential, education, etc.) should seek to incorporate facilities to compost household waste, reducing the amount of household waste sent to landfill. • Adequate provision for both internal and external storage of waste should be provided. This space should be an integral part of the design of the proposal and not merely added on at the end of the process. • Development should consider the incorporation of the following strategies within the developments to help reduce waste: ○ Greywater recycling ○ Composting toilets ○ On site food composting ○ Off-site recycling facilities

appendix a – review of planning policy and good practice...

Image	Policy/Document	Policy/Objectives	Key Policy Targets Summary
	Reading Borough Local Plan Reading Borough Council Adopted November 2019	EN18: FLOODING AND SUSTAINABLE DRAINAGE SYSTEMS Development will be directed to areas at lowest risk of flooding in the first instance, following the Sequential and Exceptions Test set out in the NPPF, and taking into account the effects of climate change. It will consider flooding from all sources, including fluvial, surface water, groundwater and sewer flooding. Where development in areas at risk of flooding is necessary, it will not reduce the capacity of the flood plain to store floodwater, impede the flow of floodwater or in any way increase the risks to life and property arising from flooding. Wherever possible, development should be designed to reduce flood risk, both on- and off-site.	All major developments must incorporate sustainable drainage systems (SuDS) as appropriate and in line with the Government's Technical Standards Smaller schemes are encouraged to incorporate SuDS, where possible. Runoff rates should aim to reflect greenfield conditions and, in any case, must be no greater than the existing conditions of the site. Schemes should ensure that the movement of water through vertical infiltration as well as horizontal run-off does not worsen contamination effects. Wherever possible, SuDS provision should maximise ecological benefits, link into the existing Green Network, incorporate tree planting and landscaping and avoid 28 10 or more dwellings or equivalent non-residential or mixed developments All new developments in areas of flood risk should give priority to SuDS.
	Sustainable Design and Construction Supplementary Planning Document Reading Borough Council Adopted December 2019	The Sustainable Design and Construction Supplementary Planning Document (SPD) is intended to guide developers and decision-makers on the implementation of key sustainability policies set out in the Reading Local Plan, namely CC2-CC5, EN18 and H5 and will be a material consideration in the determination of planning applications. The SPD brings together relevant national guidance. It provides practical advice on forms of sustainable design and construction, as well as waste minimisation that will meet these policy requirements. It also details how policies will be applied. This should assist applicants in ensuring that the relevant information is submitted at the appropriate stage of the application and development process.	The SPD explains planning requirements with regards to energy, climate change, water management and waste reduction. It is intended to supplement the policies of the Local Plan, particularly: • CC2: Sustainable Design and Construction • CC3: Adaptation to Climate change • CC4: Decentralised Energy • CC5: Waste Minimisation and Storage • EN18: Flooding and Drainage • H5: Housing Standards The Sustainable Construction Design and Construction SPD requires the following: • Submission of a Sustainability Statement with the planning application; • An Energy Statement demonstrating how the energy related aspects of the proposed development actually meets the requirement of policies CC2, CC4 and H5 (where relevant); and • A completed Sustainable Design Checklist at submission stage of the application.

appendix a – review of planning policy and good practice...

OTHER REFERENCES

Image	Policy/Standard/Initiative	Commentary	Key Policies and Targets Summary
	BREEAM Refurbishment and Fit Out 2014 BRE Global 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. The BREEAM UK Refurbishment and Fit-out scheme is a performance based assessment method and certification scheme for existing building refurbishment and fit-out projects. 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).	BREEAM RFO 2014 can be used to assess the environmental life cycle impacts of existing non-domestic buildings at the refurbishment and fit-out stages. The definition of 'refurbishment' encompasses a wide range of works to improve the performance, function and overall condition of an existing building. 'Fit-out' also encompasses a wide range of works, however it is more associated with internal works to a building including the first fit-out of a newly constructed building or re-fitting an existing building. The BREEAM UK Non-domestic Refurbishment and Fit-out 2014 scheme provides a modular set of criteria that are applied depending upon the scope of works for a particular project type including: - Part 1: Fabric and Structure - Part 2: Core Services - Part 3: Local Services - Part 4: Interior Design This approach provides the scheme's users with a flexible means of measuring the environmental performance of their building and comparing it with other buildings across the property market, backed with the assurance that independent third party certification of the assessment process provides.

appendix b – thermal model summary...



...sustainable building services solutions

appendix b – detailed review of LZC options...



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 CO₂. 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, CO₂ 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 PM₁₀ 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 efficiency not affected by part load operation conditions;
- 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

DISCUSSION

There is not currently a hydrogen network in Egham, 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
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 other conventional and renewable technologies, alongside the higher capital and operational costs mean that fuel cell technology is not recommended.

appendix b – detailed review of LZC options...



...sustainable building services solutions

AIR SOURCE HEAT PUMPS - HEATING ONLY



Technology Background

Air source heat pumps work by converting the energy of the outside air into heat, creating a comfortable temperature inside a 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.

Applicability

The use of air source heat pumps in place of the gas boilers, will achieve significant CO₂ emissions savings across the heating and cooling energy use. The implementation of Air Source Heat Pumps (as a VRF heat recovery system) is recommended.

appendix b – detailed review of LZC options...

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 2-4 MW 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.

Applicability

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 would present a significant risk to the applicant in respect of the need to pursue an open loop system.

appendix b – detailed review of LZC options...

DECISION TABLES

GENERAL CONSIDERATIONS

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

GROUND-SOURCE HEAT PUMPS

Issue	Consideration	Response
Ground Conditions	Has a basic ground study concluded that the site is suitable for GSHP?	TBC
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

RECOMMENDATION

Due to the number of negative or undetermined responses in the above 'decision tables' and based on the proposed development's low heating demand, ground-source heat pumps are not recommended.

It is not proposed to pursue a ground source heating and cooling system.

appendix b – detailed review of LZC options...

PHOTOVOLTAICS



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 South-East there is an annual average solar energy availability of 1 MWh/m² 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.

Applicability

DISCUSSION

The roof of the proposed building accommodates some plant accommodation, but PV panels could potentially be installed on other areas. The project team are reviewing these opportunities.

RECOMMENDATION

Based on the above discussion, it is may be feasible to install PV panels on the main office roof, subject to further survey and payback review. As the proposed ASHP services strategy can be demonstrated to address the policy requirements, any additional energy/CO₂ savings would be additional to this.

appendix b – detailed review of LZC options...

SOLAR WATER HEATING



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.

Application

DISCUSSION

As discussed in the photovoltaic panels review, it is not feasible to install solar thermal panels on the roof.

DECISION TABLE

Issue	Consideration	Response
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?	YES
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 not suitable for the implementation of PV arrays, the opportunity to place solar thermal panels into the roof layout here is not available either. Solar thermal panels are not recommended.

appendix b – detailed review of LZC options...



...sustainable building services solutions

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.



...sustainable building services solutions

appendix b – detailed review of LZC options...

Applicability

DISCUSSION

Wind turbines are not specified where average wind speeds are less than 6 m/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 4.6 m/s, 5.4 m/s, and 5.9 m/s wind speeds predicted for 10 m, 25 m, and 45 m from the ground respectively.

DECISION TABLE

Issue	Consideration	Response
Wind Speed	Is the average wind speed greater than 6 m/s at hub height?	NO
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

Wind turbines are not recommended.



...sustainable building services solutions

appendix b – detailed review of LZC options...

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)	Conclusion
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.	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.	To perform effectively CHP requires a constant base load for more than 4,000 hours. Due to its use as an office, which is predominantly cooled and has a very low domestic hot water demand, CHP is not considered appropriate for this development.
Fuel cells	Poor Limited range of commercially available cells, and expensive.	High Same as CHP.	Low No planning approval required.	Low The unit has very few mechanical moving parts and is generally silent in operation.	Good Heat and electricity can directly be used on site or exported to the grid.	Good Low carbon technology that provides a relatively good payback, however the market is small and therefore initial capital costs are very high making the paybacks extended unless extensive heat and electricity demand exists.	None at present.	The technology is relatively new within the construction sector with only a few high profile sites in the UK. With units currently at around 200 kW minimum size the application tends to be towards large buildings with a very good and consistent heat and electricity demand. Fuel cells are not recommended.
Ground source heat pumps - Heating and cooling	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 80 m 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.	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 CoP 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.	In order to provide a significant contribution towards reducing carbon emissions a majority of the heating and cooling demands would need to be met by GSHPs. No below ground works are proposed as part of this project. Due to the required area to drill boreholes and its associated cost, ground source heat pumps are not recommended.
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 (FIT) the feed in tariff scheme was closed to new applications on 31 March 2019.	Due to cost and limited yields, the use of photovoltaic panels has been discounted as an applicable technology.



...sustainable building services solutions

appendix b – detailed review of LZC options...

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)	Conclusion
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, a payment will be made per kilowatt hour (kWh) of heat produced.	Due to the reasons mentioned for photovoltaics, solar thermal panels have also been discounted
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 (100-850 kW) will have a payback of around 7 years and large wind turbines (1 MW-2.5 MW) have a payback 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 350 m, about the same as a road 5 km away. Noise from wind in trees is louder than wind turbines at 300 m.	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.		Not to be considered further. Unreliable wind profiles due to urban/suburban location and relatively low contributions from building mounted technology.
Air Source Heat Pump	Good The payback time of an air source heat pump is on average 5 years.	Low ASHP will easily fit in most commercial plant rooms.	Medium Air source heat pumps are not considered 'Permitted Development' and as such will require Planning Permission. Typically, it is a requirement for planning permission on the noise level and the visual impact of the external unit.	Low Heat pumps make slight humming noise much like refrigerator and so is best stored in basement/utility room or away from occupants. Not a significant issue. Noise can be mitigated.	Medium Low temperature space heating system required.	Average High CoP are dependent on relatively low supply temperatures in heating mode.	Enhanced Capital Allowances (ECAs) can be claimed for air to air systems (including splits and multi splits) and air to water systems. The air source heat pump needs to comply with the energy technology list (ETL) criteria and be on the energy technology list (ETL). Renewable Heat Incentive (RHI) Splits and Multi- splits systems are not covered by RHI.	An air source heat pump-based heating and cooling system have been selected as the appropriate technologies for this development.

appendix c – BREEAM RFO 2014 Pre-Assessment – main office...



...sustainable building services solutions

appendix c...

Project:

Subject:

Assessor:

Support:

RIBP - Main Office

BREEAM RFO 2014 - Parts 2, 3 & 4

Martin Lawless

Ellis Leake-Lyall

Job Number:

Date:

Issue:

1264

4th November 2020

04

RFO 2014 Parts 2,3,4

DESIGN STAGE

Req. %: >70%

Req. Rating: Excellent

Sought %: 75.89%

Sought Rating: Excellent

Complete %: 0.00%

Complete Rating: Fail

Risk %: 0.00%

REVIEW

Sought Margin %: 5.89%

Outstanding Margin %: 75.89%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Applicable Parts	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Man 01.1	Project Brief and Design - Stakeholder Consultation (Project Delivery)	1	1	0		1. A clear sustainability brief is developed prior to Concept Design which sets out: a. Client requirements e.g. internal environmental conditions required b. Sustainability objectives and targets including target BREEAM rating, business objectives etc. c. Timescales and budget d. List of consultees and professional appointments that may be required e.g. Suitably Qualified Acoustician etc. e. Constraints for the project e.g. technical, legal, physical, environmental. 2. Prior to completion of the Concept Design (RIBA Stage 2 or equivalent), the project delivery stakeholders have met to identify and define their roles, responsibilities and contributions for each of the key phases of project delivery. 3. 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. Design and construction risk assessments e.g. CDM, legionella risk assessment e. Legislative requirements e.g. building control notification, heritage requirements f. Procurement and supply chain g. Identifying and measuring project success in line with project brief objectives h. Occupiers' budget and technical expertise in maintaining any proposed systems i. Maintainability and adaptability of the proposals j. Requirements for the production of project and end user documentation k. Requirements for commissioning, training and aftercare support. 4. The project team demonstrate how the project delivery stakeholder contributions and the outcomes of the consultation process have influenced or changed the Initial Project Brief, including if appropriate, the Project Execution Plan, Communication Strategy, and the Concept Design.	All	1-3. Consultation plan setting out the process and scope of the consultation. 1. Meeting minutes confirming role, responsibility and contribution definition for each of the key phases. 2. 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. 3. 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. 4. 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.	261020 Quartz provided information with respect to functionality, build quality and impact, internal and external facilities, management and operational implications, maintenance resources implications, inclusive and accessible design etc. Additional Information Required: - Quartz to provide completed sustainability brief, responsibilities matrix in accordance with MTTS email 141020. 141020 MTTS issued additional guidance, templates and pro forma letter text to Quartz. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because setting out roles and responsibilities for project delivery would be straight forward for a project of this scope and type. Time Critical Action - RIBA Stage 2 - Prior to completion of the Concept Design (RIBA Stage 2 or equivalent), the project delivery stakeholders have met to identify and define their roles, responsibilities and contributions for each of the key phases of project delivery.	QPS (PM)	

Man 01.2	Project Brief and Design - Stakeholder Consultation (Third Party)	1	1	0	5. 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 Minimum consultation content will be dependent on the building and scope of the project but would typically include the following: - Functionality, build quality and impact (including aesthetics). - Provision of appropriate internal and external facilities (for future building occupants and visitors/users). - Management and operational implications. - Maintenance resources implications. - Impacts on the local community, e.g. local traffic/transport impact. - Opportunities for shared use of facilities and infrastructure with the community/appropriate stakeholders, if relevant/appropriate to building type. - Compliance with statutory (national/local) consultation requirements. - Inclusive and accessible design. - Where services are taken from outside of the refurbishment area that affect the suitability of the service, e.g. domestic hot water services and legionella prevention. 6. 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. 7. 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.	All	5. Copy of the Consultation Plan and/or a letter 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. 6. Meeting minutes and/or Letter and/or design drawings confirming all changes to the Initial Brief and Concept Design occurred during the consultation. 7. Meetings minutes and/or Letter confirming that consultation feedback has been given to, and received by, all relevant parties by RIBA Stage 4.	141020 MTTs issued additional guidance to Quartz. Additional Information Required: - Quartz to provide completed stakeholder consultation evidence in accordance with MTTs email 141020. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought because consultation with stakeholders (i.e. professional teams and agents) in the manner BREEAM expects could be undertaken for a project of this type. Time Critical Action - RIBA Stage 2 - Prior to completion of the Concept Design stage, all relevant third Party stakeholders have been consulted by the design team and this cover the minimum consultation content.	QPS (PM)	
Man 01.3	Project Brief and Design - Sustainability Champion (Design)	1	1	0	9. A Sustainability Champion has been appointed to facilitate the setting and achievement of BREEAM performance targets for the project. The design stage Sustainability Champion is appointed to perform this role during the feasibility stage (Stage 1, Preparation and Brief stage, as defined by the RIBA Plan of Work 2013 or equivalent). 10. The defined BREEAM performance target(s) has been formally agreed between the client and design/project team no later than the Concept Design stage (RIBA Stage 2 or equivalent). 11. To achieve this Credit at the interim design stage assessment, the agreed BREEAM performance target(s) must be demonstrably achieved by the project design. This must be demonstrated via the BREEAM assessor's design stage assessment report.	All	9. Copy of a letter of appointment of a Sustainability Champion at the feasibility stage (RIBA Stage 1 or equivalent). 10. 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). 11. BREEAM assessor's design stage assessment report.	211020 Quartz provided completed letter text, sustainability brief, responsibilities matrix in accordance with MTTs email 141020. Additional Information Required: - MTTs to compile evidence set at completion of Design Stage assessment. 141020 MTTs issued additional guidance and pro forma letter text relating to BREEAM AP appointment to Quartz. 230920 MTTs note that, as compliance is demonstrated via the BREEAM assessor's Design Stage assessment report, this Credit cannot be signed off until the completion of all other Design Stage Credits. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because the appointment of a Sustainability Champion to facilitate setting and achievement of BREEAM targets would be achieved through the use of the BREEAM AP. Time Critical Action - RIBA Stage 1 - A Sustainability Champion has been appointed to facilitate the setting and achievement of BREEAM performance targets for the project. The design stage Sustainability Champion is appointed to perform this role during the feasibility stage (Stage 1, Preparation and Brief stage, as defined by the RIBA Plan of Work 2013 or equivalent). The defined BREEAM performance target(s) has been formally agreed between the client and design/Project Team no later than the Concept Design stage (RIBA Stage 2 or equivalent). Additional Team Appointment - A Sustainability Champion (Design Stage) must be appointed.	MTTS	

Man 01.4	Project Brief and Design - Sustainability Champion (Monitoring Progress)	1	1	0	12. The Sustainability Champion criteria 9, 10 and 11 have been achieved. 13. 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. To do this 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.	All	13. Copy of a letter of appointment for a sustainability champion to monitor progress against the agreed BREEAM performance targets throughout the design process.	211020 Quartz provided completed letter text, sustainability brief, responsibilities matrix in accordance with MTTs email 141020. Additional Information Required: - MTTs to compile evidence set at completion of Design Stage assessment. 141020 MTTs issued additional guidance and pro forma letter text relating to BREEAM AP appointment to Quartz. 230920 MTTs note that, as compliance is demonstrated via the BREEAM assessor's Design Stage assessment report, this Credit cannot be signed off until the completion of all other Design Stage Credits. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because the appointment of a Sustainability Champion to facilitate setting and achievement of BREEAM targets would be achieved through the use of the BREEAM AP. Time Critical Action - RIBA Stage 2 - 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. Additional Team Appointment - A Sustainability Champion (Monitoring Progress) must be appointed.	MTTs	
Man 02.1	Life Cycle Cost and Service Life Planning - Elemental LCC Plan	2	2	0	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 'Standardised method of life cycle costing for construction procurement' PD 156865:2008. 2. The LCC analysis shows: a. An outline LCC plan has been undertaken for the project based on the building's basic structure and envelope, appraising a range of options and based on the life expectancy of the refurbished building, e.g. 20, 30, 50+ years. b. The servicing strategy for the project outlining services component over a 15 -year period, in the form of an 'elemental LCC Plan'. c. A fit-out strategy is developed outlining fit-out options over a 10-year period.	All	1-2. Copy of the Life Cycle Cost analysis report in accordance with PD 156865:2008.	121020 QPS noted that the Life Cycle Cost analysis was underway by ADW Developments. Additional Information Required: - ADW Developments to provide Elemental Level Life Cycle Cost analysis report. 240920 QPS (PM) advised that the life cycle cost exercise would be undertaken by ADW Developments. Responsible Party updated from QPS (PM) to ADW Developments. 200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should be sought. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought as part of the 'Enhanced' score as the level of investigation to undertake elemental lifecycle costing is not generally considered appropriate for a project of this type and scope, but LCC analysis could be a cost-effective activity to secure Credits necessary to achieve an 'Excellent' rating. Credit assigned to QPS (PM) as they will need to appoint a suitable specialist/extend role of QS. 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 'Standardised method of life cycle costing for construction procurement' PD 156865:2008. Additional Team Appointment - A Life Cycle Cost Consultant (Elemental) must be appointed.	ADW	

Man 02.2	Life Cycle Cost and Service Life Planning - Component Level LCC Plan	1	1	0		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): Applicability/Building components Part 1 assessments, including components within scope of works. / Envelope, e.g. cladding, windows, and/or roofing Part 2 & 3 assessments including newly specified local and core services./ Newly specified local and/or core service equipment, e.g. boiler, air-conditioning, air handling unit, and/or controls etc. Parts 1 – 4, where finishes are within scope of works. / Finishes, e.g. walls, partitions, floors and/or ceilings etc. Where external spaces are within scope of works. / External spaces, e.g. alternative hard landscaping, boundary protection. Where carrying out a major refurbishment covering all parts of the scheme, a component level LCC plan shall be developed as above. 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.	All	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.	240920 QPS (PM) advised that the life cycle cost exercise would be undertaken by ADW Developments. Responsible Party updated from QPS (PM) to ADW Developments. Additional Information Required: - ADW Developments to provide Component Level Life Cycle Cost analysis report. 200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should be sought. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought as part of the 'Enhanced' score as the level of investigation to undertake component level lifecycle costing is not generally considered appropriate for a project of this type and scope, but LCC analysis could be a cost-effective activity to secure Credits necessary to achieve an 'Excellent' rating. Credit assigned to QPS (PM) as they will need to appoint a suitable specialist/extend role of QS. 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. Additional Team Appointment - A Life Cycle Cost Consultant (Component Level) must be appointed.	ADW	
Man 02.3	Life Cycle Cost and Service Life Planning - Capital Cost Reporting	1	1	0		Report the capital cost for the refurbishment/fit-out works in pounds per square metre (£k/m2 via the BREEAM Assessment Scoring and Reporting tool.	All	Reporting of capital cost in £/m2	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is reasonable to expect that the capital cost of the project could be identified and reported.	QPS (QS)	
Man 03.0	Responsible Construction Practices - Pre-Requisite	0	0	0		Report the capital cost for the refurbishment/fit-out works in pounds per square metre (£k/m2 via the BREEAM Assessment Scoring and Reporting tool.	All	Reporting of capital cost in £/m2	070820 MITS issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MITS to issue draft Contract Preliminaries text to QPS (QS). Done 070820. Mandatory Credit Requirement - For 'Excellent' and above - One Credit (Considerate Construction Element. For small scale or low value projects: where an individual is responsible for implementing and maintaining the following considerate construction practices: Keeping the site clear and tidy; Reducing impacts on the community through community engagement; Continuous improvements in safety; Commitments to respect and fair treatment of all workers; Suitable site and facilities for operatives and visitors. For other projects: where the contractor achieves 'compliance' with the criteria of a compliant scheme, i.e. the CCS).	QPS (QS)	

Man 03.1	Responsible Construction Practices - Environmental Management	1	1	0		2. 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 1 to 4, as defined in BS 8555:2003. 3. 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	All	2. A copy of the current EMS certificate (ISO 14001 / EMAS or equivalent) 3. A letter confirming procedures on-site are in accordance with Pollution Prevention Guidelines, Working at construction and demolition-sites: PPG6.	070820 MITS issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because use of a contractor that has an environmental management policy and that implement best practice Pollution Prevention is' expected for this project. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MITS to issue draft Contract Preliminaries text to QPS (QS). Done 070820. Mandatory Credit Requirement - For 'Excellent' and above - One Credit (Considerate Construction Element. For small scale or low value projects: where an individual is responsible for implementing and maintaining the following considerate construction practices: Keeping the site clear and tidy; Reducing impacts on the community through community engagement; Continuous improvements in safety; Commitments to respect and fair treatment of all workers; Suitable site and facilities for operatives and visitors. For other projects: where the contractor achieves 'compliance' with the criteria of a compliant scheme, i.e. the CCS).	QPS (QS)	
Man 03.2	Responsible Construction Practices - Sustainability Champion (Construction)	1	1	0		4. 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 will require action to be taken to address shortcomings in compliance. The Sustainability Champion will monitor site activities with sufficient frequency to ensure that risks of non-compliance are minimised. In this context, visits should occur at key stages of the construction process, at times where: works can be observed before they are covered up or new works or trades start; where significant risks of conflicts or errors could occur; where timing is critical to demonstrating compliance; where key evidence is required to be produced at specific times including, but not limited to photographic, delivery notes and other documentary evidence; and where different trades and systems come together and one could harm the integrity or compliance of another system's performance against BREEAM requirements. They will report on progress at relevant project team meetings including identifying potential areas of non-compliance and any action needed to mitigate. 6. The defined BREEAM performance target forms a requirement of the principal contractor's contract 7. 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.	All	4. Copy of a letter of appointment for a sustainability champion to monitor progress against the agreed BREEAM performance targets throughout the Construction, Handover and Close Out stages. 5. Contractor's Requirements/Preliminaries including BREEAM performance target. 6. BREEAM assessor's final post construction stage assessment report.	070820 MITS issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because the appointment of a Sustainability Champion to facilitate setting and achievement of BREEAM targets throughout the construction process could be achieved for a project of this type by imposing the requirement on the Main Contractor. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MITS to issue draft Contract Preliminaries text to QPS (QS). Done 070820. Time Critical Action - RIBA Stage 5 - The 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). Additional Team Appointment - A Sustainability Champion (Construction Stage) must be appointed.	QPS (QS)	

Man 03.3	Responsible Construction Practices - Considerate Construction	2	2	0		7. For small scale or low value refurbishment or fit-out projects (projects up to 500m2 total floor area or a contract value of up to £1m for education, industrial, institutions, leisure, retail and multi-residential buildings or up to £2m for health, mixed use, residential institutions and other buildings.): a. One Credit can be awarded where an individual(s) is responsible for implementing and maintaining the following considerate construction practices throughout the works stage (see Relevant definitions): i. Keeping the site clean and tidy ii. Reducing impacts on the community through community/neighbour engagement iii. Continuous improvements in safety iv. Commitments to respect and fair treatment of all workers v. Suitable site facilities for operatives and visitors b. Two Credits can be awarded where the contractor achieves 'compliance' with the criteria of a 'compliant' scheme 8. Where the refurbishment or fit-out project does not meet the definition of a small scale or low value project 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. Considerate Constructors Scheme is defined as one of the compliant schemes for the purpose of this BREEAM issue. The BREEAM Credits can be awarded as follows: <u>One Credit</u>: a CCS score between 25 and 34, a score of at least 5 in each of the five sections must be achieved <u>Two Credits</u>: a CCS score between 35 and 39, at least 7 in each of the five sections must be achieved.	All	Small scale projects: 7. 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. Large scale projects: 8. 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	070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the two Credits should be sought because achievement 'beyond compliance' with a compliant considerate construction scheme could be expected on a project of this type and scope. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820.	QPS (QS)	
Exe Man 03.3e	Responsible Construction Practices - Considerate Construction - Exemplary	0	0	0		Exemplary level performance: a CCS score of 40 or more, at least 7 in each of the five sections must be achieved.	All	Copy of report confirming achievement of compliance or beyond compliance with a compliant considerate construction scheme	060820 (Pre-Assessment Workshop) Credit discussed and MTTs noted that they do not recommend that this Exemplary Credit should be sought as the selected contractor may not be capable of achieving an exemplary CCS score.		
Man 03.4	Responsible Construction Practices - Monitoring of Refurbishment Or Fit-Out Site Impacts	2	2	0		9. 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 refurbishment or fit-out processes. This individual(s) must have the appropriate authority and responsibility to request and access the data required. The Sustainability Champion could perform this role. First Credit 10. Criterion 9 is achieved. 11. Monitor and record data of the site energy consumption in kWh (and where relevant, litres of fuel used) as a result of the use of construction plant, equipment (mobile and fixed) and site accommodation (as relevant to the project type). 12. Report the total carbon dioxide emissions (total kgCO2/project value) from the construction process via the BREEAM Assessment Scoring and Reporting tool. Second Credit 16. Criterion 9 is achieved 17. Monitor and record data on transport movements and impacts resulting from delivery of the majority of refurbishment or fit-out materials to site and refurbishment, fit-out and demolition or strip-out 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. Where Part 1 is being assessed, materials used in major building elements, including insulation materials ii. Where Part 2 is being assessed, materials used for core services iii. Where undertaking a comprehensive refurbishment including fit-out with a combination of Parts 1 - 4, materials used for major building elements, services and interior fit-out iv. Where within scope, ground works and landscaping materials v. Where undertaking a Parts 3 & 4 only assessment, materials used in the fit-out are included with the exception of small scale and low value refurbishment of fit-out projects (projects up to 500m2 total floor area or a contract value of up to £1m for education, industrial, institutions, leisure, retail and multi-residential buildings or up to £2m for health, mixed use, residential institutions and other buildings.) where this Credit is not applicable. c. Transport of construction waste from the construction gate to waste disposal processing or recovery centre gate. Scope of this monitoring must cover the construction waste groups outlined in the project's waste management plan. 18. Using the collated data, report separately for materials and waste, the total fuel consumption (litres) and/or total carbon dioxide emissions (kgCO2 eq), plus total distance travelled (km) via the BREEAM Assessment Scoring and Reporting tool.	All	9-16. 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. 17-18. A copy of a letter confirming the assignment of an individual for monitoring, recording and reporting transport movement in compliance with BREEAM criteria.	070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because monitoring of energy, water and transport impacts during refurbishment or fit-out could be expected on a project of this type and scope. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820.	QPS (QS)	

Man 04.1	Commissioning and Handover - Commissioning and Testing Schedule and Responsibilities	1	1	0	1. There is a schedule of commissioning and testing that identifies appropriate commissioning required for the scope of works that includes a suitable timescale for commissioning and re-commissioning of all relevant works carried out. Commissioning should be carried out where changes are being made to the following: a. Building services (including both complex and non-complex systems) b. Building services control systems (including Building Management Systems) c. Changes to the building fabric that will affect thermal performance. 2. The schedule will identify the appropriate standards that all commissioning activities will be conducted in accordance with such as current Building Regulations, BSRIA and CIBSE guidelines and/or other appropriate standards, where applicable. Where a building management system (BMS) is specified, , the following commissioning procedures must be carried out: a. Commissioning of air and water systems is carried out when all control devices are installed, wired and functional b. In addition to air and water flow results, commissioning results include physical measurements of room temperatures, off-coil temperatures and other key parameters as appropriate c. The BMS/controls installation should be running in auto with satisfactory internal conditions prior to handover d. All BMS schematics and graphics (if BMS is present) are fully installed and functional to user interface before handover e. The occupier or facilities team is fully trained in the operation of the system. 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.	All	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.	070820 MITS issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because having a commissioning and testing schedule and having commissioning responsibilities agreed is expected on a project of this type and scope. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MITS to issue draft Contract Preliminaries text to QPS (QS). Done 070820.	QPS (QS)	
Man 04.2	Commissioning and Handover - Commissioning Building Services	1	1	0	5. The commissioning and testing schedule and responsibilities Credit is achieved. 6. For projects where work is being undertaken to upgrade, renovate or install new building services and systems. For complex building services and systems (These include, but are not limited to, air-conditioning, comfort cooling, mechanical ventilation, displacement ventilation, complex passive ventilation, building management systems (BMS), renewable energy sources, microbiological safety cabinets and fume cupboards, cold storage enclosures and refrigeration plant, fume cupboards, microbiological safety cabinets), a specialist commissioning manager is appointed during the design stage (by either client or contractor) with responsibility for: i. Undertaking design reviews and giving advice on suitability for ease of commissioning ii. Providing commissioning management input to construction programming and during installation stages iii. Management of commissioning, performance testing and handover/post handover stages. b. For simple building services, this role can be carried out by an appropriate project team member (see criterion 3), provided they are not involved in the general installation works for the building services system(s).	if part 2 or 3	5-6. 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.	070820 MITS issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because commissioning of building services in line with best practice is expected on a project of this type and scope. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MITS to issue draft Contract Preliminaries text to QPS (QS). Done 070820. Time Critical Action - RIBA Stage 2 - The Specialist Commissioning Manager is appointed during the Design Stage to undertaking design reviews and giving advice on suitability for ease of commissioning, provide commissioning management input to construction programming and during installation stages and manage commissioning, performance testing and handover/post hand-over stages. Additional Team Appointment - A Specialist Commissioning Manager must be appointed.	QPS (QS)	

Man 04.3	Commissioning and Handover - Testing and Inspecting Building Fabric	0	0	0		7. Projects where the fabric of the building is being upgraded, the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths is quality assured through completion of a thermographic survey as well as airtightness testing and visual inspection at appropriate times during the refurbishment. The survey/testing is undertaken by a Suitably Qualified Professional, in accordance with the appropriate standard, with visual inspection conducted by a representative of the main contractor or by an independent inspector such as a clerk of works. Thermography surveys and airtightness testing are to be undertaken by suitably qualified professionals in accordance with the appropriate standards, as follows: Airtightness testing: by professionals with membership of ATTMA (Air Tightness Testing and Measurement Association) attained at organisational level maintaining UKAS accreditation (as air tightness testing laboratories to ISO 17025). Thermographic survey: by a professional holding a valid Level 2 certificate in thermography, as defined by the UKTA website. 8. Any defects identified in the site inspection, thermographic survey and the airtightness testing reports are rectified prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building/element.	Included if Part 1	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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment. Additional Team Appointment - A Thermographic Surveyor and Air Tightness Tester must be appointed.		
Man 04.4	Commissioning and Handover - Handover	1	1	0		9. A Building User Guide is developed or (where present) an existing Building User Guide is updated, prior to handover for distribution to the building occupiers and premises managers with a draft copy developed and discussed with users first (where the building occupants are known) to ensure the guide is most appropriate and useful to potential users. Building User Guide (BUG). Dedicated building/site specific guidance for the non-technical building user. The purpose of the guide is to help building users access, understand and operate the building efficiently and in a manner in keeping with the original design intent. A Building User Guide should be written in plain English and will provide easily accessible and understandable information relevant to the following stakeholders: - The building's staff (or where relevant residents) - The non-technical facilities management team/building manager - Other building users, e.g. visitors/community users. The content of the guide will be specific to the building type and end users, but broadly should include information on the following: - Overview of the building and its environmental strategy, e.g. energy/water/waste efficiency policy/strategy and how users should engage with/deliver the policy/strategy. - Building services overview and access to controls, e.g. where to find them, what they control, how to operate effectively and efficiently etc. - Pre-arrival information for visitors, e.g. access and security procedures/provisions - Provision of, and access to, shared facilities - Safety and emergency information/instructions - Building related operational procedures specific to building type/operation, e.g. laboratories - Building related incident reporting/feedback arrangements - Building related training information/links including information on legionella - Provision of, and access to, transport facilities, e.g. public transport, cyclist facilities, pedestrian routes etc. - Provision of, and access to, local amenities - Provide details and copies of risk assessments carried out including a legionella risk assessment - Re-fit, refurbishment and maintenance arrangements/considerations - Links, references and relevant contact details There is no requirement on the format the Building User Guide should take.	All	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.	070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because provision of a building users guide and implementation of a training schedule for occupants at handover is expected on a project of this type and scope. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820. Mandatory Credit Requirement - For 'Excellent' and above - Criterion 9 (Building User Guide: A Building User Guide is developed or an existing Building User Guide is updated.).	QPS (QS)	

Man 05.1	Aftercare - Aftercare Support	0	0	0		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 features of the refurbished building including the design intent and how to use the building to ensure it operates as efficiently and effectively as possible (including the use of local services and controls and central services, as applicable). b. On-site facilities management training, to include a walkabout of the refurbished area 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 and to conduct a walk-around to examine how the refurbished area of the building is being used/operated to identify any issues that need to be communicated to building users/facilities managers (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 coordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months (for Part 4, where local metering is available and accessible), once the building is occupied. Discrepancies between actual and predicted performance should be identified, with a commitment to identify actions required to address any discrepancies such as adjusting systems and/or to develop/review operational policies to influence user behaviours accordingly.	All	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	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Exe Man 05.1e	Aftercare - Exemplary	0	0	0		6. There are, or will be, operational infrastructure and resources in place to coordinate the following activities at quarterly intervals for the first three years of building occupation: a. Collection of occupant satisfaction, energy consumption and (where available) water consumption data. b. Analysis of the data to check the building is performing as expected and make any necessary adjustments to systems controls or to inform building user behaviours. c. Setting targets and/or appropriate actions for reducing water and energy consumption and monitor progress towards these. d. Feedback any 'lessons learned' to the design team and developer for use in future projects. e. Provision of the actual annual building energy, water consumption (where available and accessible) and occupant satisfaction data to BRE for the purpose of future BREEAM performance benchmarking. BRE for the purpose of future BREEAM performance benchmarking.	All	Ongoing aftercare support for first 12 months and the monitoring of energy and water use to identify any discrepancies in performance from design.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Man 05.2	Aftercare - Seasonal Commissioning	0	0	0		3. The following seasonal commissioning activities will be completed over a minimum 12-month period, once the building becomes substantially occupied: a. Complex systems - Specialist Commissioning Manager: i. Testing of all building services under full load conditions, i.e. heating equipment in mid-winter, cooling/ventilation equipment in mid-summer, and under part load conditions (spring/autumn). ii. Where applicable, testing should also be carried out during periods of extreme (high or low) occupancy. iii. Interviews with building occupants (where they are affected by the complex services) to identify problems 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.	If Part 2 or 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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

Man 05.3	Aftercare - Post Occupancy Evaluation	0	0	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. Where a fit-out specification is based upon a standard/corporate specification (e.g. large-scale rolling fit-out programmes) it is not necessary to conduct POE for every fit-out and compliance can be demonstrated for requirement 5 where a POE exercise has been carried out for each of the key specification types and where POE has also been carried out for the prototype fit-out, prior to full roll out.. 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). b. 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. c. Sustainability performance (energy/water consumption, performance of any sustainable features or technologies, e.g. materials, renewable energy, rainwater 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. Refer to the BREEAM RFO 2014 Manual for a definition of 'appropriate dissemination.' This also provides advice on appropriate dissemination where the building or building information is commercially or security sensitive.	All	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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Hea 01.1	Visual Comfort - Glare Control	1	0	0	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. Glare control must provide shading from both high level summer and low level winter sun. Where using fixed systems, design studies can be used to demonstrate that sunlight is prevented from reaching building occupants during occupied hours. Curtains (where used without other forms of shading) do not meet the criteria for the glare control criteria, as they do not provide sufficient control to optimise daylight into the space. Furthermore, the use of curtains to control glare is likely to cause occupants to rely more on artificial lighting. The only exception to this rule is in healthcare buildings in patient occupied spaces, treatment rooms and other high infection risk areas where the use of blinds is not recommended due to known risks relating to infection control. 2. The glare control strategy avoids increasing lighting energy consumption, by ensuring that: a. The glare control system is designed to maximise daylight levels under all conditions while avoiding disabling glare in the workplace or other sensitive areas. The system should not inhibit daylight from entering the space under cloudy conditions, or when sunlight is not on the façade: AND b. The use or location of shading does not conflict with the operation of lighting control systems.	If Part 1 or 4	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.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought because the provision of glare control measures of the type required by BREEAM is unlikely to be within the scope of the project.		

Hea 01.2	Visual Comfort - Daylighting	3	0	0	3. Up to three Credits are awarded on a sliding scale depending on the percentage of relevant building areas that comply with one of the following daylighting criteria: a. The relevant building areas meet good practice daylight factor(s) and other criterion as outlined in Table - 12 and Table - 13: OR b. The relevant building areas meet good practice average and minimum point daylight illuminance criteria as outlined in Table - 14. Office building Criteria extracted from Table 14: - Building/area type – Office, All occupied spaces - Average daylight factor required – 2% - Minimum area (m2) to comply for 1 Credit – 40% 2 Credits – 60 % 3 Credits – 80 % - Other requirements - At least 90 lux for 2000 hours per year or more. - Internal association/atrium area and teaching, lecture and seminar spaces have different requirements, please refer to the BREEAM RFO 2014 Manual for detailed values, other building types described as well. 4. Two Credits where daylighting provision, averaged over all relevant spaces, has improved after refurbishment or fit-out by 30% or more and there is a minimum glazing to floor area ratio of either: a. 5% glass to floor area ratio for side windows; OR b. 2.5% glass to floor area ratio for roof lights; 5. One Credit where daylighting provision, averaged over all relevant spaces, has improved after refurbishment or fit-out by 15% or more and there is a minimum glazing to floor area ratio of either: a. 5% glass to floor area ratio for side windows; OR b. 2.5% glass to floor area ratio for roof lights Note: The improvement in daylighting provision is calculated using the BREEAM Hea 01 Calculator tool based upon either the increase in glazing area, transmittance, illuminance or percentage daylight factor. Please refer to the Methodology section for calculation procedures.	If Part 1 or 4	Design drawings and daylight calculations.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought as due to the proposed layout of the development, it is unlikely that the required daylighting levels will be achieved in all relevant areas. Additional Team Appointment - A Daylight Consultant must be appointed.		
Exe Hea 01.2e	Visual Comfort - Daylighting - Exemplary	0	0	0		If Part 1 or 4	Design drawings and daylight calculations.	As above.		
Hea 01.3	Visual Comfort - View Out	2	0	0	6. Two Credits where 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, defined as a view of a landscape or buildings (rather than just the sky) at seated eye level (1.2 – 1.3m) within the relevant building areas and should ideally be through an external window. A view into an internal courtyard or atrium will comply provided the distance from the opening to the back wall of the courtyard/atrium is at least 10m (therefore allowing enough distance for the eyes to refocus). The view cannot be an internal view across the room, as this is likely to become obstructed by partitions, filing cabinets etc. 7. One Credit where 80% of the floor area space in relevant building areas is within 7m of a wall which has a window or permanent opening that provides an adequate view out and criterion 8 is met. - The window/opening must be ≥ 20% of the surrounding wall area (area in m2 of the internal wall on which the window/opening is located, including the area of the window/opening itself.). 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 8206. 9. In addition, specific requirements apply to Prison buildings, Multi-residential buildings, Healthcare buildings with inpatient areas (one additional Credit) Please refer to the RFO 2014 manual.	If Part 1 or 4	Design of the space to optimise desks with a view out in accordance with view out criteria	060820 (Pre-Assessment Workshop) Credit discussed and MTTS noted that they do not recommend that the Credit is sought, as due to the proposed layout of the development, it is very unlikely that the view out criteria will be achieved in all relevant areas.		

Hea 01.4	Visual Comfort - Internal and External Lighting	1	1	0		10. All fluorescent and compact fluorescent lamps are fitted with high frequency ballasts. 11. 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. 12. 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. 13. All external lighting located within the refurbishment or fit-out 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. 14. Internal lighting is zoned to allow for occupant control (see Relevant definitions) in accordance with the criteria below for relevant areas present within the building: In office areas, zones of no more than four workplaces Workstations adjacent to windows/atria and other building areas separately zoned and controlled Seminar and lecture rooms: zoned for presentation and audience areas Library spaces: separate zoning of stacks, reading and counter areas Teaching space or demonstration area Whiteboard or display screen Auditoria: zoning of seating areas, circulation space and lectern area Dining, restaurant, café areas: separate zoning of serverly and seating/dining areas Retail: separate zoning of display and counter areas Bar areas: separate zoning of bar and seating areas Wards or bedded areas: zoned lighting control for individual bed spaces and control for staff over groups of bed spaces Treatment areas, dayrooms, waiting areas: zoning of seating and activity areas and circulation space with controls accessible to staff.	If Part 3	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because design to include best practice internal and external lighting levels and zoning is expected for the project.	MC M+E	
Hea 02.1	Indoor Air Quality - IAQ Plan	1	1	0		1. An indoor air quality plan has been produced and implemented, with the objective of facilitating a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during the design, construction and occupation of the building. 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. Protection of Heating Ventilation and Air Conditioning (HVAC) systems from sources of pollution during refurbishment/fit-out works e.g. dust e. Procedures for protecting the indoor air quality of areas outside of the refurbishment or fit-out zone that may be affected by the refurbishment/fit-out works f. Procedures for identifying and implementing third party testing and analysis required to ascertain that the contaminant sources have been removed effectively before occupancy g. Commitments for maintaining indoor air quality in-use, e.g. maintenance and cleaning of the HVAC system, ductwork and filters.	All	A copy of the Indoor Air Quality Plan in compliance with the BREEAM criteria.	150920 Air Quality Consultants appointed by QPS (PM). Responsible Party updated from QPS (PM) to QCIC. Additional Information Required: - AQC to provide Indoor Air Quality Plan. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is anticipated that an air quality plan can be produced by a specialist consultant and its recommendations incorporated into the design. Credit assigned to QPS (PM) as they will need to appoint a suitable specialist. Action -MTTS to suggest names for Indoor Air Quality Specialist to QPS, for them to procure quotations for an Indoor Air Quality Plan. Additional Team Appointment - A Specialist Consultant for Indoor Air Quality Plans must be appointed.	AQC	
Exe Hea 02.1e	Indoor Air Quality - IAQ Plan - Exemplary	0	2	0		<u>One Credit</u> 15. Criterion 6 has been achieved. 16. All seven remaining product categories listed in Table - 20 meet the testing requirements and emission levels criteria for Volatile Organic Compound (VOC) emissions (listed in the table). 17. For products B – F listed in Table - 20, the formaldehyde emission levels have been measured and found to be less than or equal to 0.06mg/m3 air in accordance with the approved testing standards in Table - 20. <u>Two Credits</u> 18. Criterion 6 has been achieved. 19. All seven remaining products categories listed in Table - 20 meet the testing requirements and emission levels criteria for Volatile Organic Compound (VOC) emissions (listed in the table). 20. For products B to F listed in Table - 20, the formaldehyde emission levels have been measured and found to be less than or equal to 0.01mg/m3 air, in accordance with the approved testing standards in Table - 20. Please refer to the BREEAM RFO 2014 Manual for Table - 20.	All	A copy of the Indoor Air Quality plan in compliance with the BREEAM criteria.	150920 Air Quality Consultants appointed by QPS (PM). Responsible Party updated from QPS (PM) to AQC. Additional Information Required: - AQC to provide Indoor Air Quality Plan. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is anticipated that products meeting the required VOC standards should be specifiable within the palette of materials envisaged for the project and appropriate testing on-site can be included in the Contractor's scope. Action - MTTS to provide additional guidance to BGY (refer to Hea 02.3) Done 070820. Additional Team Appointment - A Specialist Consultant for Indoor Air Quality Plans must be appointed.	AQC	

Hea 02.2	Indoor Air Quality - Ventilation	1	1	0	Refurbishment and fit-out works include measures to minimise the concentration and recirculation of pollutants in the building as follows: 2. Provide fresh air into the building in accordance with the criteria of the relevant standard for ventilation. 3. Design ventilation pathways to minimise the build-up of air pollutants in the building, as follows: a. In air conditioned and mixed mode buildings/spaces: i. The building's air intakes and exhausts are over 10m apart and intakes are over 20m from sources of external pollution; OR ii. The location of the building's air intakes and exhausts, in relation to each other and external sources of pollution, is designed in accordance with BS EN 13779:20071 Annex A2. b. In naturally ventilated buildings/spaces: openable windows/ventilators are over 10m from sources of external pollution. 4. Where present, HVAC systems must incorporate suitable filtration to minimise external air pollution, as defined in BS EN 13779:2007 Annex A3. 5. Areas of the building subject to large and unpredictable or variable occupancy patterns have carbon dioxide (CO2) or air quality sensors specified and: a. In mechanical 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.	If Part 2 or 3	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because design to include best practice ventilation levels is expected for the project.	MC M+E	
Hea 02.3	Indoor Air Quality - Volatile Organic Compounds	2	2	0	<u>First Credit</u> 6. All decorative paints and varnishes specified meet the criteria in Table - 20 7. At least five of the seven remaining product categories listed in Table - 20 meet the testing requirements and emission levels criteria for volatile organic compound (VOC) emissions (listed in the table). <u>Second Credit</u> 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 8 and 9, 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, including re-measurement. 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 diffusive sampling d. BS ISO 16000-3: 2011 Formaldehyde and other carbonyls in air by active sampling. 12. The measured concentration levels of formaldehyde (µg/m3) and TVOC (µg/m3) are reported, via the BREEAM Assessment Scoring and Reporting Tool.	If Part 4	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. 8-12. 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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the first Credit should be sought because the Design Team believe that products meeting the required VOC standards should be specifiable within the palette of materials envisaged for the project. The second Credit is achievable where a commitment can be made to test VOC levels post construction and they are found to be within the limits required by BREEAM. This is reflected in the scoring. Action - MTTs to provide additional guidance to BGY. Done 070820.	MC ARCH	

Hea 02.4	Indoor Air Quality - Potential For Natural Ventilation	1	0	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 AM107 (or for education buildings by using the ClassVent tool). b. For fit-out projects (Part 3 assessments), local services are designed to provide fresh air via a natural ventilation strategy and are appropriately designed according to the room depth in accordance with CIBSE AM10. 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 (The two levels of ventilation must be able to achieve the following: a. Higher level: higher rates of ventilation achievable to remove short term odours and/or prevent summertime overheating b. Lower level: adequate levels of draught-free fresh air to meet the need for good indoor air quality throughout the year, sufficient for the occupancy load and the internal pollution loads of the space). Note: Any opening mechanisms must be easily accessible and provide adequate user-control over air flow rates to avoid draughts. Relevant industry standards for ventilation can be used to define 'adequate levels of fresh air' sufficient for occupancy and internal air pollution loads relevant to the building type. Note: Multi-residential buildings with self-contained flats and individual bedrooms must have a degree of openable window function. This does not need to provide two levels of user-control (as required above), but must be occupant controlled.	If Part 1, 2 or 3	Provision of fresh air through a natural ventilation strategy	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought because a natural ventilation strategy is not currently proposed for the building.		
Hea 03.1	Safe Containment In Laboratories - Laboratory Containment Devices and Containment Areas	0	0	0		Production of an objective risk assessment of the proposed laboratory facilities. Containment devices such as fume cupboards meet best practice safety and performance requirements and objectives. Containment level 2 and 3 laboratory facilities to meet best practice safety and performance criteria where specified.	If Part 2, 3 or 4 and if Labs Specified	Design of new laboratory systems or retrofitting of existing facilities to best practice standards	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Hea 03.2	Safe Containment In Laboratories - Buildings With Level 2 and 3 Laboratory Facilities	0	0	0			If Part 2, 3 or 4 and if level 2 & 3 labs specified	Meeting best practice performance and safety criteria	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

Hea 04.1	Thermal Comfort - Thermal Modelling	1	1	0		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. Where undertaking a Part 4 assessment a competent person (e.g. chartered building services engineer) must assess the suitability of existing building services and controls to identify any changes that may be required as a result of fit-out works (e.g. as a result of changes to internal layout, occupant density, additional equipment that may increase cooling loads etc.). 5. 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.	All	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.	260920 MTTs note thermal modelling is commencing. Additional Information Required: - MTT to provide thermal modelling outputs for thermal comfort in due course. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because thermal modelling in accordance with CIBSE guidance is understood to be part of the current project scope. Time Critical Action - RIBA Stage 3 - The Energy Consultant is appointed to carry out the thermal modelling of the building using software in accordance with CIBSE AM11 Building Energy and Environmental Modelling. The software used to carry out the simulation at the detailed design stage provides full dynamic thermal analysis. Additional Team Appointment - A Energy Consultant (not for Part 4 assessment only) or a Chartered Building Services Engineer (for Part 4 assessment only) must be appointed.	MTTS	
Hea 04.2	Thermal Comfort - Adaptation - For A Projected Climate Change Scenario	1	0	0		6. Criteria 1 to 4 are achieved. 7. The thermal modelling demonstrates that the relevant requirements set out in criterion 3 are achieved for a projected climate change environment. Dynamic thermal simulation software packages currently provide the facility for building designs to be assessed under external climatic conditions specific to geographic location. Industry standard weather data for the UK is available in the form of Test Reference Years (TRYs) and Design Summer Years (DSYs) provided by CIBSE. This weather data enables thermal analysis of building designs under current climatic conditions, yet no account is taken of the projected variations in weather data that will occur during the building's life cycle as a result of climate change. For BREEAM, the DSY weather file should be used for the fiftieth percentile. The weather file represents the minimum requirements to perform thermal modelling under a climate change scenario and subsequently demonstrate compliance. Where design teams feel that added consideration of building occupant risk/sensitivity to overheating is necessary, weather files can be used that exceed the minimum requirements outlined above. The time periods indicated above have been selected to represent the building services life cycle likely to be present in each building services strategy type. A shorter time period is chosen for mechanically ventilated/mixed mode building types due to consideration of mechanical servicing equipment life span (before major upgrade or replacement is required), and to avoid over-specification of plant which could lead to inefficient operation. 8. 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 the future using passive design solutions in order to subsequently meet the requirements under criterion 7. 9. For air conditioned buildings, the PMV and PPD indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.	If Part 1, 2 or 3	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.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought because modelling future climate change environments in not Part of the current project scope.		

Hea 04.3	Thermal Comfort - Thermal Zoning and Controls	1	1	0	10. Criteria 1 to 4 are achieved. 11. The thermal modelling analysis (undertaken for compliance with criteria 1 to 4) has informed the temperature control strategy for the building and its users. 12. 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. Where specified, any new local cooling or heating services (or changes to existing services) are designed to ensure they do not conflict with core services (e.g. conflicts between two separate cooling systems, conflicts between core heating and locally provided cooling systems). c. 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). d. 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. e. The need or otherwise for an accessible building user actuated manual override for any automatic systems. If Part 2 or 3 11. Thermal comfort study AND 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 141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought as the design team are likely to develop a thermal zoning strategy that has been informed by the thermal modelling. MC M+E
Hea 05	Acoustic Performance - Acoustic Performance	3	3	0	Up to three Credits for Education, Healthcare, Office and Law courts building types 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: - Sound insulation - Indoor ambient noise level - Reverberation times. Please refer to the BREEAM RFO 2014 Manual for building type specific requirements. Where undertaking a partial refurbishment or fit-out, the performance standards and testing requirements defined in the checklist and tables section for the following principles are applicable to each assessment part: Part 1: criteria for sound insulation and indoor ambient noise levels Part 2: criteria for indoor ambient noise levels only Part 3: criteria for sound insulation and indoor ambient noise levels Part 4: sound insulation and reverberation control See relevant compliance notes on applicable assessment criteria, where undertaking a partial refurbishment or fit-out for further information on how to apply the appropriate acoustic performance standards and testing requirements defined in this issue. Up to three Credits are available for Industrial, Retail, Prisons and 'Other' building types Up to two Credits Where the building meets the acoustic performance standards and testing requirements detailed in Table - 25 (see Checklists and tables) for all relevant functional areas. Where undertaking a partial refurbishment or fit-out, the performance standards and testing requirements detailed in Table - 5 for the following principles are applicable to each assessment part: Part 1: criteria for sound insulation and indoor ambient noise levels Part 2: criteria for indoor ambient noise levels only Part 3: criteria for sound insulation and indoor ambient noise levels Part 4: sound insulation and reverberation control OR Up to three Credits Where a suitably qualified acoustician (see relevant definitions) is appointed to define a bespoke set of performance requirements for all function areas in the building using the three acoustic principles defined in criterion 1, setting out the performance requirements for each and the testing regime required. Up to four Credits are available for Multi-residential and Other, Residential institutions building types One, three or four Credits are available for Multi-residential and Other, Residential institution buildings where the relevant criteria in the checklists and table section have been applied. Please also see CN12. All 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. 151020 Sandy Brown advised that it would be reasonable to seek all three Credits and that it would be reasonable to make the statement that 'the developer's scope of works will enable a future tenant utilising a typical fit-out and specification to meet the levels required to demonstrate compliance with the BREEAM criteria'. Additional Information Required: - Acoustician to provide acoustic report and calculations undertaken. 141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from Sandy Brown to Main Contractor's Acoustician. 240920 QPS (PM) advised that Sandy Brown would undertake the role of Suitably Qualified Acoustician. Responsible Party updated from QPS(IACO) to Sandy Brown. 200820 (Review with AAM) It was agreed that this 'Enhanced' (third) Credit should not be sought, although the Acoustician should advise whether this is achievable once they are appointed. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is likely a decent level of acoustic performance will be required on a project of this type and scope. Action - QPS to provide details of Acoustician when appointed/instructed. Additional Team Appointment - A Suitably Qualified Acoustician must be appointed. MC ACO

Hea 06	Safety and Security - Security of Site and Building	1	1	0		1. A Suitably Qualified Security Specialist (SQSS) conducts an evidence based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent), see compliance note where the refurbishment or fit-out zone comprises part of a larger building. 2. The SQSS develops a set of recommendations or solutions during or prior to Concept Design (RIBA Stage 2 or equivalent). These recommendations or solutions aim to ensure that the design of buildings, public and private car parks and public or amenity space are planned, designed and specified to address the issues identified in the preceding SNA. 3. The recommendations or solutions proposed by the SQSS are implemented. When confirming whether the recommendations or solutions set out by the suitably qualified security specialist(s) have been implemented at the post construction stage, it may be necessary for the assessor to use one or more of the following evidence types, supplied by the design team: - Desk-based evidence e.g. manufacturers literature/certificates etc. - Site-based evidence e.g. site inspection report/photographs etc. Any deviation from those recommendations or solutions will need to be justified, documented and agreed in advance with a suitably qualified security specialist.	If Part 1 or 4	1. A copy of a letter confirming the appointment of a Suitably Qualified Security Specialist to conduct a Security Needs Assessment. 2. Correspondence or copy of the report/feedback from the Suitably Qualified Security Specialist. 3. A marked-up plan highlighting that the recommendations from the SQSS are implemented.	021120 QCIC provided Security Needs Assessment report. Responsible Party updated from QCIC to Main Contractor - Architect with M+E Engineer Additional Information Required: - Main Contractor - Architect with M+E Engineer to provide evidence of implementation of Security Needs Assessment recommendations within their design. 150920 QCIC appointed by QPS (PM). Responsible Party updated from QPS (PM) to AQC. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because engagement with an ALO/CPDA or 'Suitably Qualified Security Specialist' (SQSS) to produce a Security Needs Assessment is expected to occur at the appropriate RIBA stage and their recommendations can be incorporated into the design. Action - MTTS to suggest names for SQSS to QPS, for them to procure quotations for a Security Needs Assessment. Done 070820. Time Critical Action - RIBA Stage 2 - A Suitably Qualified Security Specialist (SQSS) conducts an evidence based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent), see compliance note where the refurbishment or fit-out zone comprises Part of a larger building. Additional Team Appointment - A Suitably Qualified Security Specialist (SQSS) must be appointed.	QCIC	
Ene 01	Reduction of Energy Use and Carbon Emissions - Reduction of Energy Use and Carbon Emissions	15	7	0		Option 1: Whole building energy model For projects that want to gain recognition for improvements made at the whole building level, using whole building energy modelling National Calculation Methodology (NCM) compliant software Up to fifteen Credits - Whole building energy model (option 1) 1. Calculate the Energy Performance Ratio for Non Domestic Refurbishment (EPRNDR) and compare with the benchmarks below to determine the corresponding number of BREEAM Credits. BREEAM Credits EPRNDR 1 ≥ 0.06 2 ≥ 0.12 3 ≥ 0.18 4 ≥ 0.24 5 ≥ 0.30 6 ≥ 0.36 7 ≥ 0.42 8 ≥ 0.48 9 ≥ 0.54 10 ≥ 0.60 11 ≥ 0.66 12 ≥ 0.72 13 ≥ 0.78 14 ≥ 0.84 15 ≥ 0.90 Minimum requirements - Excellent Requires a minimum of 6 Credits to be achieved (equivalent to an EPRNDR of ≥ 0.36). - Outstanding Requires a minimum of 10 Credits to be achieved (equivalent to an EPRNDR of ≥ 0.60). Option 2: Elemental level energy model For projects where the scope of work is limited to a single or multiple assessment part (from parts 1, 2, 3 and 4) such as partial or minor refurbishment projects and fit-out projects. This option can, however, be used by projects undertaking a full refurbishment (all assessment parts). Note: The Credits available for option 2 are dependent upon the applicable assessment part and building type as defined in the BREEAM Refurbishment and Fit-out reporting tool. However irrespective of the building type and assessment scope, it is always possible to score up to 100% of the Credits available to each project.	If Part 1, 2 or 3	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).	231020 MTT provided preliminary thermal model results, demonstrating that an EPCndr of 0.44, equivalent to 7 credits is anticipated. Additional Information Required: - MTTS to populate BREEAM Ene 01 Calculator Tool 060820 (Pre-Assessment Workshop) Credit discussed and MTTS noted that For 'Excellent' and above Six Credits were required. Mandatory Credit Requirement - For 'Excellent' and above - Full assessments (Parts 1,2,3 and 4): Six Credits, varies for other assessment types (EPRNDR has to be equal to or greater than 0.36). Time Critical Action - RIBA Stage 2 - The Suitably Qualified Heritage Conservation Specialist at the Concept Design stage to investigate the implications of improving building fabric and services performance while minimising the potential negative impacts of both the historic character of the building, the condition of the building fabric and indoor air quality (historic buildings only). Additional Team Appointment - A Suitably Qualified Heritage Conservation Specialist must be appointed (historic buildings only)	MTTS	

Exe Ene 01.1e	Reduction of Energy Use and Carbon Emissions - Exemplary	0	0	0		The following outlines the exemplary level criteria to achieve up to five innovation Credits for this BREEAM issue: <u>Two Credits - Zero regulated carbon</u> 8. The building achieves an EPRNDR ≥ 0.9 and zero net regulated CO2emissions Up to four Credits - Zero regulated carbon and carbon neutral unregulated energy 9. Criterion 8 has been achieved. 10. An equivalent percentage of the building's modelled regulated operational delivered energy consumption is generated by carbon neutral on-site or near-site sources and used to meet energy demand from unregulated building systems or processes. Five Credits - Carbon negative 11. The building is carbon negative in terms of its total modelled operational delivered energy consumption, including regulated and unregulated energy	If Part 1, 2 or 3	Measuring improvement in existing energy performance through using the BREEAM Ene01 assessment tools at the whole building or elemental approach as appropriate to scope of works.	060820 (Pre-Assessment Workshop) Credit discussed and MTTs noted that they do not recommend that the Exemplary Credits should be sought as the development is highly unlikely to achieve zero regulated carbon and carbon neutral unregulated energy or carbon negative levels.		
Ene 02.1	Energy Monitoring - Sub-Metering of Major Energy Consuming Systems	1	1	0		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. Where the total consumption of any single end use category (or a combination of end use categories added together) is estimated to account for less than 10% of the annual energy consumption for a given fuel type, it is not necessary for this end use to be sub-metered. In this instance, the design team should demonstrate that the respective end usels) is expected to account for less than 10% of the annual energy consumption for the fuel type. Where a given end usels) will clearly account for less than 10% of the total annual energy consumption for the fuel type in question, a simple hand calculation or use of benchmark data to demonstrate this is acceptable. 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. 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. Examples include automatic meter reading systems (AMR) and building energy management systems (BEMS). Automatic monitoring and targeting (aM&T) is an example of a management tool that includes automatic meter reading and data management. 3. The end energy consuming uses are identifiable to the building users, for example through labelling or data outputs.	If Part 2, 3 or 4	Specification document or technical drawings confirming: - 90% of energy load is appropriately metered through energy metering systems - 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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is anticipated that appropriately detailed metering strategy will be provided as part of the project scope. Mandatory Credit Requirement - For 'Very Good' and above - Parts 2, 3 and 4: One Credit (First Sub-Metering Credit: 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. In buildings with a total useful floor area greater than 1000m2: the energy consuming systems are metered using an appropriate energy monitoring and management system. In smaller buildings: they are metered either with an energy monitoring and management system or with separate accessible energy sub-meters).	MC M+E	
Ene 02.2	Energy Monitoring - Sub-Metering of High Energy Load and Tenancy Areas	1	1	0		4. 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.	If Part 2 or 3	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought for the development because the project scope includes the full provision of services to the tenanted floors.	MC M+E	
Ene 03	External Lighting - External Lighting	1	1	0		<u>One Credit</u> 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.	All	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because providing appropriately specified external lighting is likely to be straightforward for the project and a relatively small number of fittings are likely to be necessary at the new building entrances.	MC M+E	

Ene 04.1	Low Carbon Design - Passive Design Analysis	1	1	0		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 existing building fabric, form, site location and outline scheme design to influence decisions made during the Concept Design stage (RIBA Stage 2 or equivalent) and identifies opportunities for the implementation of passive design solutions and retrofit measures that reduce demands for energy consuming building services As a minimum, the passive design analysis should cover: Site location, Site weather, Microclimate, Building layout, Building orientation, Building form, Building fabric, Thermal mass or other fabric thermal storage, Building occupancy type, Daylighting strategy, Ventilation strategy, Adaptation to climate change. 3. The building uses passive design measures to reduce the total heating, cooling, mechanical ventilation and lighting loads and energy consumption in line with the findings of the passive design analysis and the analysis demonstrates a meaningful reduction in the total energy demand as a result The amount of energy or CO2 emissions reduction is not specified in the criteria in this issue. However, it should not be a trivial amount. As a guide, the installation should contribute at least 5% of overall building energy demand and/or CO2 emissions.	If Part 1, 2 or 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.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because passive design analysis as part of the thermal modelling exercise underway. Time Critical Action - RIBA Stage 2 - The Project Team carries out an analysis of the existing building fabric, form, site location and outline scheme design to influence decisions made during the Concept Design stage (RIBA Stage 2 or equivalent) and identifies opportunities for the implementation of passive design solutions and retrofit measures that reduce demands for energy consuming building services.	MTTS	
Ene 04.2	Low Carbon Design - Free Cooling	1	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 below to reduce the cooling energy demand (i.e. it does not use active cooling): - Night time cooling (which could include the use of a high exposed thermal mass) - Ground coupled air cooling - Displacement ventilation (not linked to any active cooling system) - Ground water cooling - Surface water cooling - Evaporative cooling, direct or indirect - Desiccant dehumidification and evaporative cooling, using waste heat - Absorption cooling, using waste heat - The building does not require any significant form of active cooling or mechanical ventilation (i.e. naturally ventilated).	If Part 1 or 2	Drawings or specifications confirming the implementation of free cooling measures. Results from a dynamic simulation model demonstrating the feasibility of the free cooling strategy and meeting the first Credit of Hea 04	220920 (Sustainability Workshop) MTTs noted that the use of the proposed displacement ventilation system would allow this Credit to be sought. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought because implementation of free cooling measures is not Part of the current project scope.	MTTS	
Ene 04.3	Low Carbon Design - Low and Zero Carbon Technologies	1	1	0		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 (An individual who has acquired substantial expertise or a recognised qualification for undertaking assessments, designs and installations of low or zero carbon solutions in the commercial buildings sector and is not professionally connected to a single low or zero carbon technology or manufacturer.) 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: - Energy generated from LZC energy source per year - Carbon dioxide savings from LZC energy source per year - Life cycle cost of the potential specification, accounting for payback - Local planning criteria, including land use and noise - Feasibility of exporting heat/electricity from the system - Any available grants - All technologies appropriate to the site and energy demand of the development. - Reasons for excluding other technologies - 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 The amount of energy or CO2 emissions reduction is not specified in the criteria in this issue. However, it should not be a trivial amount. As a guide, the installation should contribute at least 5% of overall building energy demand and/or CO2 emissions.	If Part 2	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%).	220920 (Sustainability Workshop) MTT noted that heat pumps were anticipated as part of the services strategy and so the Credit may be sought. 200820 (Review with AAM) it was agreed that this 'Enhanced' Credit should not be sought for the purposes of BREEAM alone. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought because the provision of renewables is not currently within the scope of the project. 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 to establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy source(s) for the building/development. Additional Team Appointment - A Energy Specialist must be appointed to undertake a Feasibility study.	MTTS	

Ene 05.1	Energy Efficient Cold Storage - Refrigeration Energy Consumption	0	0	0		1. The refrigeration system, its controls and components have been designed, installed and commissioned as follows: a. In accordance with the Code of Conduct for carbon reduction in the refrigeration retail sector (The Code of Conduct has been developed by the Carbon Trust, in partnership with the Institute of Refrigeration (IoR) and the British Refrigeration Association (BRA). The Code is intended to compliment the Carbon Trust Refrigeration Road Map.) and BS EN 378-2 Refrigeration systems and heat pumps - Safety and environmental requirements. b. Using robust and tested refrigeration systems/components, normally defined as those included on the Enhanced Capital Allowance (ECA) Energy Technology Product List (ETPL) or an equivalent list (Where specified as part of the refrigeration system, products used for the following components must be listed on the ECA Energy Technology Product List (or equivalent list): - Air cooled condensing units - Automatic air purgers - Cellar cooling equipment - Commercial service cabinets (cold food storage) - Curtains, blinds, sliding doors and covers for refrigerated display cabinets - Evaporative condensers - Forced air pre-coolers - Refrigerated display cabinets - Refrigeration compressors - Refrigeration system controls.). 2. The refrigeration plant has been commissioned to comply with the criteria for commissioning outlined in BREEAM issue Man 04 Commissioning and handover.	If Part 2, 3 or 4 AND if cold storage specified	Refrigeration system, its controls and components have been designed, installed and commissioned in accordance with best practice.	060820 (Pre-Assessment Workshop - Post Workshop Note) The Credit is not applicable in this assessment it is anticipated that the refrigeration for kitchen and catering facilities will be self-contained units, not connected to building cooling systems		
Ene 05.2	Energy Efficient Cold Storage - Indirect Greenhouse Gas Emissions	0	0	0		3. Criteria 1 and 2 have been achieved. 4. The installed refrigeration system demonstrates a saving in indirect greenhouse gas emissions (CO2 eq.) over the course of its operational life. With reference to The Carbon Trust Refrigeration Road Map3, this can be demonstrated through specification of technologies described in CO2 emissions saving options available when designing a new store/retail concept that delivers savings in comparison with the 'baseline' building. The indirect emissions must be calculated in accordance with the procedures in BS EN 378-14- Refrigerating system and heat pumps safety and environmental requirements, Annex B. Further detail on applying this method to calculate the indirect emissions are available in the Guideline methods of calculating Total Equivalent Warming Impact (TEWI5) published by the British Refrigeration Association (BRA). Calculations must be carried out by an appropriately qualified professional (e.g. a building services engineer), including calculations to justify for assumptions and methodologies for savings in indirect greenhouse emissions. Note: for non-retail building types with cold storage refrigeration systems, refer to the BREEAM RFO 2014 manual.	If Part 2, 3 or 4 AND if cold storage specified	The installed refrigeration system demonstrates a saving in indirect greenhouse gas emissions (CO2 eq.) over the course of its operational life.	060820 (Pre-Assessment Workshop - Post Workshop Note) The Credit is not applicable in this assessment it is anticipated that the refrigeration for kitchen and catering facilities will be self-contained units, not connected to building cooling systems		
Ene 06.1	Energy Efficient Transportation Systems - Energy Consumption	1	0	0		An analysis of the transport demand and usage patterns is undertaken to determine the optimum number and size of lifts, escalators and/or moving walks. Energy efficient installations are specified.	If Part 2 or 3 AND if transportation systems specified	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	091020 QPS(PM) noted that the proposed works would now include refurbishment (rather than replacement) of the lifts. The Credit is therefore no longer achievable. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because a lift drive study is currently expected to be part of the project scope. As lift drive replacement may not occur, this is shown as a 'high risk' Credit. Additional Team Appointment - A Lift Consultant must be appointed.		

Ene 06.2	Energy Efficient Transportation Systems - Energy Efficient Measures	1	0	0		<u>One Credit - Energy consumption</u> Where new lifts, escalators and/or moving walks (transportation types) are specified within refurbishment works: 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, escalators and/or moving walks. The energy consumption has been estimated in accordance with BS EN ISO 25745 Energy performance of lifts, escalators and moving walks, Part 2: Energy calculation and classification for lifts (elevators) and/or Part 3 - Energy calculation and classification for escalators and moving walks, for one of the following: - At least two types of system (for each transportation type required); OR - An arrangement of systems (e.g. for lifts, hydraulic, traction, machine room-less lift (MRU)); OR - A system strategy which is 'fit for purpose'. - The use of regenerative drives should be considered, subject to the requirements in CN6 - The transportation system with the lowest energy consumption is specified. <u>Two Credits - Energy efficient features</u> Criterion 1 is achieved for newly specified lifts.	If Part 2 or 3 AND if transportation systems specified	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.	091020 QPS(PM) noted that the proposed works would now include refurbishment (rather than replacement) of the lifts. The Credit is therefore no longer achievable. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that two Credits should be sought because specification of energy efficient measures for transportation systems (lifts) is currently expected to be part of the project scope. As lift drive replacement may not occur, this is shown as a 'high risk' Credit.		
Ene 07.1	Energy Efficient Laboratory Systems - Design Specification	0	0	0		Client engagement to determine occupant requirements and define laboratory performance criteria to optimise energy demand of the laboratory facilities. Specification of best practice energy efficient equipment and measures as appropriate.	If Part 2, 3 or 4 AND if laboratory systems specified	Carrying out client engagement to ensure design and performance of laboratories is optimised	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Ene 07.2	Energy Efficient Laboratory Systems - Best Practice Energy Efficiency Measures	0	0	0			If Part 2, 3 or 4 AND if laboratory systems	Implementing energy efficient measures to reduce laboratory energy consumption	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Ene 08	Energy Efficient Equipment - Energy Efficient Equipment	2	0	0		<u>Two Credits</u> Identify the building's unregulated energy consuming loads and estimate their contribution to the total annual unregulated energy consumption of the building, assuming a typical/standard specification. Identify the systems and/or processes that use a significant proportion of the total annual unregulated energy consumption of the development and its operation. Demonstrate a meaningful reduction in the total annual unregulated energy consumption of the building. See Table - 32 Table - 32 contains solutions deemed to satisfy compliance for common examples of significant contributors to unregulated energy consumption, for a number of different building types/functions.	If Part 4	Measuring and reducing unregulated energy demands through use of energy efficient equipment	200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should not be sought as JLL could not advise yet whether the appropriate catering measures could be put in place. 060820 (Pre-Assessment Workshop - Post Workshop Note) The Credit is now applicable in this assessment it is anticipated that the refrigeration for kitchen and catering facilities will be self-contained units, not connected to building cooling systems, so this Credit is relevant rather than Ene 05. Action - MTTs to review Credit requirements with JLL Food Service Consultant. Done 070820.		
Ene 09	Drying Space - Drying Space	0	0	0		<u>One Credit</u> - For self-contained dwellings: an adequate internal or external space with posts and footings, or fixings capable of holding; - One to two bedrooms: 4m+ of drying line - Three or more bedrooms: 6m+ of drying line. OR - Individual bedrooms: an adequate internal or external space with posts and footings, or fixings capable of holding; - Two metres or more of drying line per bedroom for developments with up to 30 individual bedrooms; plus - One metre of additional drying line for each bedroom over the 30 individual bedroom threshold. AND - The space (internal or external) is secure.	If Parts 1, 3 or 4 AND Multi-residential	Provision of adequate internal or external drying space	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Tra 01	Sustainable Transport Options - Accessibility Index or Alternative transport measures	0	0	0		Recognition for projects where proximity to good public transport networks has been reviewed and where poor, alternative measures have been implemented, thereby helping to reduce transport-related pollution and congestion.	If Parts 1 or 4	A copy of the site plan showing location of public transport networks and distance from the site.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the three Credits should be sought because appropriate public transport services are known to exist close to the development.		
Tra 02	Proximity To Amenities - Proximity To Amenities	1	1	0		Recognition of projects where proximity of, and accessible to, local amenities which are likely to be frequently required and used by building occupants has been reviewed.	If Parts 1 or 4	A scaled site plan indicating amenities and distance from the site.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because a variety of facilities (encompassing the listed items) are known to exist in close proximity to the development.	MTTS	

Tra 03.1	Cyclist Facilities - Cycle Storage	1	1	0		1. Compliant cycle storage spaces that meet the minimum levels set out in Table - 38(see Checklists and tables) are installed. Please refer to the BREEAM RFO 2014 manual for table 38.	If Parts 1 or 4	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credits should be sought because cycle storage is expected to be included as part of the project scope. Action - MITS to provide additional guidance to BGY. Done 070820.	MC ARCH	
Tra 03.2	Cyclist Facilities - Cyclist Facilities	1	1	0		2. Criterion 1 has been achieved. 3. At least two of the following types of compliant cyclist facilities have been provided for all building users (including pupils where appropriate to the building type) - see Relevant definitions for the scope of each compliant cyclist facility: a. Showers b. Changing facilities c. Lockers d. Drying spaces .	If Parts 1 or 4	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).	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because cyclist facilities are expected to be included as part of the project scope.	MC ARCH	
Tra 04	Maximum Car Parking Capacity - Car Parking Capacity	0	0	0		To ensure change of use projects review provision of car parking spaces to optimise car parking capacity and encourage alternatives to car travel.	If Change of Use Project	A copy of the site plan showing the number of car parking space that will be provided for the development.	060820 (Pre-Assessment Workshop) The Credit is not applicable in this assessment.		
Tra 05	Travel Plan - Travel Plan	1	1	0		A travel plan has been developed as part of the feasibility and design stages. A site specific travel assessment/statement has been undertaken to ensure the travel plan is structured to meet the needs of the particular site and covers the following (as a minimum): - Where relevant, existing travel patterns and opinions of existing building or site users towards cycling and walking so that constraints and opportunities can be identified. - Travel patterns and transport impact of future building users. - Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children). - Disabled access (accounting for varying levels of disability and visual impairment). - Public transport links serving the site. - Current facilities for cyclists. - 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 building's operation and use. - 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 refurbishment or fit-out and be supported by the building's management in operation.	If Parts 1 or 4	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.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because the procurement of a Travel Plan is a cost-effective measure for the project. The current planning application is expected to require a Travel Plan, which could be written to cover the BREEAM requirements. Additional Information Required: - Velocity to provide Travel Plan. Time Critical Action - RIBA Stage 2 - A travel plan has been developed as part of the feasibility and design stages. Additional Team Appointment - A Transport Consultant must be appointed.	VELO	

Wat 01	Water Consumption - Water Consumption	5	4	0	1. An assessment of the efficiency of newly specified domestic water-consuming components and (where relevant) measures specified to retrofit existing devices is undertaken using the BREEAM Wat 01 calculator, including all fittings applicable to the project type as detailed in Table - 42. Where there are no fittings within the scope of refurbishment or fit-out works, or only minimal water-consuming fittings present or specified, refer to compliance notes 5 or 6 to determine how this issue should be assessed. 2. The water consumption (litres/person/day) for the assessed building is compared against a baseline performance and BREEAM Credits awarded: % improvement - No. of BREEAM Credits 12.5 - 1 25 - 2 40 - 3 50 - 4 55 - 5 65 - Exemplary performance 3. The efficiency of the following 'domestic scale' water-consuming components must be included in the assessment (where specified/relevant to project type as defined by Table - 42): 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 8525-1:2010 Greywater Systems - Part 1 Code of Practice. Any rainwater systems must be specified and installed in compliance with BS 8515:2009 Rainwater Harvesting Systems - Code of practice.	If Parts 2, 3 or 4 AND sanitary fittings specified	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should be sought as similar water consumption performance had recently been achieved in another high-end office refurbishment undertaken by MTT and BGY. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that two Credits should be sought because specification of a level of water efficient equipment is within the current project scope. This level of water consumption reduction is unlikely to compromise the performance of the water fittings and does not require the specification of rainwater/greywater recovery systems. Mandatory Credit Requirement - For 'Very Good' and above - One Credit (for 25% of improvement over baseline building water consumption (litres/person/day)).	MC ARCH
Wat 02	Water Monitoring - Water Monitoring	1	1	0	One Credit 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. The sub-meter requirement does not necessarily apply in the following cases, where the assessor confirms there will be no additional monitoring benefit resulting from their installation: Where a building has only one or two small sources of water demand (e.g. an office with sanitary fittings and a small kitchen) Where the building has two sources of water demand, one significantly larger than the other, and the water consumption for the larger demand is likely to mask the smaller demand. 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. Examples include automatic meter reading systems (AMR) and building energy management systems (BEMS). Automatic monitoring and targeting (aM&T) is an example of a management tool that includes automatic meter reading and data management. 4. If the refurbishment zone is within a site that has an existing BMS, managed by the same occupier/owner (as the space undergoing refurbishment or fit-out), the pulsed/digital water meter(s) for the refurbishment or fit-out zone must be connected to the existing BMS 5. If the refurbishment or fit-out zone is within a building that is leasehold, the pulsed/digital water meter(s) for the refurbishment or fit-out zone must be connected to the incoming water supply for water using equipment in tenanted areas (see compliance note)	If Parts 2, 3 or 4	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because provision of water metering equipment is expected to be part of the current project scope. Mandatory Credit Requirement - For 'Very Good' and above - Part 2: Criterion 1 Only (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).	MC M+E

Wat 03.1	Leak Detection - Leak Detection System	1	1	0		<u>One Credit - Leak detection system</u> 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 inbuilt 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.	If Part 2	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. Location of Thames Water meter confirmed. 070920 MTT noted that the leak detection system would need to be 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, which could be some distance across the site. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because specification of leak detection system on the incoming mains is expected to be part of the current project scope.	MC M+E	
Wat 03.2	Leak Detection - Flow Control Devices	1	1	0		<u>One Credit - Flow control devices</u> 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).	If Parts 2, 3 or 4	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because providing flow control devices that regulate water supply to WC areas is expected to be part of the project scope.	MC M+E	
Wat 04	Water Efficient Equipment - Water Efficient Equipment	1	1	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. BREEAM does not prescriptively define all potential means or solutions for reducing unregulated water consumption. The design team needs to demonstrate to the assessor that they have identified key areas of water consumption in the building and that a reduction in unregulated water consumption has been achieved using existing 'tried and tested' solutions or new innovative solutions relevant to the building and its functional requirements. The following are some examples of solutions deemed to satisfy compliance for a number of different building types or functions (where the unregulated water demand for that function is one of/the significant contributor in the building): - Drip-fed subsurface irrigation incorporating soil moisture sensors. The irrigation control should be zoned to permit variable irrigation to different planting assemblages. - Reclaimed/recovered water from a rainwater collection or waste water recovery system, with appropriate storage, i.e. greywater collection from building functions or processes that use potable water, e.g. vehicle wash, training water in fire stations, sanitary facilities, irrigation etc. This should take into account the Government Buying Standards\where appropriate to the building type. - External landscaping and planting that relies solely on precipitation, during all seasons of the year. - All planting specified is restricted to contextually appropriate species that thrive without irrigation and will continue to do so in those conditions likely as a result of climate change, i.e. typically warmer and drier conditions.	If Unregulated Water Use	Specifications and drawings confirming measures to reduce unregulated water use (e.g. irrigation etc.)	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit could be sought, subject to verification from the RIBP Building Manager that sprinklers are not currently used in the landscaping. Action - MTTs to review Credit requirements with RIBP Building Manager. Done 070820.	RIBP BM	

Mat 01	Environmental Impact of Materials	6	3	0		Up to six Credits (option 1): Project lifecycle assessment study 1. The project uses a life cycle assessment (LCA) tool or undertakes a building information model life cycle assessment (BIM LCA) to measure the life cycle environmental impact of the refurbishment or fit-out works. 2. The LCA covers new materials as per the following list: - Part 1 includes elements of the fabric and structure including: External walls (envelope, structure and finishes), External windows and roof lights, Structural frame, Basements/retaining walls (including excavations), Upper floors (including horizontal structure), Roof (including coverings), Stairs, Ground/lowest floor. - Part 2 and 3 includes elements used for core and local services including: Heat source, space heating, air-conditioning and ventilation, Communication, security and control systems, Electrical installations, Fire and lightning protection, Lift and conveyor installations/systems, Water and waste installations, Sanitary installations. - Part 4 includes interior fit-out elements including: Internal floor finishes (including access floors), Ceiling finishes (including suspended/access ceilings), Internal walls, partitions and finishes, Internal windows, Internal doors, Furniture (desks, chairs, display cabinets, shelving), Fittings (shop fittings, railings, screens, gutters, vents, air grilles) - Hard landscaping and boundary protection are included where within scope of works 3. A member of the project team completes the BREEAM Refurbishment and Fit-out Mat 01 calculator using parts A and B and determines a score based on the robustness of the LCA tool used (Part A of the tool) and the scope of the assessment in terms of the materials specified that have been considered (Part B of the tool) 5. Where the design team can demonstrate how the LCA has benefited the building in terms of measuring and reducing its environmental impact. This should take the form of a short qualitative statement from the design team providing comments on the following: - How and at what stages of the design the tool was utilised. - How the tool helped (or did not help) steer the design process to optimise cost and mitigate environmental impacts, giving examples of specific changes to the building design/specification that resulted. 6. Where the design team submit the LCA tool output (e.g. Building Information Model (BIM)) for assessing the building to BRE Global (via the project's appointed BREEAM assessor) to inform future potential LCA benchmarking for BREEAM	Parts 1,2,3 or 4	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)	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should not be sought as, whereas similar materials performance had recently been achieved in another high-end office refurbishment undertaken by MTT and BGY, this could not necessarily be replicated on this project. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that three to four Credits should be sought because the general specification of materials with robust environmental claims and re-using existing elements in situ can be expected for the project. The final number of Credits achievable will not be clear until the materials specification is developed. Action - MTTs to provide additional guidance to BGY. Done 070820.	MC ARCH	
						OR Up to four Credits (option 2): Elemental assessment of environmental performance information 8. Robust environmental performance information has been collected for newly specified materials or where materials are retained in situ, for elements listed above. 9. The total number of points achieved as set out in the Methodology section are calculated using Part B of the BREEAM Mat 01 calculator. The number of points scored is based on the percentage of each element that has been: a. reused in situ b. reused in situ with minor repairs c. specified with robust environmental performance information. 10. Credits are awarded based upon the percentage of available points achieved as set out in Table - 47 of the BREEAM RFO 2014 manual.		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)	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. As above.	MC ARCH	
Exe Mat 01e	Environmental Impact of Materials - Exemplary	0	0	0		As above.	Parts 1,2,3 or 4	Using robust Lifecycle assessment tools, specification of materials with robust environmental claims and re-using existing elements in situ.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

Mat 03.1	Responsible Sourcing of Materials - Sustainable Procurement Plan	1	1	0		2. The principal contractor sources materials for the project in accordance with a documented sustainable procurement plan. A plan that sets out a clear framework for the responsible sourcing of materials to guide procurement throughout a project and by all involved in the specification and procurement of construction materials. The plan may be prepared and adopted at an organisational level or be site/project specific, and for the purposes of BREEAM compliance, will cover the following as a minimum: - 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. - Aims, objectives and targets to guide sustainable procurement activities. - The strategic assessment of sustainably sourced materials available locally and nationally. There should be a policy to procure materials locally where possible. - 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.	All	A copy of the sustainable procurement plan	070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. --- 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it would be expected that the Contractor will have a sustainable procurement plan for a project of this type and scope. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. --- Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820. --- Mandatory Credit Requirement - For 'Very Good' and above - Criterion 1 Only (All timber and timber-based products used on the project is legally harvested and traded timber) ---	QPS (QS)									
Mat 03.2	Responsible Sourcing of Materials - Responsible Sourcing of Materials	3	2	0		4. One Credit can be awarded where at least three of the material types listed below as 'Material categories' has been responsibly sourced from one of the responsible sourcing schemes recognised by BREEAM: - External wall (structure and finishes) - Insulation - Roof (structure and finishes) - Upper floors (structure) - Flooring finishes (including coatings) - Internal partitions/internal walls (structure and finishes) - Ceiling (structure and finishes) - External/internal doors/ windows - Staircases/ramps - Fittings (shop fittings, railings, screens, gutters, vents, air grilles) - Furniture (desks, chairs, display cabinets, shelving) - Building services (equipment, distribution systems) - Hard landscaping - Other 5. Up to three of the available RSM Credits, as below specified, can be awarded where the applicable building materials are responsibly sourced in accordance with the BREEAM methodology, as defined in the BREEAM RFO 2014 Manual: <table><tr><td>Credits</td><td>% of available RSM points achieved</td></tr><tr><td>3</td><td>≥ 54%</td></tr><tr><td>2</td><td>≥ 36%</td></tr><tr><td>1</td><td>≥ 18%</td></tr></table>	Credits	% of available RSM points achieved	3	≥ 54%	2	≥ 36%	1	≥ 18%	All	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. --- 200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should not be sought, but that performance should be kept under review throughout the design. --- 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credits should be sought because it is reasonable to expect that sufficient elements within the scope of the project can be procured through manufacturers and processors operating responsible sourcing systems. --- Action - MTTs to provide additional guidance to BGY. Done 070820. ---	MC ARCH	
							Credits	% of available RSM points achieved											
3	≥ 54%																		
2	≥ 36%																		
1	≥ 18%																		
All	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. --- As above. ---	MC ARCH																
Exe Mat 03.2e	Responsible Sourcing of Materials - Exemplary	0	0	0		The following outlines the exemplary level criteria to achieve one innovation Credit for this BREEAM issue: Where at least 70% of the available RSM points are achieved.	All	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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment. ---										

Mat 04	Insulation - Insulation	1	1	0	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. The Insulation Index is calculated using the BREEAM Mat 04 calculator which uses the following calculation methodology. For each type of thermal insulation used in the relevant building elements, the volume weighted thermal resistance provided by each type of insulation is calculated as follows: - (Area of insulation (m2) x thickness (ml)/thermal conductivity (W/m.K) OR - Total volume of insulation used (m3)/thermal conductivity (W/m.K) - The volume weighted thermal resistance for each insulation material is then multiplied by the relevant Green Guide point(s) from the following table to give the Green Guide rating corrected value: <table><tr><td>Green Guide rating</td><td>Points/element</td></tr><tr><td>A</td><td>3</td></tr><tr><td>A</td><td>2</td></tr><tr><td>B</td><td>1</td></tr><tr><td>C</td><td>0.5</td></tr><tr><td>D</td><td>0.25</td></tr><tr><td>E</td><td>0</td></tr></table> To calculate the Insulation Index, the sum of the Green Guide rating corrected values for all insulating elements is divided by the sum of the volume weighted thermal resistance values. See example calculation below. Note - Where more than one insulation type is present for a given element, the rating, area and conductivity for each insulation type should be entered into the BREEAM Mat 04 calculator and an average is calculated (by volume). - Where no similar insulation can be found assessors should seek guidance from BRE on the appropriate rating. - Where an independently verified third party Environmental Product Declaration (EPD), covering part of or the whole life cycle, is available for an insulating material/product, this can be used to increase the contribution of that material/product to the building's Mat 04 performance.	Green Guide rating	Points/element	A	3	A	2	B	1	C	0.5	D	0.25	E	0	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	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY and MTT to Main Contractor's Architect and M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought it is anticipated the thermal insulation with appropriate Green Guide rating will be specified for the project. The second Credit is dependent on the responsible sourcing route for these materials.	MC ARCH M+E
Green Guide rating	Points/element																						
A	3																						
A	2																						
B	1																						
C	0.5																						
D	0.25																						
E	0																						
Mat 05	Designing For Durability and Resilience	1	1	0	<u>Protecting vulnerable parts of the building from damage</u> 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. <u>Protecting exposed parts of the building from material degradation</u> 2. Environmental factors have been identified that are relevant to the site location 3. Existing applicable building elements that are exposed to any relevant environmental factors have been identified 4. Existing applicable building elements have been surveyed have been assessed to identify impacts of material degradation effects including an assessment to grade the severity of any degradation effects. Design and specification measures have been developed to repair and protect existing elements according to the severity of any degradation affects, to limit degradation. Where it is not feasible to implement measures to limit material degradation for existing elements, justification should be provided. 5. Newly specified materials or newly constructed elements (e.g. a new external wall) within the scope of refurbishment or fit-out works incorporate appropriate design and specification measures to limit material degradation due to environmental factors	Part 1 or 4	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..	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because is would be expected that suitable durability measures to protect vulnerable parts of the building and external parts of the building are expected to be specified as part of the current project scope. Action - MTTs to provide additional guidance to BGY. Done 070820.	MC ARCH														

Mat 06	Material Efficiency - Material Efficiency	1	1	0		1. Opportunities have been identified, and appropriate measures investigated and implemented within the scope of refurbishment or fit-out works, to optimise the use of materials through building design, procurement, refurbishment, maintenance and end of life 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. Relevant parties are all parties (as relevant to the project stage) involved in the design, specification and/or construction of the building should be consulted. This includes but is not limited to, the following: - Client/developer - Cost consultant - Architect - Structural/civil engineers - Building services engineers - mechanical, electrical - Principal contractor - Demolition/strip-out contractor - Environmental consultant - Project management consultant - Materials/component manufacturers/suppliers.	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because opportunities to optimise material use throughout refurbishment and fit-out (e.g. designing out waste) could be covered in the design to the level of detail that BREEAM requires. Action - MTTs to provide additional guidance to BGY. Done 070820. Time Critical Action - RIBA Stage 1,2,3,4 - Opportunities have been identified, and appropriate measures investigated and implemented within the scope of refurbishment or fit-out works, to optimise the use of materials through building design, procurement, refurbishment, maintenance and end of life.	MC ARCH	
Wst 01.1	Construction Waste Management - Pre-Refurbishment Audit	1	1	0		1. The client shall ensure that a pre-refurbishment audit of all existing buildings, structures or hard surfaces within the scope of the refurbishment or fit-out zone is completed. The requirements for carrying out an appropriate pre-refurbishment audit are: a. The audit should be carried out at the Concept Design Stage (equivalent to RIBA stage 2) prior to strip-out or demolition works in order to use the audit results to guide the design, consideration of materials that can be reused, and to set targets for waste management and ensure all contractors are engaged in the process of maximising high grade reuse and recycling opportunities. b. The audit should be carried out by a competent person (see Relevant Definitions) who is independent of the project, has appropriate knowledge of buildings, waste and options for the reuse and recycling of different waste streams c. Actual waste arisings and waste management routes used should be compared with those forecast from the audit and barriers to achieving targets should be investigated. The audit must be referenced in the resource management plan and cover: d. Identification and quantification of the key materials where present on the project e. Potential applications and any related issues for the reuse and recycling of the key materials in accordance with the waste hierarchy. f. Identification of local reproprocessors or recyclers for recycling of materials g. Identification of overall recycling rate for all key materials h. Identification of reuse targets where appropriate. I. Identification of overall landfill diversion rate for all key materials.	All	A copy of the pre-refurbishment audit in accordance with the BREEAM criteria.	070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because the production of a pre-refurbishment audit has been conducted to identify materials that can be re-used and to set appropriate waste targets is expected for a project of this type and scope. Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820.	QPS (QS)	

Wst 01.2	Construction Waste Management - Re-Use and Direct Recycling of Materials	2	0	0		2. Where waste material types detailed in Table - 64 are either directly re-used on-site or off-site or are sent back to the manufacturer for closed loop recycling 3. One Credit is achieved where 50% of the total available points for the waste material types detailed in Table - 64, that are present on the project have been achieved (using the Was 01 calculator tool, see Table - 65 in the Methodology section). 4. Two Credits are achieved where 75% of the total available points for the waste material types detailed in Table - 64, that are present on the project have been achieved (using the Was 01 calculator tool, see Table - 65 in the Methodology section) Please note that in most instances any materials specified in Table - 64 that are sent to a Material Recovery Facility (MRF) for recovery does not qualify for this Credit. See compliance note CN2, To achieve any of the refurbishment resource efficiency Credits the assessed development, regardless of value or locality, must have a resource management plan compliant with best practice (Best practice is a combination of commitments to: - Design out waste (materials optimisation) - Reduce waste generated on-site - Develop and implement procedures to sort and reuse/recycle construction and demolition waste on and off-site (as applicable) - Follow guidance from: - DEFRA (Department of Environment, Food and Rural Affairs) - BRE (Building Research Establishment Ltd) - WRAP (Waste and Resources Action Programme) - Welsh Government. Please refer to the BREEAM RFO 2014 manual for the tables.	All	A copy of the RMP including the re-use or closed loop recycling (sent back to manufacturer) of the material types detailed in Table 64 and that 75% of the points available in Table 65 have will be achieved.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought because the direct re-use or recycling of materials would not be expected on a project of this type and scope. —		
Wst 01.3	Construction Waste Management - Resource Efficiency	3	3	0		5. Develop and implement a compliant resource management plan covering the waste arisings from the refurbishment or fit-out project with the aim of minimising waste, recording and reporting accurate data on waste arisings. Minimising waste encompasses two elements of the waste hierarchy: Waste reduction/prevention = using less material in design, manufacture and installation, keeping products for longer, using no hazardous materials. Reuse = using products again for the same purpose for which they were conceived, which may require checking, cleaning or repairing (preparing for reuse). Types of waste minimisation actions include: - Set and report against waste reduction targets - Design for standardisation of components - Return packaging for reuse - Consider community reuse of surplus/offcuts - Include waste minimisation initiatives and targets in tenders or contracts, and engage with the supply chain - Consider use of BIM (Building Information Modelling) - Design for off-site or modular build - Design for flexibility, adaptability and future deconstruction - Design to use fewer materials - Use of reusable temporary elements such as shuttering and protection. This list is not exhaustive and other waste minimisation actions can be taken. 6. The non-hazardous waste relating to on-site refurbishment or fit-out, and dedicated off-site manufacture or fabrication processes generated by the building's design and construction meets, or exceeds, the resource efficiency benchmarks set out in Table - 61 and Table - 62 as relevant to the project type. Please refer to the BREEAM RFO 2014 manual. Table - 61: Refurbishment and fit-out waste resource efficiency benchmarks - Refurbishment (Combinations of Parts 1 - 4) BREEAM Credits / Amount of construction waste generated per 100m2 (gross internal floor area) in m3 and tonnes One / $\leq 11.3 \leq 3.5$ Two / $\leq 4.5 \leq 1.2$ Three / $\leq 2.1 \leq 0.4$ Exemplary level/ $\leq 1.4 \leq 0.3$	All	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.	200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should be sought. Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. — 070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). — 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because achievement of reasonable resource efficiency targets can be pursued for the project. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. — Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820. —	QPS (QS)	

Exe Wst 01.3e	Construction Waste Management - Resource Efficiency - Exemplary	0	0	0		The following outlines the exemplary level criteria to achieve an innovation Credit for this BREEAM issue: - Non-hazardous construction waste generated by the building's design and refurbishment or fit-out is no greater than the exemplary level resource efficiency benchmark (outlined in Table - 62 and Table - 61). - The percentage of non-hazardous construction and demolition (if relevant) waste diverted from landfill meets or exceeds the exemplary level percentage benchmark (outlined in Table - 63). - Waste materials will be sorted into separate key waste groups (according to the waste streams generated by the scope of the works; the List of Wastes/European Waste Catalogue code should be referenced) either on-site or off-site through a licensed contractor for recovery. - 75% of difficult to manage wastes have been reused on or off-site rather than recycled, in accordance with Table - 64. Please refer to the BREEAM RFO 2014 manual for the tables.	All	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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.																	
Wst 01.4	Construction Waste Management - Diversion of Waste from Landfill	1	1	0		The following percentages of non-hazardous construction and demolition waste (where applicable) generated have been diverted from landfill: Diversion of waste for refurbishment and fit-out <table><tr><th colspan="3">BREEAM Credits</th></tr><tr><th>Source of waste</th><th>Volume</th><th>Tonnage</th></tr><tr><td colspan="3"><u>One Credit</u></td></tr><tr><td>Refurbishment/fit-out</td><td>85%</td><td>90%</td></tr><tr><td>Demolition</td><td>90%</td><td>95%</td></tr></table>	BREEAM Credits			Source of waste	Volume	Tonnage	<u>One Credit</u>			Refurbishment/fit-out	85%	90%	Demolition	90%	95%	All	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.	070820 MITS issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is reasonable to expect that basic diversion from landfill targets can be achieved for the project. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MITS to issue draft Contract Preliminaries text to QPS (QS). Done 070820.	QPS (QS)	
BREEAM Credits																										
Source of waste	Volume	Tonnage																								
<u>One Credit</u>																										
Refurbishment/fit-out	85%	90%																								
Demolition	90%	95%																								
Exe Wst 01.4e	Construction Waste Management - Diversion of Waste from Landfill - Exemplary	0	1	0		8. Non-hazardous construction waste generated by the building's design and refurbishment or fit-out is no greater than the exemplary level resource efficiency benchmark (outlined in Table - 62 and Table - 61). 9. The percentage of non-hazardous construction and demolition (if relevant) waste diverted from landfill meets or exceeds the exemplary level percentage benchmark Diversion of waste for refurbishment and fit-out <table><tr><th colspan="3">BREEAM Credits</th></tr><tr><th>Source of waste</th><th>Volume</th><th>Tonnage</th></tr><tr><td colspan="3"><u>Exemplary level</u></td></tr><tr><td>Refurbishment/fit-out</td><td>95%</td><td>97%</td></tr><tr><td>Demolition</td><td>95%</td><td>97%</td></tr></table> 10. Waste materials will be sorted into separate key waste groups (according to the waste streams generated by the scope of the works; the List of Wastes/European Waste Catalogue code should be referenced) either on-site or off-site through a licensed contractor for recovery. 11. 75% of difficult to manage wastes have been reused on or off-site rather than recycled, in accordance with Table - 64. Please refer to the BREEAM RFO 2014 manual for the tables.	BREEAM Credits			Source of waste	Volume	Tonnage	<u>Exemplary level</u>			Refurbishment/fit-out	95%	97%	Demolition	95%	97%	All	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.	200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should be sought. Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 070820 MITS issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is reasonable to expect that higher diversion from landfill targets can be achieved for the project. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MITS to issue draft Contract Preliminaries text to QPS (QS). Done 070820.	QPS (QS)	
BREEAM Credits																										
Source of waste	Volume	Tonnage																								
<u>Exemplary level</u>																										
Refurbishment/fit-out	95%	97%																								
Demolition	95%	97%																								

Wst 02	Recycled Aggregates - Recycled Aggregates	0	0	0	1. The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the following minimum % levels (by weight or volume) to contribute to the total amount of recycled or secondary aggregate: Structural Frame 15%, Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads 30%, Building foundations 20%, Concrete road surfaces 15%, Pipe bedding 100%, Granular fill and capping 100%. 2. The total amount of recycled 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 project. Where the minimum level in criterion 1 is not met for an application, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified. 3. The recycled or secondary aggregates are EITHER: b. Construction, demolition and excavation waste obtained on-site or off-site; OR c. Secondary aggregates obtained from a non-construction post-consumer industrial by product source. By products of industrial processes that can be processed to produce secondary aggregates. Secondary aggregates are subdivided into manufactured and natural, depending on their source. - Recognised non-construction post-consumer or post-industrial by products include: - China clay waste - Slate overburden - Pulverised Fuel Ash (PFA) - Ground Granulated Blast Furnace Slag (GGBFS) - Air cooled blast furnace slag - Steel slag - Furnace Bottom Ash (FBA) - Incinerator bottom ash - Foundry sands - Recycled glass - Recycled plastic - Spent oil shale - Colliery spoil - Municipal solid waste treatment residues.	If Part 1	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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment. Use of high grade aggregate, including secondary aggregate and recycled aggregates is not expected for the project.		
Exe Wst 02e	Recycled Aggregates - Exemplary	0	0	0	4. The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the exemplary minimum levels (by weight or volume): Structural Frame 30%, Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads 75%, Building foundations 35%, Concrete road surfaces 45%, Pipe bedding 100%, Granular fill and capping 100%. Where this minimum level is not met, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified. 5. Where the total amount of recycled or secondary aggregate specified is greater than 35% (by weight or volume) of the total high grade aggregate specified for the project. Where the minimum level in criterion 1 is not met for an application, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified. 6. The contributing recycled or secondary aggregate must not be transported more than 30 km by road transport.	If Part 1	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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

Wst 03	Operational Waste - Operational Waste	1	1	0		<u>One Credit</u> - Operational waste 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 on-site, a water outlet is provided adjacent to or within the facility for cleaning and hygiene purposes. Please refer to the BREEAM RFO 2014 manual for the following building types: healthcare buildings only , multi-residential buildings with self-contained dwellings/bedsits only, multi-residential buildings with individual bedrooms and communal facilities only	If Part 1 or 4	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, if applicable. Design drawing and relevant specification clause confirming that both multi-residential buildings type comply with internal waste containers, location and composting criteria.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because provision of facilities for the storage of operational waste could be expected for the building. It is understood that here is allocated space for waste storage in the ground floor or basement within easy reach from the building users via the lifts. Action - MTTs to provide space allowances requirements to BGY to support with layout of recycle waste storage area. Done 070820. Mandatory Credit Requirement - For 'Excellent' and above - One Credit (Appropriate 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).	MC ARCH	
Wst 04	Speculative Floor and Ceiling Finishes - Speculative Floor and Ceiling Finishes	1	1	0		Office building types only 1. For tenanted areas (where the future occupant is not known), prior to full fit-out works, interior finishes (including carpets, other floor finishes, ceiling finishes and any other interior finishes) have been installed in a show area only. 2. In a building being refurbished or fitted out for a specific occupant, that occupant has selected (or agreed to) the specified interior finishes.	If Part 2 or 3	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought.	MC ARCH	
Wst 05.1	Adaptation To Climate Change - Structural and Fabric Resilience	0	0	0		<u>One Credit</u> - Adaptation to climate change – 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.	If Part 1	A copy of the Risk assessment report in line with the BREEAM Criteria.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
							If Part 1	Where a Climate change resilience study has been conducted to provide structural and fabric resilience to climate change	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
							If Part 1	Where a Climate change resilience study has been conducted to provide structural and fabric resilience to climate change	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

Exe Wst 05	Adaptation To Climate Change - Structural and Fabric Resilience Exemplary	0	0	0	<u>Exemplary Credit</u> – Responding to adaptation to climate change A holistic approach to the design and refurbishment or fit-out of the current building's life cycle, to mitigate against the impacts of climate change, is represented by the achievement of these criteria. The following outlines the exemplary level criteria to achieve an innovation Credit for this BREEAM issue: 2. Achievement of criterion 1, the structural and fabric resilience criterion in this issue, and the following criteria points or Credits: Hea 04 Thermal comfort (Link to Wst 05 issue:- to preventing increasing risks of overheating) - Criterion 7 in the second Credit of the Hea 04 issue has been achieved. Ene 01 Reduction of energy use and carbon emissions (Link to Wst 05 issue: to maximise energy efficiency contributing to low carbon emissions resulting from increasing energy demands) - At least eight Credits in this issue have been achieved. Ene 04 Low carbon design (Link to Wst 05 issue: to maximise opportunities to avoid unnecessary carbon emissions) - The Passive design analysis Credit in this issue has been achieved. Wat 01 Water consumption (Link to Wst 05: to minimise water demands in periods of drought) - A minimum of three Credits in this issue have been achieved. Mat 05 Designing for durability and resilience (Link to Wst 05 issue: to avoid increased risks of deterioration and higher maintenance demands) - Criterion 2 relating to material degradation in this issue has been achieved. Pol 03 Flood risk management and reducing surface water run-off (Link to Pol 03: to minimise the risks of increased flood risk and surface water run-off affecting the site or others) - Flood risk – a minimum of one Credit has been achieved. - Surface water run-off – two Credits have been achieved.	If Part 1	Where a Climate change resilience study has been conducted to provide structural and fabric resilience to climate change	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Wst 06	Functional Adaptability	1	1	0	<u>One Credit</u> - Functional adaptability 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 (see examples below) have been adopted in the design by Technical Design stage (RIBA Stage 4 or equivalent) in accordance with the functional adaptation strategy recommendations, where practical and cost effective. Omissions have been justified in writing to the assessor. Examples Part 1: Fabric and structure - External walls - Cladding - Ground and first floor - Roof Use of products or systems which allow easy replacements Location of structural components within the floor space Provision to add extensions or alterations to increase building capacity Parts 2 and 3: Core and local services - Mechanical and electrical - Plumbing - Stairs and lifts - Fire Inclusion of facilities management requirements and CDM feedback for future operational needs Provision of capacity in infrastructure to enable future expansion and adaptation Part 4: Interior design - Finishes - Floors - Interior walls - Connections Use of products or systems which allow easy replacements Layout in standardised grids Use of inherent finishes to allow replacement Use of standardised material sizes Identifying or recognising potential future functional requirements Efficient use of space to allow for any increase in occupancy	All	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.	061020 Twin + Earth noted that a Functional Adaptability study would be a useful undertaking for the project. MTTS issued fee proposal email to QPS(PM) 220920 (Sustainability Workshop) T+E noted that a Functional Adaptability Study could usefully be undertaken for the building. 060820 (Pre-Assessment Workshop) Credit discussed and BGY advised that they did not anticipate that a Functional Adaptability study would be fruitful for a project of this type and scope. Time Critical Action - RIBA Stage 2 - A 'Facilitator for the Functional Adaptability Strategy' is appointed and their responsibilities include compilation of a building-specific functional adaptation strategy in conjunction with the Client and Design Team, including recommendations for measures to be incorporated to facilitate future adaptation. Additional Team Appointment - A Facilitator for the Functional Adaptability Strategy must be appointed.	QPS (PM)	
					All	Implementation of adaptability measures to accommodate future changes	220920 (Sustainability Workshop) As above.	060820 (Pre-Assessment Workshop) As above.	QPS (PM)	

							All	Implementation of adaptability measures to accommodate future changes	220920 (Sustainability Workshop) As above. 060820 (Pre-Assessment Workshop) As above.	QPS (PM)	
LUE 02	Protection of Ecological Features - Protecting Ecological Value	1	1	0		One Credit - Protection of ecological features 1. All existing features of ecological value within and surrounding the refurbishment or fit-out zone and site boundary area are adequately protected from damage during clearance, site preparation and refurbishment or fit-out activities in line with BS42020: 2013. 2. In all cases, the principal contractor is required to construct ecological protection recommended by the Suitably Qualified Ecologist (SQE), prior to any preliminary site refurbishment or fit-out or preparation works (e.g. erection of temporary site facilities). Features requiring protection during site clearance and refurbishment or fit-out in accordance with BS 42020: 2013 to maintain their presence and ecological value, which include as a minimum: 1. Trees determined to be of value using one of the following measures: a. More than 10 years old (or where age is unknown where the trunk diameter is over 100mm). b. Tree of significant ecological value (as defined by BS 5837: 2012 and confirmed by the Suitably Qualified Ecologist or qualified arboriculturalist). 2. Hedges and natural areas requiring protection. 3. Watercourses and wetland areas. 4. Nesting or roosting opportunities for birds or bats within the building (information on the protection of roosting and/or nesting opportunities in existing buildings for bats and birds can be found in the following guidance: - Birds in your building - what to look for, RSPB. www.rspb.org.uk/advice/helpingbirds. - Bats and buildings vol.1: bats in the built environment series, Bat Conservation Trust, 2011 www.bats.org.uk/pages/existing_buildings. Note: Where a tree is deemed to create a significant danger to the public or occupants by a statutory body or qualified arboriculturalist, then that feature may be exempt from this issue.	If Part 1 or if landscaping within scope of works	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.	240920 QPS (PM) advised that Greengage would undertake the role of Suitably Qualified Ecologist. Responsible Party updated from QPS (ECO) to Greengage. Additional Information Required: - Greengage to provide Ecology Report. 060820 (Pre-Assessment Workshop) Credit discussed and it was noted that, as removal of trees is currently expected as part of the landscaping works, this should be shown as a 'high risk' Credit. Action - QPS to provide details of Ecologist when appointed/instructed. Time Critical Action - RIBA Stage 1 - A Suitably Qualified Ecologist is appointed to produce an Ecology Report based on a site survey. The principal contractor is required to construct ecological protection recommend by the Suitably Qualified Ecologist (SQE), prior to any preliminary site refurbishment or fit-out or preparation works (e.g. erection of temporary site facilities). Additional Team Appointment - A Suitably Qualified Ecologist must be appointed.	GREEN	
LUE 04	Ecological Enhancement - Ecological Enhancement	0	0	0		One Credit - Ecologist's report and recommendations 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. The suitably qualified ecologist must carry out site surveys of existing site ecology, on which their report is based (or to provide verification where the report is prepared by others) at the Concept Design stage (RIBA Stage 2 or equivalent) in order to facilitate and maximise potential ecological enhancement. 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 refurbishment or fit-out. Please refer to the BREEAM RFO 2014 manual for simple buildings and for HM Prison sites.	If Part 1 or if landscaping within scope of works	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	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

LUE 05	Long Term Impact on Biodiversity	2	2	0	Up to two Credits 1. Where a Suitably Qualified Ecologist (SQE) is appointed prior to commencement of activities on-site and they confirm that all relevant UK and EU legislation relating to the protection and enhancement of ecology has been complied with during the refurbishment or fit-out process. 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. This is to be handed over to the building owner/occupants for use by the grounds maintenance staff. Where additional measures to improve the assessed site's long term biodiversity are adopted: - The principal contractor nominates a Biodiversity Champion with the authority to influence site activities and ensure that detrimental impacts on site biodiversity are minimised in line with the recommendations of a Suitably Qualified Ecologist. - The principal contractor trains the site workforce on how to protect site ecology during the project. Specific training must be carried out for the entire site workforce to ensure they are aware of how to avoid damaging site ecology during operations on-site. Training should be based on the findings and recommendations for protection of ecological features highlighted within a report prepared by a Suitably Qualified Ecologist. - The principal contractor records actions taken to protect biodiversity and monitor their effectiveness throughout key stages of the refurbishment or fit-out process. The requirement commits the principal contractor to make such records available where publicly requested. - Where a new ecologically valuable habitat appropriate to the local area is created. This includes a habitat that supports nationally, regionally or locally important biodiversity, and/or which is nationally, regionally or locally important itself; including any UK Biodiversity Action Plan (UK BAP) priority habitats, Local Biodiversity Action Plan (LBAP) habitats, those protected within statutory sites (e.g. SSSIs), or those within non-statutory sites identified in local plans. Local biodiversity expertise should be sought during the Preparation and Brief (RIBA Stage 1 or equivalent) to help identify species of local biodiversity importance on-site and ensure that the proposals support local priorities. - Where flora and/or fauna habitats exist on-site, the contractor programmes site works to minimise disturbance to wildlife. For example, site preparation, ground works, and soft landscape works have been, or will be, scheduled at an appropriate time of year to minimise disturbance to wildlife. Timing of works may have a significant impact on, for example, breeding birds, flowering plants, seed germination, amphibians etc. Actions such as phased clearance of vegetation may help to mitigate ecological impacts. This additional requirement will be achieved where a clear plan has been produced detailing how activities will be timed to avoid any impact on site biodiversity in line with the recommendations of a Suitably Qualified Ecologist. If Part 1 or if landscaping within scope of works	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.	240920 QPS (PM) advised that Greengage would undertake the role of Suitably Qualified Ecologist. Responsible Party updated from QPS (ECO) to Greengage. Additional Information Required: - Greengage to provide Ecology Report. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because appropriate measures are likely to be achievable. QPS to provide details of Ecologist when appointed/instructed. Action - QPS to provide details of Ecologist when appointed/instructed. Time Critical Action - RIBA Stage 5 - A 'Biodiversity Champion' is appointed and their responsibilities include influencing site activities and ensuring that detrimental impacts on site biodiversity are minimised in line with the recommendations of the Suitably Qualified Ecologist.. Additional Team Appointment - A Biodiversity Champion must be appointed (in addition to the Suitable Qualified Ecologist)	GREEN
Pol 01.1	Impact of Refrigerants - Impact of Refrigerants	2	1	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: Pre-requisite 2. All systems (with electric compressors) must comply with the requirements of BS EN 378:20081 (parts 2 and 3) and where refrigeration systems containing ammonia are installed, the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice2. 3. Where the systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELCO2e) of ≤ 100 kgCO2e/kW cooling/heating capacity. To calculate the DELCO2e 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 One Credit - Impact of refrigerant 5. Where the systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELCO2e) of ≤ 1000 kgCO2e/kW cooling/heating capacity. If Parts 2 OR 3 and 4 if local cooling specified	Communication records, Construction specification, Other third party information, Completed copy of the Pol01 calculator tool	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because a compliant cooling system may be specified for the building.	MC M+E

Pol 01.2	Impact of Refrigerants - Leak Detection	1	1	0		One Credit - Leak detection 6. Where systems using refrigerants have a permanent automated refrigerant leak detection system installed; OR where an inbuilt automated diagnostic procedure for detecting leakage is installed. In all instances a robust and tested refrigerant leak detection system must be installed and must be capable of continuously monitoring for leaks. 7. The system must be capable of automatically isolating and containing the remaining refrigerant(s) charge in response to a leak detection incident An example of a system which would meet criterion 7 could be one which initiates an automated shut down and pump down of the refrigerant into a separate storage tank.	If Parts 2 OR 3 and 4 if local cooling specified	A specification, schedule or drawings highlighting the scope of the refrigerant leak detection and containment systems within the building.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer.	MC M+E	
Pol 02	NOx Emissions	3	0	0		Up to three Credits (all building types except Industrial) 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% excessO2) as follows: NOx Emission levels for heating and hot water (mg/kWh) Credits ≤ 100 mg/kWh 1 Credit ≤ 70 mg/kWh 2 Credits ≤ 40 mg/kWh 3 Credits 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.	If Parts 2 OR 3 and 4 if local heating specified	A specification or schedule confirming the NOx emissions levels for heating and hot water systems.	060820 (Pre-Assessment Workshop) Credit discussed and MTTs noted that they do not recommend that the Credit is sought, as the proposed VRF system is unlikely to be allow compliance with the NOX emission requirements to be achieved.		
Pol 03.1	Flood Risk and Reducing Surface Water Run-Off - Flood Risk Management	2	2	0		<u>Low flood risk</u> 1. Where flood maps from the appropriate statutory body (see Relevant definitions)confirm the refurbishment or fit-out is situated in a flood zone that is defined as having a low annual probability of flooding; OR 2. The project meets the requirements for avoidance of flooding in accordance with Checklist 1, e.g. where the refurbishment or fit-out zone is of a floor level that is 0.3m higher than the obtained/estimated flood level and safe access/escape routes are available/present <u>Medium/high flood risk</u> 3. Where criterion 4 and either criterion 5 or 6 have been met 4. Where flood maps from the appropriate statutory body (see Relevant definitions) confirm the site has a medium or high flood risk and a site specific FRA has been undertaken (as relevant to size of project in accordance with CN7). The FRA must take all current and future sources of flooding into consideration in accordance with compliance note. 5. Where the refurbishment or fit-out zone achieves avoidance from flooding through either: a. the refurbishment and fit-out zone is located entirely on the first floor or above and a flood emergency plan has been developed in accordance with 'Would your business stay afloat? A Guide to preparing your business for flooding', Environment Agency, 2011 b. As a result of the building's floor level or measures to keep water away, the building is defined as achieving avoidance from flooding by following Checklist A-1, Checklists and tables. 6. Where avoidance is not possible, two Credits are achieved where a full flood resilience/resistance strategy is implemented for the building's scope of works in accordance with recommendations made by a Suitably Qualified Building Professional (The following aspects of the design should be addressed for the relevant parts, in accordance with best practice guidance: a. Part 1: Fabric – using flood resilient materials and flood protection measures for the building fabric, e.g. waterproof materials, impermeable membranes, flood barriers, safe access/exit points in the event of a flood etc. b. Part 2: Core services – core services and associated infrastructure (including equipment and vulnerable pipes/ducts/cables etc.) should be located/specified so as to protect services from flooding damage, e.g. location/routing/height, protection of building apertures (such as intakes/extracts/ventilation), non-return valves etc. c. Part 3: Local services – the location/height of local services such as sockets, vents etc. and the location of the wiring/pipework/ductwork in relation to the flood level and other measures to protect local services. d. Part 4: Interior – the proposed function of spaces that are below the flood level (e.g. sacrificial spaces) should be limited to those which are not susceptible to flood damage, and the resilience of materials used for partitions, walls, floors, ceiling finishes, furniture and fittings and the location of equipment in relation to the flood level, e.g. avoid storing flood sensitive materials and functions in spaces that are below the flood level.	All	Low flood risk A copy of the flood risk assessment in accordance with BREEAM requirements confirming the development is situated in a low flood risk zone. A copy of the relevant flooding map (if available). A letter confirming that an appropriate consultant has been appointed to demonstrate the compliance with the relevant BREEAM criteria. Medium/high flood risk 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.	240920 MTTs reviewed process of using Environment Agency online flood maps as evidence for this Credit and note that BRE Knowledge Base Compliance Note states 'EA confirmation is no more robust or detailed than reference to flood maps, which are not in themselves compliant without a FRA.' Accordingly, a formal FRA will be required. Responsible Party updated from MTTs to QPS(FRA) for QPS to procure a Flood Risk Assessment. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that two Credits should be sought because the site is expected to have a low risk of flooding, based on Environment Agency flood maps. Action -MTTs to verify that EA flood maps are sufficient for the purposes of this Credit. Additional Team Appointment - A Flood Risk Assessor and/or a Suitably Qualified Building Professional must be appointed if EA flood maps are insufficient.	QPS (PM)	

Pol 03.2	Flood Risk and Reducing Surface Water Run-Off - Surface Water Run-Off	0	0	0	One Credit - neutral impact on surface water 7. There is no increase in the impermeable surfaces as a result of the refurbishment works; OR 8. If there is an increase in the impermeable surface as a result of the refurbishment works then the following must be met: a. Hard standing areas - where there is an extension or increase in the hardstanding areas and hence an increase in the total impermeable area as a result of the refurbishment works, the hardstanding area must be permeable or be provided with on-site SuDS to allow full infiltration of the additional volume, to achieve the same end result. The permeable hardstanding must include all pavements and public rights of way, car parks, driveways and non-adoptable roads, but exclude footpaths that cross soft landscaped areas which will drain onto a naturally permeable surface. b. Building extension - where there is an increase in building footprint, extending onto any previously permeable surfaces, the additional run-off caused by the area of the new extension must be managed on-site using an appropriate SuDS technique for rainfall depths up to 5mm. Two Credits - reducing run-off 9. An Appropriate Consultant (A consultant with qualifications and experience relevant to designing Suds and flood prevention measures and completing peak rate of run-off calculations. Where complex flooding calculations and prevention measures are required, this must be a specialist hydrological engineer.) has been used to design an appropriate drainage strategy for the site. 10. Either of the following criteria are met: a. There is a decrease in the impermeable area by 50% or more, from the pre-existing impermeable hard surfaces; OR b. Where run-off as a result of the refurbishment is managed on-site using source control achieving the following requirements: i. The peak rate of run-off as a result of the refurbishment for the 1 in 100 year event has been reduced by 50% from the existing site. ii. The total volume of run-off discharged into the watercourses and sewers as a result of the refurbishment, for a 1 in 100 year event of 6 hour duration has been reduced by 50%. iii. An allowance for climate change must be included for all of the above calculations; this should be made in accordance with current best practice planning guidance.	If Part 1	7-8. An appropriate consultants report detailing that there is no increase to the impermeable area or where there is an increase, the report highlights all issues in the adjacent column. 9-10. A copy of the relevant report or calculations 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, calculations 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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Exe Pol 03.2e	Flood Risk and Reducing Surface Water Run-Off - Surface Water Run-Off Exemplary	0	0	0	The following outlines the exemplary level requirements to achieve an innovation Credit for surface water run-off: 15. Where all run-off from the developed site is managed on-site using source control, the following must be achieved to confirm compliance: a. The peak rate of run-off as a result of the refurbishment for the 1 in 1 year event is reduced to zero. b. The peak rate of run-off as a result of the refurbishment for the 1 in 100 year event is reduced to zero. c. There is no volume of run-off discharged into the watercourses and sewers as a result of the refurbishment, for a 1 in 100 year event of 6 hour duration. d. An allowance for climate change must be included for all of the above calculations, in accordance with current best practice national planning guidance. e. Where an appropriately qualified professional has been employed to provide the above calculations and design an appropriate drainage strategy for the site, ensuring all above criteria are achieved.	If Part 1	A copy of the relevant report or calculations confirming that drainage measures specified to ensure that the peak rate of run-off from the site to the watercourses meet the exemplary Credit requirements.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

Pol 03.3	Flood Risk and Reducing Surface Water Run-Off - Minimising Watercourse Pollution	0	0	0		One Credit 11. There is no discharge from the developed site (includes new and existing hard landscaping and buildings) for rainfall up to 5mm (confirmed by the Appropriate Consultant). 12. Where suitable pollution prevention measures are put in place (or already exist) for the different sources of pollution present on the assessed site. - Low risk source of watercourse pollution: An appropriate level of pollution prevention treatment is provided, using appropriate Suds techniques - High risk source of watercourse pollution: Where there is risk of contamination or spillage of substances such as petrol and oil (For the purpose of assessing the watercourse pollution Credit, an area that presents a risk of watercourse pollution includes vehicle manoeuvring areas, car parks, waste disposal facilities, delivery and storage facilities or plant areas.), separators (or an equivalent system) are installed in surface water drainage systems. - 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). - Vehicle washing areas: Pollution prevention systems must be in accordance with Pollution Prevention Guidelines 13, see Other information section. - 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, see Other information. 13. A comprehensive and up to date drainage plan of the site will be made available for the building/site occupiers. 14. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified Suds must be in place.	If Part 1	Marked-up proposed site plan highlighting the low and high risk areas of the site. A copy of the specification or design plan confirming the type of pollution control systems specified. A letter from the design team confirming: · All water pollution prevention systems designed in accordance with PPG3 and the SUDS manual · Outlining indicative examples of compliance with PPG3 and the SUDS manual · A copy of the drainage plan will be produced and handed over to the building occupier.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Pol 04	Reduction of Night Time Light Pollution - Reducing Night Time Light Pollution	1	1	0		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.	If Parts 2 or 3	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because the Credit requirements can be quite easily met for the external lighting installation to be provided as part of the current project scope, through the use of appropriately specified external lighting fittings and timers.	MC M+E	

Pol 05	Noise Attenuation - Noise Attenuation	1	1	0	One Credit 1. Where there are, or will be, no noise-sensitive areas or buildings within 800m radius of the assessed site. OR 2. Alternatively, where the building does have noise-sensitive areas or buildings within 800m radius of the site, one Credit can be awarded as follows: a. Where a noise impact assessment in compliance with BS 74451 has been carried out and the following noise levels measured/determined: i. Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development or at a location where background conditions can be argued to be similar. ii. The rating noise level resulting from the new noise source (At the design stage of assessment, where noise-sensitive areas or buildings are present, actual measurement is unlikely to be possible due to the planned but non-existent installation. In such situations compliance can be demonstrated through the use of acousticians' calculations or by scale model investigations. For such cases BS 7445-2 states that 'as universally agreed prediction models do not exist, the method adopted should be carefully described in the acoustician's report' and that 'when available, prediction models accepted by relevant authorities should be used'. Where prediction through these methods is not possible, measurement will be necessary using either a noise source similar to that proposed or, alternatively, measurement of the actual noise from the installation (once installed); compliance with the latter approach requires a written commitment to appoint a suitably qualified acoustician to carry out the required measurements post-installation, and a further commitment to attenuate the noise source in compliance with criteria 4 and 5 of BREEAM (if proved necessary by the measurements). 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 (An individual who holds a recognised acoustic qualification and membership of an appropriate professional body. The primary professional body for acousticians in the UK is the Institute of Acoustics.). 3. The noise level from the proposed site/building, as measured in the locality of the nearest or most exposed noise-sensitive development, is a difference no greater than +5dB during the day (07:00 to 23:00) and +3dB at night (23:00 to 07:00) compared to the background noise level. 4. 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. If Parts 1, 2 or 3
--------	---------------------------------------	---	---	---	--

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.

141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from Sandy Brown to Main Contractor's Acoustician.

Additional Information Required:
- Acoustician to provide acoustic report and calculations undertaken.

240920 QPS (PM) advised that Sandy Brown would undertake the role of Suitably Qualified Acoustician. Responsible Party updated from QPS(ACO) to Sandy Brown.

060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that one Credit should be sought since the external plant attenuation measures currently expected can be specified to meet the requirements of this Credit.

Action - QPS to provide details of Acoustician when appointed/instructed.

Additional Team Appointment - A Suitably Qualified Acoustician must be appointed.

MC ACO

appendix d – BREEAM RFO 2014 Pre-Assessment – the dot...



Project:

RIBP - The Dot

Job Number:

1264

Subject:

BREEAM RFO 2014 - Parts 2, 3 & 4

Date:

4th November 2020

Assessor:

Martin Lawless

Support:

Ellis Leake-Lyall

Issue:

04

RFO 2014 Parts 2,3,4

DESIGN STAGE

Req. %: >70%

Req. Rating: Excellent

Sought %: 75.12%

Sought Rating: Excellent

Complete %: 0.00%

Complete Rating: Fail

Risk %: 0.00%

REVIEW

Sought Margin %: 5.12%

Outstanding Margin %: 25.00%

Credit ID	Credit Name	Maximum Credits	Sought Credits	Complete Credits	Credit Status	Credit Criteria	Applicable Parts	Evidence Requirements	MTTS Commentary	Resp. Party	Risk
Man 01.1	Project Brief and Design - Stakeholder Consultation (Project Delivery)	1	1	0		1. A clear sustainability brief is developed prior to Concept Design which sets out: a. Client requirements e.g. internal environmental conditions required b. Sustainability objectives and targets including target BREEAM rating, business objectives etc. c. Timescales and budget d. List of consultees and professional appointments that may be required e.g. Suitably Qualified Acoustician etc. e. Constraints for the project e.g. technical, legal, physical, environmental. 2. Prior to completion of the Concept Design (RIBA Stage 2 or equivalent), the project delivery stakeholders have met to identify and define their roles, responsibilities and contributions for each of the key phases of project delivery. 3. 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. Design and construction risk assessments e.g. CDM, legionella risk assessment e. Legislative requirements e.g. building control notification, heritage requirements f. Procurement and supply chain g. Identifying and measuring project success in line with project brief objectives h. Occupiers' budget and technical expertise in maintaining any proposed systems i. Maintainability and adaptability of the proposals j. Requirements for the production of project and end user documentation k. Requirements for commissioning, training and aftercare support. 4. The project team demonstrate how the project delivery stakeholder contributions and the outcomes of the consultation process have influenced or changed the Initial Project Brief, including if appropriate, the Project Execution Plan, Communication Strategy, and the Concept Design.	All	1-3. Consultation plan setting out the process and scope of the consultation. 1. Meeting minutes confirming role, responsibility and contribution definition for each of the key phases. 2. 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. 3. 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. 4. 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.	261020 Quartz provided information with respect to functionality, build quality and impact, internal and external facilities, management and operational implications, maintenance resources implications, inclusive and accessible design etc. Additional Information Required: - Quartz to provide completed sustainability brief, responsibilities matrix in accordance with MTTS email 141020. 141020 MTTS issued additional guidance, templates and pro forma letter text to Quartz. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because setting out roles and responsibilities for project delivery would be straight forward for a project of this scope and type. Time Critical Action - RIBA Stage 2 - Prior to completion of the Concept Design (RIBA Stage 2 or equivalent), the project delivery stakeholders have met to identify and define their roles, responsibilities and contributions for each of the key phases of project delivery.	QPS (PM)	

Man 01.2	Project Brief and Design - Stakeholder Consultation (Third Party)	1	1	0	5. 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 Minimum consultation content will be dependent on the building and scope of the project but would typically include the following: - Functionality, build quality and impact (including aesthetics). - Provision of appropriate internal and external facilities (for future building occupants and visitors/users). - Management and operational implications. - Maintenance resources implications. - Impacts on the local community, e.g. local traffic/transport impact. - Opportunities for shared use of facilities and infrastructure with the community/appropriate stakeholders, if relevant/appropriate to building type. - Compliance with statutory (national/local) consultation requirements. - Inclusive and accessible design. - Where services are taken from outside of the refurbishment area that affect the suitability of the service, e.g. domestic hot water services and legionella prevention. 6. 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. 7. 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.	All	5. Copy of the Consultation Plan and/or a letter 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. 6. Meeting minutes and/or Letter and/or design drawings confirming all changes to the Initial Brief and Concept Design occurred during the consultation. 7. Meetings minutes and/or Letter confirming that consultation feedback has been given to, and received by, all relevant parties by RIBA Stage 4.	211020 Quartz provided completed letter text, sustainability brief, responsibilities matrix in accordance with MTTs email 141020. Additional Information Required: - MTTs to compile evidence set at completion of Design Stage assessment. 141020 MTTs issued additional guidance and pro forma letter text relating to BREEAM AP appointment to Quartz. 230920 MTTs note that, as compliance is demonstrated via the BREEAM assessor's Design Stage assessment report, this Credit cannot be signed off until the completion of all other Design Stage Credits. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because the appointment of a Sustainability Champion to facilitate setting and achievement of BREEAM targets would be achieved through the use of the BREEAM AP. Time Critical Action - RIBA Stage 1 - A Sustainability Champion has been appointed to facilitate the setting and achievement of BREEAM performance targets for the project. The design stage Sustainability Champion is appointed to perform this role during the feasibility stage (Stage 1, Preparation and Brief stage, as defined by the RIBA Plan of Work 2013 or equivalent). The defined BREEAM performance target(s) has been formally agreed between the client and design/Project Team no later than the Concept Design stage (RIBA Stage 2 or equivalent). Additional Team Appointment - A Sustainability Champion (Design Stage) must be appointed.	QPS (PM)
Man 01.3	Project Brief and Design - Sustainability Champion (Design)	1	1	0	9. A Sustainability Champion has been appointed to facilitate the setting and achievement of BREEAM performance targets for the project. The design stage Sustainability Champion is appointed to perform this role during the feasibility stage (Stage 1, Preparation and Brief stage, as defined by the RIBA Plan of Work 2013 or equivalent). 10. The defined BREEAM performance target(s) has been formally agreed between the client and design/project team no later than the Concept Design stage (RIBA Stage 2 or equivalent). 11. To achieve this Credit at the interim design stage assessment, the agreed BREEAM performance target(s) must be demonstrably achieved by the project design. This must be demonstrated via the BREEAM assessor's design stage assessment report.	All	9. Copy of a letter of appointment of a Sustainability Champion at the feasibility stage (RIBA Stage 1 or equivalent). 10. 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). 11. BREEAM assessor's design stage assessment report.	211020 Quartz provided completed letter text, sustainability brief, responsibilities matrix in accordance with MTTs email 141020. Additional Information Required: - MTTs to compile evidence set at completion of Design Stage assessment. 141020 MTTs issued additional guidance and pro forma letter text relating to BREEAM AP appointment to Quartz. 230920 MTTs note that, as compliance is demonstrated via the BREEAM assessor's Design Stage assessment report, this Credit cannot be signed off until the completion of all other Design Stage Credits. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because the appointment of a Sustainability Champion to facilitate setting and achievement of BREEAM targets would be achieved through the use of the BREEAM AP. Time Critical Action - RIBA Stage 1 - A Sustainability Champion has been appointed to facilitate the setting and achievement of BREEAM performance targets for the project. The design stage Sustainability Champion is appointed to perform this role during the feasibility stage (Stage 1, Preparation and Brief stage, as defined by the RIBA Plan of Work 2013 or equivalent). The defined BREEAM performance target(s) has been formally agreed between the client and design/Project Team no later than the Concept Design stage (RIBA Stage 2 or equivalent). Additional Team Appointment - A Sustainability Champion (Design Stage) must be appointed.	MTTs

Man 01.4	Project Brief and Design - Sustainability Champion (Monitoring Progress)	1	1	0		12. The Sustainability Champion criteria 9, 10 and 11 have been achieved. 13. 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. To do this 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.	All	13. Copy of a letter of appointment for a sustainability champion to monitor progress against the agreed BREEAM performance targets throughout the design process.	211020 Quartz provided completed letter text, sustainability brief, responsibilities matrix in accordance with MTTs email 141020. Additional Information Required: - MTTs to compile evidence set at completion of Design Stage assessment. 141020 MTTs issued additional guidance and pro forma letter text relating to BREEAM AP appointment to Quartz. 230920 MTTs note that, as compliance is demonstrated via the BREEAM assessor's Design Stage assessment report, this Credit cannot be signed off until the completion of all other Design Stage Credits. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because the appointment of a Sustainability Champion to facilitate setting and achievement of BREEAM targets would be achieved through the use of the BREEAM AP. Time Critical Action - RIBA Stage 2 - 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. Additional Team Appointment - A Sustainability Champion (Monitoring Progress) must be appointed.	MTTs	
Man 02.1	Life Cycle Cost and Service Life Planning - Elemental LCC Plan	2	2	0		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 'Standardised method of life cycle costing for construction procurement' PD 156865:2008. 2. The LCC analysis shows: a. An outline LCC plan has been undertaken for the project based on the building's basic structure and envelope, appraising a range of options and based on the life expectancy of the refurbished building, e.g. 20, 30, 50+ years. b. The servicing strategy for the project outlining services component over a 15 -year period, in the form of an 'elemental LCC Plan'. c. A fit-out strategy is developed outlining fit-out options over a 10-year period.	All	1-2. Copy of the Life Cycle Cost analysis report in accordance with PD 156865:2008.	121020 QPS noted that the Life Cycle Cost analysis was underway by ADW Developments. Additional Information Required: - ADW Developments to provide Elemental Level Life Cycle Cost analysis report. 240920 QPS (PM) advised that the life cycle cost exercise would be undertaken by ADW Developments. Responsible Party updated from QPS (PM) to ADW Developments. 080920 MTTs issued requirements and an example report for the Credit to QPS (PM). 200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should be sought. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought as part of the 'Enhanced' score as the level of investigation to undertake elemental lifecycle costing is not generally considered appropriate for a project of this type and scope, but LCC analysis could be a cost-effective activity to secure Credits necessary to achieve an 'Excellent' rating. Credit assigned to QPS (PM) as they will need to appoint a suitable specialist/extend role of QS. 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 'Standardised method of life cycle costing for construction procurement' PD 156865:2008. Additional Team Appointment - A Life Cycle Cost Consultant (Elemental) must be appointed.	ADW	

Man 02.2	Life Cycle Cost and Service Life Planning - Component Level LCC Plan	1	1	0		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): Applicability/Building components Part 1 assessments, including components within scope of works. / Envelope, e.g. cladding, windows, and/or roofing Part 2 & 3 assessments including newly specified local and core services./ Newly specified local and/or core service equipment, e.g. boiler, air-conditioning, air handling unit, and/or controls etc. Parts 1 – 4, where finishes are within scope of works. / Finishes, e.g. walls, partitions, floors and/or ceilings etc. Where external spaces are within scope of works. / External spaces, e.g. alternative hard landscaping, boundary protection. Where carrying out a major refurbishment covering all parts of the scheme, a component level LCC plan shall be developed as above. 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.	All	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.	240920 QPS (PM) advised that the life cycle cost exercise would be undertaken by ADW Developments. Responsible Party updated from QPS (PM) to ADW Developments. Additional Information Required: - ADW Developments to provide Component Level Life Cycle Cost analysis report. 240920 QPS (PM) advised that the life cycle cost exercise would be undertaken by ADW Developments. Responsible Party updated from QPS (PM) to ADW Developments. 080920 MTTs issued requirements and an example report for the Credit to QPS (PM). 200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should be sought. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought as part of the 'Enhanced' score as the level of investigation to undertake component level lifecycle costing is not generally considered appropriate for a project of this type and scope, but LCC analysis could be a cost-effective activity to secure Credits necessary to achieve an 'Excellent' rating. Credit assigned to QPS (PM) as they will need to appoint a suitable specialist/extend role of QS. 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. Additional Team Appointment - A Life Cycle Cost Consultant (Component Level) must be appointed.	ADW	
Man 02.3	Life Cycle Cost and Service Life Planning - Capital Cost Reporting	1	1	0		Report the capital cost for the refurbishment/fit-out works in pounds per square metre (£k/m2 via the BREEAM Assessment Scoring and Reporting tool.	All	Reporting of capital cost in £/m2	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is reasonable to expect that the capital cost of the project could be identified and reported.	QPS (QS)	
Man 03.0	Responsible Construction Practices - Pre-Requisite	0	0	0		Report the capital cost for the refurbishment/fit-out works in pounds per square metre (£k/m2 via the BREEAM Assessment Scoring and Reporting tool.	All	Reporting of capital cost in £/m2	070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820. Mandatory Credit Requirement - For 'Excellent' and above - One Credit (Considerate Construction Element. For small scale or low value projects: where an individual is responsible for implementing and maintaining the following considerate construction practices: Keeping the site clear and tidy; Reducing impacts on the community through community engagement; Continuous improvements in safety; Commitments to respect and fair treatment of all workers; Suitable site and facilities for operatives and visitors. For other projects: where the contractor achieves 'compliance' with the criteria of a compliant scheme, i.e. the CCS).	QPS (QS)	

Man 03.1	Responsible Construction Practices - Environmental Management	1	1	0		2. 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 1 to 4, as defined in BS 8555:2003. 3. 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	All	2. A copy of the current EMS certificate (ISO 14001 / EMAS or equivalent) 3. A letter confirming procedures on-site are in accordance with Pollution Prevention Guidelines, Working at construction and demolition-sites: PPG6.	070820 MITS issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because use of a contractor that has an environmental management policy and that implement best practice Pollution Prevention is' expected for this project. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MITS to issue draft Contract Preliminaries text to QPS (QS). Done 070820. Mandatory Credit Requirement - For 'Excellent' and above - One Credit (Considerate Construction Element. For small scale or low value projects: where an individual is responsible for implementing and maintaining the following considerate construction practices: Keeping the site clear and tidy; Reducing impacts on the community through community engagement; Continuous improvements in safety; Commitments to respect and fair treatment of all workers; Suitable site and facilities for operatives and visitors. For other projects: where the contractor achieves 'compliance' with the criteria of a compliant scheme, i.e. the CCS).	QPS (QS)	
Man 03.2	Responsible Construction Practices - Sustainability Champion (Construction)	1	1	0		4. 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 will require action to be taken to address shortcomings in compliance. The Sustainability Champion will monitor site activities with sufficient frequency to ensure that risks of non-compliance are minimised. In this context, visits should occur at key stages of the construction process, at times where: works can be observed before they are covered up or new works or trades start; where significant risks of conflicts or errors could occur; where timing is critical to demonstrating compliance; where key evidence is required to be produced at specific times including, but not limited to photographic, delivery notes and other documentary evidence; and where different trades and systems come together and one could harm the integrity or compliance of another system's performance against BREEAM requirements. They will report on progress at relevant project team meetings including identifying potential areas of non-compliance and any action needed to mitigate. 6. The defined BREEAM performance target forms a requirement of the principal contractor's contract 7. 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.	All	4. Copy of a letter of appointment for a sustainability champion to monitor progress against the agreed BREEAM performance targets throughout the Construction, Handover and Close Out stages. 5. Contractor's Requirements/Preliminaries including BREEAM performance target. 6. BREEAM assessor's final post construction stage assessment report.	070820 MITS issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because the appointment of a Sustainability Champion to facilitate setting and achievement of BREEAM targets throughout the construction process could be achieved for a project of this type by imposing the requirement on the Main Contractor. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MITS to issue draft Contract Preliminaries text to QPS (QS). Done 070820. Time Critical Action - RIBA Stage 5 - The 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). Additional Team Appointment - A Sustainability Champion (Construction Stage) must be appointed.	QPS (QS)	

Man 03.3	Responsible Construction Practices - Considerate Construction	2	2	0		7. For small scale or low value refurbishment or fit-out projects (projects up to 500m2 total floor area or a contract value of up to £1m for education, industrial, institutions, leisure, retail and multi-residential buildings or up to £2m for health, mixed use, residential institutions and other buildings.): a. One Credit can be awarded where an individual(s) is responsible for implementing and maintaining the following considerate construction practices throughout the works stage (see Relevant definitions): i. Keeping the site clean and tidy ii. Reducing impacts on the community through community/neighbour engagement iii. Continuous improvements in safety iv. Commitments to respect and fair treatment of all workers v. Suitable site facilities for operatives and visitors b. Two Credits can be awarded where the contractor achieves 'compliance' with the criteria of a 'compliant' scheme 8. Where the refurbishment or fit-out project does not meet the definition of a small scale or low value project 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. Considerate Constructors Scheme is defined as one of the compliant schemes for the purpose of this BREEAM issue. The BREEAM Credits can be awarded as follows: <u>One Credit</u>: a CCS score between 25 and 34, a score of at least 5 in each of the five sections must be achieved <u>Two Credits</u>: a CCS score between 35 and 39, at least 7 in each of the five sections must be achieved.	All	Small scale projects: 7. 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. Large scale projects: 8. 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	070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the two Credits should be sought because achievement 'beyond compliance' with a compliant considerate construction scheme could be expected on a project of this type and scope. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820.	QPS (QS)	
Exe Man 03.3e	Responsible Construction Practices - Considerate Construction - Exemplary	0	0	0		Exemplary level performance: a CCS score of 40 or more, at least 7 in each of the five sections must be achieved.	All	Copy of report confirming achievement of compliance or beyond compliance with a compliant considerate construction scheme	060820 (Pre-Assessment Workshop) Credit discussed and MTTs noted that they do not recommend that this Exemplary Credit should be sought as the selected contractor may not be capable of achieving an exemplary CCS score.		
Man 03.4	Responsible Construction Practices - Monitoring of Refurbishment Or Fit-Out Site Impacts	2	2	0		9. 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 refurbishment or fit-out processes. This individual(s) must have the appropriate authority and responsibility to request and access the data required. The Sustainability Champion could perform this role. First Credit 10. Criterion 9 is achieved. 11. Monitor and record data of the site energy consumption in kWh (and where relevant, litres of fuel used) as a result of the use of construction plant, equipment (mobile and fixed) and site accommodation (as relevant to the project type). 12. Report the total carbon dioxide emissions (total kgCO2/project value) from the construction process via the BREEAM Assessment Scoring and Reporting tool. Second Credit 16. Criterion 9 is achieved 17. Monitor and record data on transport movements and impacts resulting from delivery of the majority of refurbishment or fit-out materials to site and refurbishment, fit-out and demolition or strip-out 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. Where Part 1 is being assessed, materials used in major building elements, including insulation materials ii. Where Part 2 is being assessed, materials used for core services iii. Where undertaking a comprehensive refurbishment including fit-out with a combination of Parts 1 - 4, materials used for major building elements, services and interior fit-out iv. Where within scope, ground works and landscaping materials v. Where undertaking a Parts 3 & 4 only assessment, materials used in the fit-out are included with the exception of small scale and low value refurbishment of fit-out projects (projects up to 500m2 total floor area or a contract value of up to £1m for education, industrial, institutions, leisure, retail and multi-residential buildings or up to £2m for health, mixed use, residential institutions and other buildings.) where this Credit is not applicable. c. Transport of construction waste from the construction gate to waste disposal processing or recovery centre gate. Scope of this monitoring must cover the construction waste groups outlined in the project's waste management plan. 18. Using the collated data, report separately for materials and waste, the total fuel consumption (litres) and/or total carbon dioxide emissions (kgCO2 eq), plus total distance travelled (km) via the BREEAM Assessment Scoring and Reporting tool.	All	9-16. 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. 17-18. A copy of a letter confirming the assignment of an individual for monitoring, recording and reporting transport movement in compliance with BREEAM criteria.	070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because monitoring of energy, water and transport impacts during refurbishment or fit-out could be expected on a project of this type and scope. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820.	QPS (QS)	

Man 04.1	Commissioning and Handover - Commissioning and Testing Schedule and Responsibilities	1	1	0	1. There is a schedule of commissioning and testing that identifies appropriate commissioning required for the scope of works that includes a suitable timescale for commissioning and re-commissioning of all relevant works carried out. Commissioning should be carried out where changes are being made to the following: a. Building services (including both complex and non-complex systems) b. Building services control systems (including Building Management Systems) c. Changes to the building fabric that will affect thermal performance. 2. The schedule will identify the appropriate standards that all commissioning activities will be conducted in accordance with such as current Building Regulations, BSRIA and CIBSE guidelines and/or other appropriate standards, where applicable. Where a building management system (BMS) is specified, , the following commissioning procedures must be carried out: a. Commissioning of air and water systems is carried out when all control devices are installed, wired and functional b. In addition to air and water flow results, commissioning results include physical measurements of room temperatures, off-coil temperatures and other key parameters as appropriate c. The BMS/controls installation should be running in auto with satisfactory internal conditions prior to handover d. All BMS schematics and graphics (if BMS is present) are fully installed and functional to user interface before handover e. The occupier or facilities team is fully trained in the operation of the system. 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.	All	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.	070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because having a commissioning and testing schedule and having commissioning responsibilities agreed is expected on a project of this type and scope. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820.	QPS (QS)	
Man 04.2	Commissioning and Handover - Commissioning Building Services	1	1	0	5. The commissioning and testing schedule and responsibilities Credit is achieved. 6. For projects where work is being undertaken to upgrade, renovate or install new building services and systems. For complex building services and systems (These include, but are not limited to, air-conditioning, comfort cooling, mechanical ventilation, displacement ventilation, complex passive ventilation, building management systems (BMS), renewable energy sources, microbiological safety cabinets and fume cupboards, cold storage enclosures and refrigeration plant, fume cupboards, microbiological safety cabinets), a specialist commissioning manager is appointed during the design stage (by either client or contractor) with responsibility for: i. Undertaking design reviews and giving advice on suitability for ease of commissioning ii. Providing commissioning management input to construction programming and during installation stages iii. Management of commissioning, performance testing and handover/post handover stages. b. For simple building services, this role can be carried out by an appropriate project team member (see criterion 3), provided they are not involved in the general installation works for the building services system(s).	if part 2 or 3	5-6. 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.	070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because commissioning of building services in line with best practice is expected on a project of this type and scope. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820. Time Critical Action - RIBA Stage 2 - The Specialist Commissioning Manager is appointed during the Design Stage to undertaking design reviews and giving advice on suitability for ease of commissioning, provide commissioning management input to construction programming and during installation stages and manage commissioning, performance testing and handover/post hand-over stages. Additional Team Appointment - A Specialist Commissioning Manager must be appointed.	QPS (QS)	

Man 04.3	Commissioning and Handover - Testing and Inspecting Building Fabric	0	0	0		7. Projects where the fabric of the building is being upgraded, the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths is quality assured through completion of a thermographic survey as well as airtightness testing and visual inspection at appropriate times during the refurbishment. The survey/testing is undertaken by a Suitably Qualified Professional, in accordance with the appropriate standard, with visual inspection conducted by a representative of the main contractor or by an independent inspector such as a clerk of works. Thermography surveys and airtightness testing are to be undertaken by suitably qualified professionals in accordance with the appropriate standards, as follows: Airtightness testing: by professionals with membership of ATTMA (Air Tightness Testing and Measurement Association) attained at organisational level maintaining UKAS accreditation (as air tightness testing laboratories to ISO 17025). Thermographic survey: by a professional holding a valid Level 2 certificate in thermography, as defined by the UKTA website. 8. Any defects identified in the site inspection, thermographic survey and the airtightness testing reports are rectified prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building/element.	Included if Part 1	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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment. Additional Team Appointment - A Thermographic Surveyor and Air Tightness Tester must be appointed.		
Man 04.4	Commissioning and Handover - Handover	1	1	0		9. A Building User Guide is developed or (where present) an existing Building User Guide is updated, prior to handover for distribution to the building occupiers and premises managers with a draft copy developed and discussed with users first (where the building occupants are known) to ensure the guide is most appropriate and useful to potential users. Building User Guide (BUG). Dedicated building/site specific guidance for the non-technical building user. The purpose of the guide is to help building users access, understand and operate the building efficiently and in a manner in keeping with the original design intent. A Building User Guide should be written in plain English and will provide easily accessible and understandable information relevant to the following stakeholders: - The building's staff (or where relevant residents) - The non-technical facilities management team/building manager - Other building users, e.g. visitors/community users. The content of the guide will be specific to the building type and end users, but broadly should include information on the following: - Overview of the building and its environmental strategy, e.g. energy/water/waste efficiency policy/strategy and how users should engage with/deliver the policy/strategy. - Building services overview and access to controls, e.g. where to find them, what they control, how to operate effectively and efficiently etc. - Pre-arrival information for visitors, e.g. access and security procedures/provisions - Provision of, and access to, shared facilities - Safety and emergency information/instructions - Building related operational procedures specific to building type/operation, e.g. laboratories - Building related incident reporting/feedback arrangements - Building related training information/links including information on legionella - Provision of, and access to, transport facilities, e.g. public transport, cyclist facilities, pedestrian routes etc. - Provision of, and access to, local amenities - Provide details and copies of risk assessments carried out including a legionella risk assessment - Re-fit, refurbishment and maintenance arrangements/considerations - Links, references and relevant contact details There is no requirement on the format the Building User Guide should take.	All	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.	070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because provision of a building users guide and implementation of a training schedule for occupants at handover is expected on a project of this type and scope. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820. Mandatory Credit Requirement - For 'Excellent' and above - Criterion 9 (Building User Guide: A Building User Guide is developed or an existing Building User Guide is updated.).	QPS (QS)	

Man 05.1	Aftercare - Aftercare Support	0	0	0		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 features of the refurbished building including the design intent and how to use the building to ensure it operates as efficiently and effectively as possible (including the use of local services and controls and central services, as applicable). b. On-site facilities management training, to include a walkabout of the refurbished area 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 and to conduct a walk-around to examine how the refurbished area of the building is being used/operated to identify any issues that need to be communicated to building users/facilities managers (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 coordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months (for Part 4, where local metering is available and accessible), once the building is occupied. Discrepancies between actual and predicted performance should be identified, with a commitment to identify actions required to address any discrepancies such as adjusting systems and/or to develop/review operational policies to influence user behaviours accordingly.	All	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	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Exe Man 05.1e	Aftercare - Exemplary	0	0	0		6. There are, or will be, operational infrastructure and resources in place to coordinate the following activities at quarterly intervals for the first three years of building occupation: a. Collection of occupant satisfaction, energy consumption and (where available) water consumption data. b. Analysis of the data to check the building is performing as expected and make any necessary adjustments to systems controls or to inform building user behaviours. c. Setting targets and/or appropriate actions for reducing water and energy consumption and monitor progress towards these. d. Feedback any 'lessons learned' to the design team and developer for use in future projects. e. Provision of the actual annual building energy, water consumption (where available and accessible) and occupant satisfaction data to BRE for the purpose of future BREEAM performance benchmarking. BRE for the purpose of future BREEAM performance benchmarking.	All	Ongoing aftercare support for first 12 months and the monitoring of energy and water use to identify any discrepancies in performance from design.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Man 05.2	Aftercare - Seasonal Commissioning	0	0	0		3. The following seasonal commissioning activities will be completed over a minimum 12-month period, once the building becomes substantially occupied: a. Complex systems - Specialist Commissioning Manager: i. Testing of all building services under full load conditions, i.e. heating equipment in mid-winter, cooling/ventilation equipment in mid-summer, and under part load conditions (spring/autumn). ii. Where applicable, testing should also be carried out during periods of extreme (high or low) occupancy. iii. Interviews with building occupants (where they are affected by the complex services) to identify problems 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.	If Part 2 or 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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

Man 05.3	Aftercare - Post Occupancy Evaluation	0	0	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. Where a fit-out specification is based upon a standard/corporate specification (e.g. large-scale rolling fit-out programmes) it is not necessary to conduct POE for every fit-out and compliance can be demonstrated for requirement 5 where a POE exercise has been carried out for each of the key specification types and where POE has also been carried out for the prototype fit-out, prior to full roll out.. 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). b. 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. c. Sustainability performance (energy/water consumption, performance of any sustainable features or technologies, e.g. materials, renewable energy, rainwater 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. Refer to the BREEAM RFO 2014 Manual for a definition of 'appropriate dissemination.' This also provides advice on appropriate dissemination where the building or building information is commercially or security sensitive.	All	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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Hea 01.1	Visual Comfort - Glare Control	1	0	0	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. Glare control must provide shading from both high level summer and low level winter sun. Where using fixed systems, design studies can be used to demonstrate that sunlight is prevented from reaching building occupants during occupied hours. Curtains (where used without other forms of shading) do not meet the criteria for the glare control criteria, as they do not provide sufficient control to optimise daylight into the space. Furthermore, the use of curtains to control glare is likely to cause occupants to rely more on artificial lighting. The only exception to this rule is in healthcare buildings in patient occupied spaces, treatment rooms and other high infection risk areas where the use of blinds is not recommended due to known risks relating to infection control. 2. The glare control strategy avoids increasing lighting energy consumption, by ensuring that: a. The glare control system is designed to maximise daylight levels under all conditions while avoiding disabling glare in the workplace or other sensitive areas. The system should not inhibit daylight from entering the space under cloudy conditions, or when sunlight is not on the façade: AND b. The use or location of shading does not conflict with the operation of lighting control systems.	If Part 1 or 4	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.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought because the provision of glare control measures of the type required by BREEAM is unlikely to be within the scope of the project.		

Hea 01.2	Visual Comfort - Daylighting	3	0	0	3. Up to three Credits are awarded on a sliding scale depending on the percentage of relevant building areas that comply with one of the following daylighting criteria: a. The relevant building areas meet good practice daylight factor(s) and other criterion as outlined in Table - 12 and Table - 13: OR b. The relevant building areas meet good practice average and minimum point daylight illuminance criteria as outlined in Table - 14. Office building Criteria extracted from Table 14: - Building/area type – Office, All occupied spaces - Average daylight factor required – 2% - Minimum area (m2) to comply for 1 Credit – 40% 2 Credits – 60 % 3 Credits – 80 % - Other requirements - At least 90 lux for 2000 hours per year or more. - Internal association/atrium area and teaching, lecture and seminar spaces have different requirements, please refer to the BREEAM RFO 2014 Manual for detailed values, other building types described as well. 4. Two Credits where daylighting provision, averaged over all relevant spaces, has improved after refurbishment or fit-out by 30% or more and there is a minimum glazing to floor area ratio of either: a. 5% glass to floor area ratio for side windows; OR b. 2.5% glass to floor area ratio for roof lights; 5. One Credit where daylighting provision, averaged over all relevant spaces, has improved after refurbishment or fit-out by 15% or more and there is a minimum glazing to floor area ratio of either: a. 5% glass to floor area ratio for side windows; OR b. 2.5% glass to floor area ratio for roof lights Note: The improvement in daylighting provision is calculated using the BREEAM Hea 01 Calculator tool based upon either the increase in glazing area, transmittance, illuminance or percentage daylight factor. Please refer to the Methodology section for calculation procedures.	If Part 1 or 4	Design drawings and daylight calculations.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought as due to the proposed layout of the development, it is unlikely that the required daylighting levels will be achieved in all relevant areas. Additional Team Appointment - A Daylight Consultant must be appointed.		
Exe Hea 01.2e	Visual Comfort - Daylighting - Exemplary	0	0	0		If Part 1 or 4	Design drawings and daylight calculations.	As above.		
Hea 01.3	Visual Comfort - View Out	2	0	0	6. Two Credits where 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, defined as a view of a landscape or buildings (rather than just the sky) at seated eye level (1.2 – 1.3m) within the relevant building areas and should ideally be through an external window. A view into an internal courtyard or atrium will comply provided the distance from the opening to the back wall of the courtyard/atrium is at least 10m (therefore allowing enough distance for the eyes to refocus). The view cannot be an internal view across the room, as this is likely to become obstructed by partitions, filing cabinets etc. 7. One Credit where 80% of the floor area space in relevant building areas is within 7m of a wall which has a window or permanent opening that provides an adequate view out and criterion 8 is met. - The window/opening must be ≥ 20% of the surrounding wall area (area in m2 of the internal wall on which the window/opening is located, including the area of the window/opening itself.). 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 8206. 9. In addition, specific requirements apply to Prison buildings, Multi-residential buildings, Healthcare buildings with inpatient areas (one additional Credit) Please refer to the RFO 2014 manual.	If Part 1 or 4	Design of the space to optimise desks with a view out in accordance with view out criteria	060820 (Pre-Assessment Workshop) Credit discussed and MTTS noted that they do not recommend that the Credit is sought, as due to the proposed layout of the development, it is very unlikely that the view out criteria will be achieved in all relevant areas.		

Hea 01.4	Visual Comfort - Internal and External Lighting	1	1	0		10. All fluorescent and compact fluorescent lamps are fitted with high frequency ballasts. 11. 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. 12. 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. 13. All external lighting located within the refurbishment or fit-out 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. 14. Internal lighting is zoned to allow for occupant control (see Relevant definitions) in accordance with the criteria below for relevant areas present within the building: In office areas, zones of no more than four workplaces Workstations adjacent to windows/atria and other building areas separately zoned and controlled Seminar and lecture rooms: zoned for presentation and audience areas Library spaces: separate zoning of stacks, reading and counter areas Teaching space or demonstration area Whiteboard or display screen Auditoria: zoning of seating areas, circulation space and lectern area Dining, restaurant, café areas: separate zoning of serverly and seating/dining areas Retail: separate zoning of display and counter areas Bar areas: separate zoning of bar and seating areas Wards or bedded areas: zoned lighting control for individual bed spaces and control for staff over groups of bed spaces Treatment areas, dayrooms, waiting areas: zoning of seating and activity areas and circulation space with controls accessible to staff.	If Part 3	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because design to include best practice internal and external lighting levels and zoning is expected for the project.	MC M+E	
Hea 02.1	Indoor Air Quality - IAQ Plan	1	1	0		1. An indoor air quality plan has been produced and implemented, with the objective of facilitating a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during the design, construction and occupation of the building. 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. Protection of Heating Ventilation and Air Conditioning (HVAC) systems from sources of pollution during refurbishment/fit-out works e.g. dust e. Procedures for protecting the indoor air quality of areas outside of the refurbishment or fit-out zone that may be affected by the refurbishment/fit-out works f. Procedures for identifying and implementing third party testing and analysis required to ascertain that the contaminant sources have been removed effectively before occupancy g. Commitments for maintaining indoor air quality in-use, e.g. maintenance and cleaning of the HVAC system, ductwork and filters.	All	A copy of the Indoor Air Quality Plan in compliance with the BREEAM criteria.	150920 Air Quality Consultants appointed by QPS (PM). Responsible Party updated from QPS (PM) to QCIC. Additional Information Required: - AQC to provide Indoor Air Quality Plan. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is anticipated that an air quality plan can be produced by a specialist consultant and its recommendations incorporated into the design. Credit assigned to QPS (PM) as they will need to appoint a suitable specialist. Action -MTTS to suggest names for Indoor Air Quality Specialist to QPS, for them to procure quotations for an Indoor Air Quality Plan. Additional Team Appointment - A Specialist Consultant for Indoor Air Quality Plans must be appointed.	AQC	
Exe Hea 02.1e	Indoor Air Quality - IAQ Plan - Exemplary	0	2	0		<u>One Credit</u> 15. Criterion 6 has been achieved. 16. All seven remaining product categories listed in Table - 20 meet the testing requirements and emission levels criteria for Volatile Organic Compound (VOC) emissions (listed in the table). 17. For products B – F listed in Table - 20, the formaldehyde emission levels have been measured and found to be less than or equal to 0.06mg/m3 air in accordance with the approved testing standards in Table - 20. <u>Two Credits</u> 18. Criterion 6 has been achieved. 19. All seven remaining products categories listed in Table - 20 meet the testing requirements and emission levels criteria for Volatile Organic Compound (VOC) emissions (listed in the table). 20. For products B to F listed in Table - 20, the formaldehyde emission levels have been measured and found to be less than or equal to 0.01mg/m3 air, in accordance with the approved testing standards in Table - 20. Please refer to the BREEAM RFO 2014 Manual for Table - 20.	All	A copy of the Indoor Air Quality plan in compliance with the BREEAM criteria.	150920 Air Quality Consultants appointed by QPS (PM). Responsible Party updated from QPS (PM) to AQC. Additional Information Required: - AQC to provide Indoor Air Quality Plan. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is anticipated that products meeting the required VOC standards should be specifiable within the palette of materials envisaged for the project and appropriate testing on-site can be included in the Contractor's scope. Action - MTTS to provide additional guidance to BGY (refer to Hea 02.3) Done 070820. Additional Team Appointment - A Specialist Consultant for Indoor Air Quality Plans must be appointed.	AQC	

Hea 02.2	Indoor Air Quality - Ventilation	1	1	0	Refurbishment and fit-out works include measures to minimise the concentration and recirculation of pollutants in the building as follows: 2. Provide fresh air into the building in accordance with the criteria of the relevant standard for ventilation. 3. Design ventilation pathways to minimise the build-up of air pollutants in the building, as follows: a. In air conditioned and mixed mode buildings/spaces: i. The building's air intakes and exhausts are over 10m apart and intakes are over 20m from sources of external pollution; OR ii. The location of the building's air intakes and exhausts, in relation to each other and external sources of pollution, is designed in accordance with BS EN 13779:20071 Annex A2. b. In naturally ventilated buildings/spaces: openable windows/ventilators are over 10m from sources of external pollution. 4. Where present, HVAC systems must incorporate suitable filtration to minimise external air pollution, as defined in BS EN 13779:2007 Annex A3. 5. Areas of the building subject to large and unpredictable or variable occupancy patterns have carbon dioxide (CO2) or air quality sensors specified and: a. In mechanical 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.	If Part 2 or 3	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because design to include best practice ventilation levels is expected for the project.	MC M+E	
Hea 02.3	Indoor Air Quality - Volatile Organic Compounds	2	2	0	First Credit 6. All decorative paints and varnishes specified meet the criteria in Table - 20 7. At least five of the seven remaining product categories listed in Table - 20 meet the testing requirements and emission levels criteria for volatile organic compound (VOC) emissions (listed in the table). Second Credit 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 8 and 9, 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, including re-measurement. 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 diffusive sampling d. BS ISO 16000-3: 2011 Formaldehyde and other carbonyls in air by active sampling. 12. The measured concentration levels of formaldehyde (µg/m3) and TVOC (µg/m3) are reported, via the BREEAM Assessment Scoring and Reporting Tool.	If Part 4	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. 8-12. 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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the first Credit should be sought because the Design Team believe that products meeting the required VOC standards should be specifiable within the palette of materials envisaged for the project. The second Credit is achievable where a commitment can be made to test VOC levels post construction and they are found to be within the limits required by BREEAM. This is reflected in the scoring. Action - MTTs to provide additional guidance to BGY. Done 070820.	MC ARCH	

Hea 02.4	Indoor Air Quality - Potential For Natural Ventilation	1	0	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 AM107 (or for education buildings by using the ClassVent tool). b. For fit-out projects (Part 3 assessments), local services are designed to provide fresh air via a natural ventilation strategy and are appropriately designed according to the room depth in accordance with CIBSE AM10. 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 (The two levels of ventilation must be able to achieve the following: a. Higher level: higher rates of ventilation achievable to remove short term odours and/or prevent summertime overheating b. Lower level: adequate levels of draught-free fresh air to meet the need for good indoor air quality throughout the year, sufficient for the occupancy load and the internal pollution loads of the space). Note: Any opening mechanisms must be easily accessible and provide adequate user-control over air flow rates to avoid draughts. Relevant industry standards for ventilation can be used to define 'adequate levels of fresh air' sufficient for occupancy and internal air pollution loads relevant to the building type. Note: Multi-residential buildings with self-contained flats and individual bedrooms must have a degree of openable window function. This does not need to provide two levels of user-control (as required above), but must be occupant controlled.	If Part 1, 2 or 3	Provision of fresh air through a natural ventilation strategy	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought because a natural ventilation strategy is not currently proposed for the building.		
Hea 03.1	Safe Containment In Laboratories - Laboratory Containment Devices and Containment Areas	0	0	0		Production of an objective risk assessment of the proposed laboratory facilities. Containment devices such as fume cupboards meet best practice safety and performance requirements and objectives. Containment level 2 and 3 laboratory facilities to meet best practice safety and performance criteria where specified.	If Part 2, 3 or 4 and if Labs Specified	Design of new laboratory systems or retrofitting of existing facilities to best practice standards	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Hea 03.2	Safe Containment In Laboratories - Buildings With Level 2 and 3 Laboratory Facilities	0	0	0			If Part 2, 3 or 4 and if level 2 & 3 labs specified	Meeting best practice performance and safety criteria	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

Hea 04.1	Thermal Comfort - Thermal Modelling	1	1	0		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. Where undertaking a Part 4 assessment a competent person (e.g. chartered building services engineer) must assess the suitability of existing building services and controls to identify any changes that may be required as a result of fit-out works (e.g. as a result of changes to internal layout, occupant density, additional equipment that may increase cooling loads etc.). 5. 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.	All	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.	260920 MTTs note thermal modelling is commencing. Additional Information Required: - MTT to provide thermal modelling outputs for thermal comfort in due course. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because thermal modelling in accordance with CIBSE guidance is understood to be part of the current project scope. Time Critical Action - RIBA Stage 3 - The Energy Consultant is appointed to carry out the thermal modelling of the building using software in accordance with CIBSE AM11 Building Energy and Environmental Modelling. The software used to carry out the simulation at the detailed design stage provides full dynamic thermal analysis. Additional Team Appointment - A Energy Consultant (not for Part 4 assessment only) or a Chartered Building Services Engineer (for Part 4 assessment only) must be appointed.	MTTS	
Hea 04.2	Thermal Comfort - Adaptation - For A Projected Climate Change Scenario	1	0	0		6. Criteria 1 to 4 are achieved. 7. The thermal modelling demonstrates that the relevant requirements set out in criterion 3 are achieved for a projected climate change environment. Dynamic thermal simulation software packages currently provide the facility for building designs to be assessed under external climatic conditions specific to geographic location. Industry standard weather data for the UK is available in the form of Test Reference Years (TRYs) and Design Summer Years (DSYs) provided by CIBSE. This weather data enables thermal analysis of building designs under current climatic conditions, yet no account is taken of the projected variations in weather data that will occur during the building's life cycle as a result of climate change. For BREEAM, the DSY weather file should be used for the fiftieth percentile. The weather file represents the minimum requirements to perform thermal modelling under a climate change scenario and subsequently demonstrate compliance. Where design teams feel that added consideration of building occupant risk/sensitivity to overheating is necessary, weather files can be used that exceed the minimum requirements outlined above. The time periods indicated above have been selected to represent the building services life cycle likely to be present in each building services strategy type. A shorter time period is chosen for mechanically ventilated/mixed mode building types due to consideration of mechanical servicing equipment life span (before major upgrade or replacement is required), and to avoid over-specification of plant which could lead to inefficient operation. 8. 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 the future using passive design solutions in order to subsequently meet the requirements under criterion 7. 9. For air conditioned buildings, the PMV and PPD indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.	If Part 1, 2 or 3	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.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought because modelling future climate change environments in not Part of the current project scope.		

Hea 04.3	Thermal Comfort - Thermal Zoning and Controls	1	1	0		10. Criteria 1 to 4 are achieved. 11. The thermal modelling analysis (undertaken for compliance with criteria 1 to 4) has informed the temperature control strategy for the building and its users. 12. 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. Where specified, any new local cooling or heating services (or changes to existing services) are designed to ensure they do not conflict with core services (e.g. conflicts between two separate cooling systems, conflicts between core heating and locally provided cooling systems). c. 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). d. 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. e. The need or otherwise for an accessible building user actuated manual override for any automatic systems.	If Part 2 or 3	11. Thermal comfort study AND 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	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought as the design team are likely to develop a thermal zoning strategy that has been informed by the thermal modelling.	MC M+E	
Hea 05	Acoustic Performance - Acoustic Performance	3	3	0		<u>Up to three Credits for Education, Healthcare, Office and Law courts building types</u> 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: - Sound insulation - Indoor ambient noise level - Reverberation times. Please refer to the BREEAM RFO 2014 Manual for building type specific requirements. Where undertaking a partial refurbishment or fit-out, the performance standards and testing requirements defined in the checklist and tables section for the following principles are applicable to each assessment part: Part 1: criteria for sound insulation and indoor ambient noise levels Part 2: criteria for indoor ambient noise levels only Part 3: criteria for sound insulation and indoor ambient noise levels Part 4: sound insulation and reverberation control See relevant compliance notes on applicable assessment criteria, where undertaking a partial refurbishment or fit-out for further information on how to apply the appropriate acoustic performance standards and testing requirements defined in this issue. <u>Up to three Credits are available for Industrial, Retail, Prisons and 'Other' building types</u> <u>Up to two Credits</u> Where the building meets the acoustic performance standards and testing requirements detailed in Table - 25 (see Checklists and tables) for all relevant functional areas. Where undertaking a partial refurbishment or fit-out, the performance standards and testing requirements detailed in Table - 5 for the following principles are applicable to each assessment part: Part 1: criteria for sound insulation and indoor ambient noise levels Part 2: criteria for indoor ambient noise levels only Part 3: criteria for sound insulation and indoor ambient noise levels Part 4: sound insulation and reverberation control OR Up to three Credits Where a suitably qualified acoustician (see relevant definitions) is appointed to define a bespoke set of performance requirements for all function areas in the building using the three acoustic principles defined in criterion 1, setting out the performance requirements for each and the testing regime required. Up to four Credits are available for Multi-residential and Other, Residential institutions building types One, three or four Credits are available for Multi-residential and Other, Residential institution buildings where the relevant criteria in the checklists and table section have been applied. Please also see CN12.	All	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.	151020 Sandy Brown advised that it would be reasonable to seek all three Credits and that it would be reasonable to make the statement that 'the developer's scope of works will enable a future tenant utilising a typical fit-out and specification to meet the levels required to demonstrate compliance with the BREEAM criteria'. Additional Information Required: - Acoustician to provide acoustic report and calculations undertaken. 141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from Sandy Brown to Main Contractor's Acoustician. 240920 QPS (PM) advised that Sandy Brown would undertake the role of Suitably Qualified Acoustician. Responsible Party updated from QPS(IACO) to Sandy Brown. 200820 (Review with AAM) It was agreed that this 'Enhanced' (third) Credit should not be sought, although the Acoustician should advise whether this is achievable once they are appointed. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is likely a decent level of acoustic performance will be required on a project of this type and scope. Action - QPS to provide details of Acoustician when appointed/instructed. Additional Team Appointment - A Suitably Qualified Acoustician must be appointed.	MC ACO	

Hea 06	Safety and Security - Security of Site and Building	1	1	0		1. A Suitably Qualified Security Specialist (SQSS) conducts an evidence based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent), see compliance note where the refurbishment or fit-out zone comprises part of a larger building. 2. The SQSS develops a set of recommendations or solutions during or prior to Concept Design (RIBA Stage 2 or equivalent). These recommendations or solutions aim to ensure that the design of buildings, public and private car parks and public or amenity space are planned, designed and specified to address the issues identified in the preceding SNA. 3. The recommendations or solutions proposed by the SQSS are implemented. When confirming whether the recommendations or solutions set out by the suitably qualified security specialist(s) have been implemented at the post construction stage, it may be necessary for the assessor to use one or more of the following evidence types, supplied by the design team: - Desk-based evidence e.g. manufacturers literature/certificates etc. - Site-based evidence e.g. site inspection report/photographs etc. Any deviation from those recommendations or solutions will need to be justified, documented and agreed in advance with a suitably qualified security specialist.	If Part 1 or 4	1. A copy of a letter confirming the appointment of a Suitably Qualified Security Specialist to conduct a Security Needs Assessment. 2. Correspondence or copy of the report/feedback from the Suitably Qualified Security Specialist. 3. A marked-up plan highlighting that the recommendations from the SQSS are implemented.	021120 QCIC provided Security Needs Assessment report. Responsible Party updated from QCIC to Main Contractor - Architect with M+E Engineer Additional Information Required: - Main Contractor - Architect with M+E Engineer to provide evidence of implementation of Security Needs Assessment recommendations within their design. --- 150920 QCIC appointed by QPS (PM). Responsible Party updated from QPS (PM) to AQC. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because engagement with an ALO/CPDA or 'Suitably Qualified Security Specialist' (SQSS) to produce a Security Needs Assessment is expected to occur at the appropriate RIBA stage and their recommendations can be incorporated into the design. --- Action - MTTs to suggest names for SQSS to QPS, for them to procure quotations for a Security Needs Assessment. Done 070820. --- Time Critical Action - RIBA Stage 2 - A Suitably Qualified Security Specialist (SQSS) conducts an evidence based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent), see compliance note where the refurbishment or fit-out zone comprises Part of a larger building. --- Additional Team Appointment - A Suitably Qualified Security Specialist (SQSS) must be appointed. ---	QCIC	
Ene 01	Reduction of Energy Use and Carbon Emissions - Reduction of Energy Use and Carbon Emissions	15	6	0		Option 1: Whole building energy model For projects that want to gain recognition for improvements made at the whole building level, using whole building energy modelling National Calculation Methodology (NCM) compliant software Up to fifteen Credits - Whole building energy model (option 1) 1. Calculate the Energy Performance Ratio for Non Domestic Refurbishment (EPRNDR) and compare with the benchmarks below to determine the corresponding number of BREEAM Credits. BREEAM Credits EPRNDR 1 ≥ 0.06 2 ≥ 0.12 3 ≥ 0.18 4 ≥ 0.24 5 ≥ 0.30 6 ≥ 0.36 7 ≥ 0.42 8 ≥ 0.48 9 ≥ 0.54 10 ≥ 0.60 11 ≥ 0.66 12 ≥ 0.72 13 ≥ 0.78 14 ≥ 0.84 15 ≥ 0.90 Minimum requirements - Excellent Requires a minimum of 6 Credits to be achieved (equivalent to an EPRNDR of ≥ 0.36). - Outstanding Requires a minimum of 10 Credits to be achieved (equivalent to an EPRNDR of ≥ 0.60). Option 2: Elemental level energy model For projects where the scope of work is limited to a single or multiple assessment part (from parts 1, 2, 3 and 4) such as partial or minor refurbishment projects and fit-out projects. This option can, however, be used by projects undertaking a full refurbishment (all assessment parts). Note: The Credits available for option 2 are dependent upon the applicable assessment part and building type as defined in the BREEAM Refurbishment and Fit-out reporting tool. However irrespective of the building type and assessment scope, it is always possible to score up to 100% of the Credits available to each project.	If Part 1, 2 or 3	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).	060820 (Pre-Assessment Workshop) Credit discussed and MTTs noted that For 'Excellent' and above Six Credits were required. --- Mandatory Credit Requirement - For 'Excellent' and above - Full assessments (Parts 1,2,3 and 4): Six Credits, varies for other assessment types (EPRNDR has to be equal to or greater than 0.36). --- Time Critical Action - RIBA Stage 2 - The Suitably Qualified Heritage Conservation Specialist at the Concept Design stage to investigate the implications of improving building fabric and services performance while minimising the potential negative impacts of both the historic character of the building, the condition of the building fabric and indoor air quality (historic buildings only). --- Additional Team Appointment - A Suitably Qualified Heritage Conservation Specialist must be appointed (Historic buildings only) ---	MTTS	

Exe Ene 01.1e	Reduction of Energy Use and Carbon Emissions - Exemplary	0	0	0		The following outlines the exemplary level criteria to achieve up to five innovation Credits for this BREEAM issue: <u>Two Credits - Zero regulated carbon</u> 8. The building achieves an EPRNDR ≥ 0.9 and zero net regulated CO2emissions Up to four Credits - Zero regulated carbon and carbon neutral unregulated energy 9. Criterion 8 has been achieved. 10. An equivalent percentage of the building's modelled regulated operational delivered energy consumption is generated by carbon neutral on-site or near-site sources and used to meet energy demand from unregulated building systems or processes. Five Credits - Carbon negative 11. The building is carbon negative in terms of its total modelled operational delivered energy consumption, including regulated and unregulated energy	If Part 1, 2 or 3	Measuring improvement in existing energy performance through using the BREEAM Ene01 assessment tools at the whole building or elemental approach as appropriate to scope of works.	060820 (Pre-Assessment Workshop) Credit discussed and MITS noted that they do not recommend that the Exemplary Credits should be sought as the development is highly unlikely to achieve zero regulated carbon and carbon neutral unregulated energy or carbon negative levels.		
Ene 02.1	Energy Monitoring - Sub-Metering of Major Energy Consuming Systems	1	1	0		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. Where the total consumption of any single end use category (or a combination of end use categories added together) is estimated to account for less than 10% of the annual energy consumption for a given fuel type, it is not necessary for this end use to be sub-metered. In this instance, the design team should demonstrate that the respective end usels) is expected to account for less than 10% of the annual energy consumption for the fuel type. Where a given end usels) will clearly account for less than 10% of the total annual energy consumption for the fuel type in question, a simple hand calculation or use of benchmark data to demonstrate this is acceptable. 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. 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. Examples include automatic meter reading systems (AMR) and building energy management systems (BEMS). Automatic monitoring and targeting (aM&T) is an example of a management tool that includes automatic meter reading and data management. 3. The end energy consuming uses are identifiable to the building users, for example through labelling or data outputs.	If Part 2, 3 or 4	Specification document or technical drawings confirming: - 90% of energy load is appropriately metered through energy metering systems - 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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is anticipated that appropriately detailed metering strategy will be provided as part of the project scope. Mandatory Credit Requirement - For 'Very Good' and above - Parts 2, 3 and 4: One Credit (First Sub-Metering Credit: 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. In buildings with a total useful floor area greater than 1000m2: the energy consuming systems are metered using an appropriate energy monitoring and management system. In smaller buildings: they are metered either with an energy monitoring and management system or with separate accessible energy sub-meters).	MC M+E	
Ene 02.2	Energy Monitoring - Sub-Metering of High Energy Load and Tenancy Areas	1	1	0		4. 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.	If Part 2 or 3	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought for the development because the project scope includes the full provision of services to the tenanted floors.	MC M+E	
Ene 03	External Lighting - External Lighting	1	1	0		<u>One Credit</u> 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.	All	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because providing appropriately specified external lighting is likely to be straightforward for the project and a relatively small number of fittings are likely to be necessary at the new building entrances.	MC M+E	

Ene 04.1	Low Carbon Design - Passive Design Analysis	1	1	0		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 existing building fabric, form, site location and outline scheme design to influence decisions made during the Concept Design stage (RIBA Stage 2 or equivalent) and identifies opportunities for the implementation of passive design solutions and retrofit measures that reduce demands for energy consuming building services As a minimum, the passive design analysis should cover: Site location, Site weather, Microclimate, Building layout, Building orientation, Building form, Building fabric, Thermal mass or other fabric thermal storage, Building occupancy type, Daylighting strategy, Ventilation strategy, Adaptation to climate change. 3. The building uses passive design measures to reduce the total heating, cooling, mechanical ventilation and lighting loads and energy consumption in line with the findings of the passive design analysis and the analysis demonstrates a meaningful reduction in the total energy demand as a result The amount of energy or CO2 emissions reduction is not specified in the criteria in this issue. However, it should not be a trivial amount. As a guide, the installation should contribute at least 5% of overall building energy demand and/or CO2 emissions.	If Part 1, 2 or 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.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because passive design analysis as part of the thermal modelling exercise underway. Time Critical Action - RIBA Stage 2 - The Project Team carries out an analysis of the existing building fabric, form, site location and outline scheme design to influence decisions made during the Concept Design stage (RIBA Stage 2 or equivalent) and identifies opportunities for the implementation of passive design solutions and retrofit measures that reduce demands for energy consuming building services.	MTTS	
Ene 04.2	Low Carbon Design - Free Cooling	1	0	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 below to reduce the cooling energy demand (i.e. it does not use active cooling): - Night time cooling (which could include the use of a high exposed thermal mass) - Ground coupled air cooling - Displacement ventilation (not linked to any active cooling system) - Ground water cooling - Surface water cooling - Evaporative cooling, direct or indirect - Desiccant dehumidification and evaporative cooling, using waste heat - Absorption cooling, using waste heat - The building does not require any significant form of active cooling or mechanical ventilation (i.e. naturally ventilated).	If Part 1 or 2	Drawings or specifications confirming the implementation of free cooling measures. Results from a dynamic simulation model demonstrating the feasibility of the free cooling strategy and meeting the first Credit of Hea 04	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought because implementation of free cooling measures is not Part of the current project scope.		
Ene 04.3	Low Carbon Design - Low and Zero Carbon Technologies	1	1	0		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 (An individual who has acquired substantial expertise or a recognised qualification for undertaking assessments, designs and installations of low or zero carbon solutions in the commercial buildings sector and is not professionally connected to a single low or zero carbon technology or manufacturer.) 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: - Energy generated from LZC energy source per year - Carbon dioxide savings from LZC energy source per year - Life cycle cost of the potential specification, accounting for payback - Local planning criteria, including land use and noise - Feasibility of exporting heat/electricity from the system - Any available grants - All technologies appropriate to the site and energy demand of the development. - Reasons for excluding other technologies - 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 The amount of energy or CO2 emissions reduction is not specified in the criteria in this issue. However, it should not be a trivial amount. As a guide, the installation should contribute at least 5% of overall building energy demand and/or CO2 emissions.	If Part 2	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%).	220920 (Sustainability Workshop) MTT noted that heat pumps were anticipated as part of the services strategy and so the Credit may be sought. 200820 (Review with AAM) it was agreed that this 'Enhanced' Credit should not be sought for the purposes of BREEAM alone. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should not be sought because the provision of renewables is not currently within the scope of the project. 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 to establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy source(s) for the building/development. Additional Team Appointment - A Energy Specialist must be appointed to undertake a Feasibility study.	MTTS	

Ene 05.1	Energy Efficient Cold Storage - Refrigeration Energy Consumption	0	0	0		1. The refrigeration system, its controls and components have been designed, installed and commissioned as follows: a. In accordance with the Code of Conduct for carbon reduction in the refrigeration retail sector (The Code of Conduct has been developed by the Carbon Trust, in partnership with the Institute of Refrigeration (IoR) and the British Refrigeration Association (BRA). The Code is intended to compliment the Carbon Trust Refrigeration Road Map.) and BS EN 378-2 Refrigeration systems and heat pumps - Safety and environmental requirements. b. Using robust and tested refrigeration systems/components, normally defined as those included on the Enhanced Capital Allowance (ECA) Energy Technology Product List (ETPL) or an equivalent list (Where specified as part of the refrigeration system, products used for the following components must be listed on the ECA Energy Technology Product List (or equivalent list): - Air cooled condensing units - Automatic air purgers - Cellar cooling equipment - Commercial service cabinets (cold food storage) - Curtains, blinds, sliding doors and covers for refrigerated display cabinets - Evaporative condensers - Forced air pre-coolers - Refrigerated display cabinets - Refrigeration compressors - Refrigeration system controls.). 2. The refrigeration plant has been commissioned to comply with the criteria for commissioning outlined in BREEAM issue Man 04 Commissioning and handover.	If Part 2, 3 or 4 AND if cold storage specified	Refrigeration system, its controls and components have been designed, installed and commissioned in accordance with best practice.	060820 (Pre-Assessment Workshop - Post Workshop Note) The Credit is not applicable in this assessment it is anticipated that the refrigeration for kitchen and catering facilities will be self-contained units, not connected to building cooling systems		
Ene 05.2	Energy Efficient Cold Storage - Indirect Greenhouse Gas Emissions	0	0	0		3. Criteria 1 and 2 have been achieved. 4. The installed refrigeration system demonstrates a saving in indirect greenhouse gas emissions (CO2 eq.) over the course of its operational life. With reference to The Carbon Trust Refrigeration Road Map3, this can be demonstrated through specification of technologies described in CO2 emissions saving options available when designing a new store/retail concept that delivers savings in comparison with the 'baseline' building. The indirect emissions must be calculated in accordance with the procedures in BS EN 378-14- Refrigerating system and heat pumps safety and environmental requirements, Annex B. Further detail on applying this method to calculate the indirect emissions are available in the Guideline methods of calculating Total Equivalent Warming Impact (TEWI5) published by the British Refrigeration Association (BRA). Calculations must be carried out by an appropriately qualified professional (e.g. a building services engineer), including calculations to justify for assumptions and methodologies for savings in indirect greenhouse emissions. Note: for non-retail building types with cold storage refrigeration systems, refer to the BREEAM RFO 2014 manual.	If Part 2, 3 or 4 AND if cold storage specified	The installed refrigeration system demonstrates a saving in indirect greenhouse gas emissions (CO2 eq.) over the course of its operational life.	060820 (Pre-Assessment Workshop - Post Workshop Note) The Credit is not applicable in this assessment it is anticipated that the refrigeration for kitchen and catering facilities will be self-contained units, not connected to building cooling systems		
Ene 06.1	Energy Efficient Transportation Systems - Energy Consumption	0	0	0		An analysis of the transport demand and usage patterns is undertaken to determine the optimum number and size of lifts, escalators and/or moving walks. Energy efficient installations are specified.	If Part 2 or 3 AND if transportation systems specified	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	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

Ene 06.2	Energy Efficient Transportation Systems - Energy Efficient Measures	0	0	0		<u>One Credit - Energy consumption</u> Where new lifts, escalators and/or moving walks (transportation types) are specified within refurbishment works: 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, escalators and/or moving walks. The energy consumption has been estimated in accordance with BS EN ISO 25745 Energy performance of lifts, escalators and moving walks, Part 2: Energy calculation and classification for lifts (elevators) and/or Part 3 - Energy calculation and classification for escalators and moving walks, for one of the following: - At least two types of system (for each transportation type required); OR - An arrangement of systems (e.g. for lifts, hydraulic, traction, machine room-less lift (MRU)); OR - A system strategy which is 'fit for purpose'. - The use of regenerative drives should be considered, subject to the requirements in CN6 - The transportation system with the lowest energy consumption is specified. <u>Two Credits - Energy efficient features</u> Criterion 1 is achieved for newly specified lifts.	If Part 2 or 3 AND if transportation systems specified	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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Ene 07.1	Energy Efficient Laboratory Systems - Design Specification	0	0	0		Client engagement to determine occupant requirements and define laboratory performance criteria to optimise energy demand of the laboratory facilities. Specification of best practice energy efficient equipment and measures as appropriate.	If Part 2, 3 or 4 AND if laboratory systems specified	Carrying out client engagement to ensure design and performance of laboratories is optimised	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Ene 07.2	Energy Efficient Laboratory Systems - Best Practice Energy Efficiency Measures	0	0	0			If Part 2, 3 or 4 AND if laboratory systems	Implementing energy efficient measures to reduce laboratory energy consumption	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Ene 08	Energy Efficient Equipment - Energy Efficient Equipment	2	0	0		<u>Two Credits</u> Identify the building's unregulated energy consuming loads and estimate their contribution to the total annual unregulated energy consumption of the building, assuming a typical/standard specification. Identify the systems and/or processes that use a significant proportion of the total annual unregulated energy consumption of the development and its operation. Demonstrate a meaningful reduction in the total annual unregulated energy consumption of the building. See Table - 32 Table - 32 contains solutions deemed to satisfy compliance for common examples of significant contributors to unregulated energy consumption, for a number of different building types/functions.	If Part 4	Measuring and reducing unregulated energy demands through use of energy efficient equipment	200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should not be sought as JLL could not advise yet whether the appropriate catering measures could be put in place. 060820 (Pre-Assessment Workshop - Post Workshop Note) The Credit is now applicable in this assessment it is anticipated that the refrigeration for kitchen and catering facilities will be self-contained units, not connected to building cooling systems, so this Credit is relevant rather than Ene 05. Action - MTTs to review Credit requirements with JLL Food Service Consultant. Done 070820.		
Ene 09	Drying Space - Drying Space	0	0	0		<u>One Credit</u> - For self-contained dwellings: an adequate internal or external space with posts and footings, or fixings capable of holding: - One to two bedrooms: 4m+ of drying line - Three or more bedrooms: 6m+ of drying line. OR - Individual bedrooms: an adequate internal or external space with posts and footings, or fixings capable of holding: - Two metres or more of drying line per bedroom for developments with up to 30 individual bedrooms; plus - One metre of additional drying line for each bedroom over the 30 individual bedroom threshold. AND - The space (internal or external) is secure.	If Parts 1, 3 or 4 AND Multi-residential	Provision of adequate internal or external drying space	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Tra 01	Sustainable Transport Options - Accessibility Index or Alternative transport measures	0	0	0		Recognition for projects where proximity to good public transport networks has been reviewed and where poor, alternative measures have been implemented, thereby helping to reduce transport-related pollution and congestion.	If Parts 1 or 4	A copy of the site plan showing location of public transport networks and distance from the site.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the three Credits should be sought because appropriate public transport services are known to exist close to the development.		
Tra 02	Proximity To Amenities - Proximity To Amenities	1	1	0		Recognition of projects where proximity of, and accessible to, local amenities which are likely to be frequently required and used by building occupants has been reviewed.	If Parts 1 or 4	A scaled site plan indicating amenities and distance from the site.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because a variety of facilities (encompassing the listed items) are known to exist in close proximity to the development.	MTTS	

Tra 03.1	Cyclist Facilities - Cycle Storage	1	1	0		1. Compliant cycle storage spaces that meet the minimum levels set out in Table - 38(see Checklists and tables) are installed. Please refer to the BREEAM RFO 2014 manual for table 38.	If Parts 1 or 4	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credits should be sought because cycle storage is expected to be included as part of the project scope. Action - MITS to provide additional guidance to BGY. Done 070820.	MC ARCH	
Tra 03.2	Cyclist Facilities - Cyclist Facilities	1	1	0		2. Criterion 1 has been achieved. 3. At least two of the following types of compliant cyclist facilities have been provided for all building users (including pupils where appropriate to the building type) - see Relevant definitions for the scope of each compliant cyclist facility: a. Showers b. Changing facilities c. Lockers d. Drying spaces .	If Parts 1 or 4	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).	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because cyclist facilities are expected to be included as part of the project scope.	MC ARCH	
Tra 04	Maximum Car Parking Capacity - Car Parking Capacity	0	0	0		To ensure change of use projects review provision of car parking spaces to optimise car parking capacity and encourage alternatives to car travel.	If Change of Use Project	A copy of the site plan showing the number of car parking space that will be provided for the development.	060820 (Pre-Assessment Workshop) The Credit is not applicable in this assessment.		
Tra 05	Travel Plan - Travel Plan	1	1	0		A travel plan has been developed as part of the feasibility and design stages. A site specific travel assessment/statement has been undertaken to ensure the travel plan is structured to meet the needs of the particular site and covers the following (as a minimum): - Where relevant, existing travel patterns and opinions of existing building or site users towards cycling and walking so that constraints and opportunities can be identified. - Travel patterns and transport impact of future building users. - Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children). - Disabled access (accounting for varying levels of disability and visual impairment). - Public transport links serving the site. - Current facilities for cyclists. - 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 building's operation and use. - 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 refurbishment or fit-out and be supported by the building's management in operation.	If Parts 1 or 4	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.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because the procurement of a Travel Plan is a cost-effective measure for the project. The current planning application is expected to require a Travel Plan, which could be written to cover the BREEAM requirements. Additional Information Required: - Velocity to provide Travel Plan. Time Critical Action - RIBA Stage 2 - A travel plan has been developed as part of the feasibility and design stages. Additional Team Appointment - A Transport Consultant must be appointed.	VELO	

Wat 01	Water Consumption - Water Consumption	5	4	0	1. An assessment of the efficiency of newly specified domestic water-consuming components and (where relevant) measures specified to retrofit existing devices is undertaken using the BREEAM Wat 01 calculator, including all fittings applicable to the project type as detailed in Table - 42. Where there are no fittings within the scope of refurbishment or fit-out works, or only minimal water-consuming fittings present or specified, refer to compliance notes 5 or 6 to determine how this issue should be assessed. 2. The water consumption (litres/person/day) for the assessed building is compared against a baseline performance and BREEAM Credits awarded: <table><tr><td>% improvement -</td><td>No. of BREEAM Credits</td></tr><tr><td>12.5 -</td><td>1</td></tr><tr><td>25 -</td><td>2</td></tr><tr><td>40 -</td><td>3</td></tr><tr><td>50 -</td><td>4</td></tr><tr><td>55 -</td><td>5</td></tr><tr><td>65 -</td><td>Exemplary performance</td></tr></table> 3. The efficiency of the following 'domestic scale' water-consuming components must be included in the assessment (where specified/relevant to project type as defined by Table - 42): 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 8525-1:2010 Greywater Systems - Part 1 Code of Practice. Any rainwater systems must be specified and installed in compliance with BS 8515:2009 Rainwater Harvesting Systems - Code of practice. If Parts 2, 3 or 4 AND sanitary fittings specified 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. 141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should be sought as similar water consumption performance had recently been achieved in another high-end office refurbishment undertaken by MTT and BGY. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that two Credits should be sought because specification of a level of water efficient equipment is within the current project scope. This level of water consumption reduction is unlikely to compromise the performance of the water fittings and does not require the specification of rainwater/greywater recovery systems. Mandatory Credit Requirement - For 'Very Good' and above - One Credit (for 25% of improvement over baseline building water consumption (litres/person/day)). MC ARCH	% improvement -	No. of BREEAM Credits	12.5 -	1	25 -	2	40 -	3	50 -	4	55 -	5	65 -	Exemplary performance
% improvement -	No. of BREEAM Credits																		
12.5 -	1																		
25 -	2																		
40 -	3																		
50 -	4																		
55 -	5																		
65 -	Exemplary performance																		
Wat 02	Water Monitoring - Water Monitoring	1	1	0	<u>One Credit</u> 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. The sub-meter requirement does not necessarily apply in the following cases, where the assessor confirms there will be no additional monitoring benefit resulting from their installation: Where a building has only one or two small sources of water demand (e.g. an office with sanitary fittings and a small kitchen) Where the building has two sources of water demand, one significantly larger than the other, and the water consumption for the larger demand is likely to mask the smaller demand. 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. Examples include automatic meter reading systems (AMR) and building energy management systems (BEMS). Automatic monitoring and targeting (aM&T) is an example of a management tool that includes automatic meter reading and data management. 4. If the refurbishment zone is within a site that has an existing BMS, managed by the same occupier/owner (as the space undergoing refurbishment or fit-out), the pulsed/digital water meter(s) for the refurbishment or fit-out zone must be connected to the existing BMS 5. If the refurbishment or fit-out zone is within a building that is leasehold, the pulsed/digital water meter(s) for the refurbishment or fit-out zone must be connected to the incoming water supply for water using equipment in tenanted areas (see compliance note) If Parts 2, 3 or 4 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. 141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because provision of water metering equipment is expected to be part of the current project scope. Mandatory Credit Requirement - For 'Very Good' and above - Part 2: Criterion 1 Only (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). MC M+E														

Wat 03.1	Leak Detection - Leak Detection System	1	1	0		<u>One Credit - Leak detection system</u> 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 inbuilt 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.	If Part 2	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. Location of Thames Water meter confirmed. --- 070920 MTT noted that the leak detection system would need to be 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, which could be some distance across the site. --- 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because specification of leak detection system on the incoming mains is expected to be part of the current project scope. ---	MC M+E	
Wat 03.2	Leak Detection - Flow Control Devices	1	1	0		<u>One Credit - Flow control devices</u> 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).	If Parts 2, 3 or 4	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. --- 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because providing flow control devices that regulate water supply to WC areas is expected to be part of the project scope. ---	MC M+E	
Wat 04	Water Efficient Equipment - Water Efficient Equipment	1	1	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. BREEAM does not prescriptively define all potential means or solutions for reducing unregulated water consumption. The design team needs to demonstrate to the assessor that they have identified key areas of water consumption in the building and that a reduction in unregulated water consumption has been achieved using existing 'tried and tested' solutions or new innovative solutions relevant to the building and its functional requirements. The following are some examples of solutions deemed to satisfy compliance for a number of different building types or functions (where the unregulated water demand for that function is one of/the significant contributor in the building): - Drip-fed subsurface irrigation incorporating soil moisture sensors. The irrigation control should be zoned to permit variable irrigation to different planting assemblages. - Reclaimed/recovered water from a rainwater collection or waste water recovery system, with appropriate storage, i.e. greywater collection from building functions or processes that use potable water, e.g. vehicle wash, training water in fire stations, sanitary facilities, irrigation etc. This should take into account the Government Buying Standards\where appropriate to the building type. - External landscaping and planting that relies solely on precipitation, during all seasons of the year. - All planting specified is restricted to contextually appropriate species that thrive without irrigation and will continue to do so in those conditions likely as a result of climate change, i.e. typically warmer and drier conditions.	If Unregulated Water Use	Specifications and drawings confirming measures to reduce unregulated water use (e.g. irrigation etc.)	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit could be sought, subject to verification from the RIBP Building Manager that sprinklers are not currently used in the landscaping. --- Action - MTTs to review Credit requirements with RIBP Building Manager. Done 070820. ---	RIBP BM	

Mat 01	Environmental Impact of Materials	6	3	0		Up to six Credits (option 1): Project lifecycle assessment study 1. The project uses a life cycle assessment (LCA) tool or undertakes a building information model life cycle assessment (BIM LCA) to measure the life cycle environmental impact of the refurbishment or fit-out works. 2. The LCA covers new materials as per the following list: - Part 1 includes elements of the fabric and structure including: External walls (envelope, structure and finishes), External windows and roof lights, Structural frame, Basements/retaining walls (including excavations), Upper floors (including horizontal structure), Roof (including coverings), Stairs, Ground/lowest floor. - Part 2 and 3 includes elements used for core and local services including: Heat source, space heating, air-conditioning and ventilation, Communication, security and control systems, Electrical installations, Fire and lightning protection, Lift and conveyor installations/systems, Water and waste installations, Sanitary installations. - Part 4 includes interior fit-out elements including: Internal floor finishes (including access floors), Ceiling finishes (including suspended/access ceilings), Internal walls, partitions and finishes, Internal windows, Internal doors, Furniture (desks, chairs, display cabinets, shelving), Fittings (shop fittings, railings, screens, gutters, vents, air grilles) - Hard landscaping and boundary protection are included where within scope of works 3. A member of the project team completes the BREEAM Refurbishment and Fit-out Mat 01 calculator using parts A and B and determines a score based on the robustness of the LCA tool used (Part A of the tool) and the scope of the assessment in terms of the materials specified that have been considered (Part B of the tool) 5. Where the design team can demonstrate how the LCA has benefited the building in terms of measuring and reducing its environmental impact. This should take the form of a short qualitative statement from the design team providing comments on the following: - How and at what stages of the design the tool was utilised. - How the tool helped (or did not help) steer the design process to optimise cost and mitigate environmental impacts, giving examples of specific changes to the building design/specification that resulted. 6. Where the design team submit the LCA tool output (e.g. Building Information Model (BIM)) for assessing the building to BRE Global (via the project's appointed BREEAM assessor) to inform future potential LCA benchmarking for BREEAM	Parts 1,2,3 or 4	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)	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should not be sought as, whereas similar materials performance had recently been achieved in another high-end office refurbishment undertaken by MTT and BGY, this could not necessarily be replicated on this project. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that three to four Credits should be sought because the general specification of materials with robust environmental claims and re-using existing elements in situ can be expected for the project. The final number of Credits achievable will not be clear until the materials specification is developed. Action - MTTs to provide additional guidance to BGY. Done 070820.	MC ARCH	
						OR Up to four Credits (option 2): Elemental assessment of environmental performance information 8. Robust environmental performance information has been collected for newly specified materials or where materials are retained in situ, for elements listed above. 9. The total number of points achieved as set out in the Methodology section are calculated using Part B of the BREEAM Mat 01 calculator. The number of points scored is based on the percentage of each element that has been: a. reused in situ b. reused in situ with minor repairs c. specified with robust environmental performance information. 10. Credits are awarded based upon the percentage of available points achieved as set out in Table - 47 of the BREEAM RFO 2014 manual.		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)	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. As above.	MC ARCH	
Exe Mat 01e	Environmental Impact of Materials - Exemplary	0	0	0		As above.	Parts 1,2,3 or 4	Using robust Lifecycle assessment tools, specification of materials with robust environmental claims and re-using existing elements in situ.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

Mat 03.1	Responsible Sourcing of Materials - Sustainable Procurement Plan	1	1	0		2. The principal contractor sources materials for the project in accordance with a documented sustainable procurement plan. A plan that sets out a clear framework for the responsible sourcing of materials to guide procurement throughout a project and by all involved in the specification and procurement of construction materials. The plan may be prepared and adopted at an organisational level or be site/project specific, and for the purposes of BREEAM compliance, will cover the following as a minimum: - 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. - Aims, objectives and targets to guide sustainable procurement activities. - The strategic assessment of sustainably sourced materials available locally and nationally. There should be a policy to procure materials locally where possible. - 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.	All	A copy of the sustainable procurement plan	070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. --- 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it would be expected that the Contractor will have a sustainable procurement plan for a project of this type and scope. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. --- Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820. --- Mandatory Credit Requirement - For 'Very Good' and above - Criterion 1 Only (All timber and timber-based products used on the project is legally harvested and traded timber) ---	QPS (QS)									
Mat 03.2	Responsible Sourcing of Materials - Responsible Sourcing of Materials	3	2	0		4. One Credit can be awarded where at least three of the material types listed below as 'Material categories' has been responsibly sourced from one of the responsible sourcing schemes recognised by BREEAM: - External wall (structure and finishes) - Insulation - Roof (structure and finishes) - Upper floors (structure) - Flooring finishes (including coatings) - Internal partitions/internal walls (structure and finishes) - Ceiling (structure and finishes) - External/internal doors/ windows - Staircases/ramps - Fittings (shop fittings, railings, screens, gutters, vents, air grilles) - Furniture (desks, chairs, display cabinets, shelving) - Building services (equipment, distribution systems) - Hard landscaping - Other 5. Up to three of the available RSM Credits, as below specified, can be awarded where the applicable building materials are responsibly sourced in accordance with the BREEAM methodology, as defined in the BREEAM RFO 2014 Manual: <table><tr><td>Credits</td><td>% of available RSM points achieved</td></tr><tr><td>3</td><td>≥ 54%</td></tr><tr><td>2</td><td>≥ 36%</td></tr><tr><td>1</td><td>≥ 18%</td></tr></table>	Credits	% of available RSM points achieved	3	≥ 54%	2	≥ 36%	1	≥ 18%	All	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. --- 200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should not be sought, but that performance should be kept under review throughout the design. --- 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credits should be sought because it is reasonable to expect that sufficient elements within the scope of the project can be procured through manufacturers and processors operating responsible sourcing systems. --- Action - MTTs to provide additional guidance to BGY. Done 070820. ---	MC ARCH	
							Credits	% of available RSM points achieved											
3	≥ 54%																		
2	≥ 36%																		
1	≥ 18%																		
All	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. --- As above. ---	MC ARCH																
Exe Mat 03.2e	Responsible Sourcing of Materials - Exemplary	0	0	0		The following outlines the exemplary level criteria to achieve one innovation Credit for this BREEAM issue: Where at least 70% of the available RSM points are achieved.	All	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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment. ---										

Mat 04	Insulation - Insulation	1	1	0	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. The Insulation Index is calculated using the BREEAM Mat 04 calculator which uses the following calculation methodology. For each type of thermal insulation used in the relevant building elements, the volume weighted thermal resistance provided by each type of insulation is calculated as follows: - (Area of insulation (m2) x thickness (m))/thermal conductivity (W/m.K) OR - Total volume of insulation used (m3)/thermal conductivity (W/m.K) - The volume weighted thermal resistance for each insulation material is then multiplied by the relevant Green Guide point(s) from the following table to give the Green Guide rating corrected value: <table><tr><th>Green Guide rating</th><th>Points/element</th></tr><tr><td>A</td><td>3</td></tr><tr><td>A</td><td>2</td></tr><tr><td>B</td><td>1</td></tr><tr><td>C</td><td>0.5</td></tr><tr><td>D</td><td>0.25</td></tr><tr><td>E</td><td>0</td></tr></table> To calculate the Insulation Index, the sum of the Green Guide rating corrected values for all insulating elements is divided by the sum of the volume weighted thermal resistance values. See example calculation below. Note - Where more than one insulation type is present for a given element, the rating, area and conductivity for each insulation type should be entered into the BREEAM Mat 04 calculator and an average is calculated (by volume). - Where no similar insulation can be found assessors should seek guidance from BRE on the appropriate rating. - Where an independently verified third party Environmental Product Declaration (EPD), covering part of or the whole life cycle, is available for an insulating material/product, this can be used to increase the contribution of that material/product to the building's Mat 04 performance.	Green Guide rating	Points/element	A	3	A	2	B	1	C	0.5	D	0.25	E	0	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	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY and MTT to Main Contractor's Architect and M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought it is anticipated the thermal insulation with appropriate Green Guide rating will be specified for the project. The second Credit is dependent on the responsible sourcing route for these materials.	MC ARCH M+E
Green Guide rating	Points/element																						
A	3																						
A	2																						
B	1																						
C	0.5																						
D	0.25																						
E	0																						
Mat 05	Designing For Durability and Resilience	1	1	0	<u>Protecting vulnerable parts of the building from damage</u> 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. <u>Protecting exposed parts of the building from material degradation</u> 2. Environmental factors have been identified that are relevant to the site location 3. Existing applicable building elements that are exposed to any relevant environmental factors have been identified 4. Existing applicable building elements have been surveyed have been assessed to identify impacts of material degradation effects including an assessment to grade the severity of any degradation effects. Design and specification measures have been developed to repair and protect existing elements according to the severity of any degradation affects, to limit degradation. Where it is not feasible to implement measures to limit material degradation for existing elements, justification should be provided. 5. Newly specified materials or newly constructed elements (e.g. a new external wall) within the scope of refurbishment or fit-out works incorporate appropriate design and specification measures to limit material degradation due to environmental factors	Part 1 or 4	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..	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because is would be expected that suitable durability measures to protect vulnerable parts of the building and external parts of the building are expected to be specified as part of the current project scope. Action - MTTs to provide additional guidance to BGY. Done 070820.	MC ARCH														

Mat 06	Material Efficiency - Material Efficiency	1	1	0		1. Opportunities have been identified, and appropriate measures investigated and implemented within the scope of refurbishment or fit-out works, to optimise the use of materials through building design, procurement, refurbishment, maintenance and end of life 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. Relevant parties are all parties (as relevant to the project stage) involved in the design, specification and/or construction of the building should be consulted. This includes but is not limited to, the following: - Client/developer - Cost consultant - Architect - Structural/civil engineers - Building services engineers - mechanical, electrical - Principal contractor - Demolition/strip-out contractor - Environmental consultant - Project management consultant - Materials/component manufacturers/suppliers.	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because opportunities to optimise material use throughout refurbishment and fit-out (e.g. designing out waste) could be covered in the design to the level of detail that BREEAM requires. Action - MTTs to provide additional guidance to BGY. Done 070820. Time Critical Action - RIBA Stage 1,2,3,4 - Opportunities have been identified, and appropriate measures investigated and implemented within the scope of refurbishment or fit-out works, to optimise the use of materials through building design, procurement, refurbishment, maintenance and end of life.	MC ARCH	
Wst 01.1	Construction Waste Management - Pre-Refurbishment Audit	1	1	0		1. The client shall ensure that a pre-refurbishment audit of all existing buildings, structures or hard surfaces within the scope of the refurbishment or fit-out zone is completed. The requirements for carrying out an appropriate pre-refurbishment audit are: a. The audit should be carried out at the Concept Design Stage (equivalent to RIBA stage 2) prior to strip-out or demolition works in order to use the audit results to guide the design, consideration of materials that can be reused, and to set targets for waste management and ensure all contractors are engaged in the process of maximising high grade reuse and recycling opportunities. b. The audit should be carried out by a competent person (see Relevant Definitions) who is independent of the project, has appropriate knowledge of buildings, waste and options for the reuse and recycling of different waste streams c. Actual waste arisings and waste management routes used should be compared with those forecast from the audit and barriers to achieving targets should be investigated. The audit must be referenced in the resource management plan and cover: d. Identification and quantification of the key materials where present on the project e. Potential applications and any related issues for the reuse and recycling of the key materials in accordance with the waste hierarchy. f. Identification of local reproprocessors or recyclers for recycling of materials g. Identification of overall recycling rate for all key materials h. Identification of reuse targets where appropriate. I. Identification of overall landfill diversion rate for all key materials.	All	A copy of the pre-refurbishment audit in accordance with the BREEAM criteria.	070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because the production of a pre-refurbishment audit has been conducted to identify materials that can be re-used and to set appropriate waste targets is expected for a project of this type and scope. Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820.	QPS (QS)	

Wst 01.2	Construction Waste Management - Re-Use and Direct Recycling of Materials	2	0	0		2. Where waste material types detailed in Table - 64 are either directly re-used on-site or off-site or are sent back to the manufacturer for closed loop recycling 3. One Credit is achieved where 50% of the total available points for the waste material types detailed in Table - 64, that are present on the project have been achieved (using the Was 01 calculator tool, see Table - 65 in the Methodology section). 4. Two Credits are achieved where 75% of the total available points for the waste material types detailed in Table - 64, that are present on the project have been achieved (using the Was 01 calculator tool, see Table - 65 in the Methodology section) Please note that in most instances any materials specified in Table - 64 that are sent to a Material Recovery Facility (MRF) for recovery does not qualify for this Credit. See compliance note CN2, To achieve any of the refurbishment resource efficiency Credits the assessed development, regardless of value or locality, must have a resource management plan compliant with best practice (Best practice is a combination of commitments to: - Design out waste (materials optimisation) - Reduce waste generated on-site - Develop and implement procedures to sort and reuse/recycle construction and demolition waste on and off-site (as applicable) - Follow guidance from: - DEFRA (Department of Environment, Food and Rural Affairs) - BRE (Building Research Establishment Ltd) - WRAP (Waste and Resources Action Programme) - Welsh Government. Please refer to the BREEAM RFO 2014 manual for the tables.	All	A copy of the RMP including the re-use or closed loop recycling (sent back to manufacturer) of the material types detailed in Table 64 and that 75% of the points available in Table 65 have will be achieved.	060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that one Credit should not be sought because the direct re-use or recycling of materials would not be expected on a project of this type and scope. —		
Wst 01.3	Construction Waste Management - Resource Efficiency	3	3	0		5. Develop and implement a compliant resource management plan covering the waste arisings from the refurbishment or fit-out project with the aim of minimising waste, recording and reporting accurate data on waste arisings. Minimising waste encompasses two elements of the waste hierarchy: Waste reduction/prevention = using less material in design, manufacture and installation, keeping products for longer, using no hazardous materials. Reuse = using products again for the same purpose for which they were conceived, which may require checking, cleaning or repairing (preparing for reuse). Types of waste minimisation actions include: - Set and report against waste reduction targets - Design for standardisation of components - Return packaging for reuse - Consider community reuse of surplus/offcuts - Include waste minimisation initiatives and targets in tenders or contracts, and engage with the supply chain - Consider use of BIM (Building Information Modelling) - Design for off-site or modular build - Design for flexibility, adaptability and future deconstruction - Design to use fewer materials - Use of reusable temporary elements such as shuttering and protection. This list is not exhaustive and other waste minimisation actions can be taken. 6. The non-hazardous waste relating to on-site refurbishment or fit-out, and dedicated off-site manufacture or fabrication processes generated by the building's design and construction meets, or exceeds, the resource efficiency benchmarks set out in Table - 61 and Table - 62 as relevant to the project type. Please refer to the BREEAM RFO 2014 manual. Table - 61: Refurbishment and fit-out waste resource efficiency benchmarks - Refurbishment (Combinations of Parts 1 - 4) BREEAM Credits / Amount of construction waste generated per 100m2 (gross internal floor area) in m3 and tonnes One / $\leq 11.3 \leq 3.5$ Two / $\leq 4.5 \leq 1.2$ Three / $\leq 2.1 \leq 0.4$ Exemplary level/ $\leq 1.4 \leq 0.3$	All	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.	200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should be sought. Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. — 070820 MTTs issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). — 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because achievement of reasonable resource efficiency targets can be pursued for the project. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. — Action - MTTs to issue draft Contract Preliminaries text to QPS (QS). Done 070820. —	QPS (QS)	

Exe Wst 01.3e	Construction Waste Management - Resource Efficiency - Exemplary	0	0	0		The following outlines the exemplary level criteria to achieve an innovation Credit for this BREEAM issue: - Non-hazardous construction waste generated by the building's design and refurbishment or fit-out is no greater than the exemplary level resource efficiency benchmark (outlined in Table - 62 and Table - 61). - The percentage of non-hazardous construction and demolition (if relevant) waste diverted from landfill meets or exceeds the exemplary level percentage benchmark (outlined in Table - 63). - Waste materials will be sorted into separate key waste groups (according to the waste streams generated by the scope of the works; the List of Wastes/European Waste Catalogue code should be referenced) either on-site or off-site through a licensed contractor for recovery. - 75% of difficult to manage wastes have been reused on or off-site rather than recycled, in accordance with Table - 64. Please refer to the BREEAM RFO 2014 manual for the tables.	All	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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.																	
Wst 01.4	Construction Waste Management - Diversion of Waste from Landfill	1	1	0		The following percentages of non-hazardous construction and demolition waste (where applicable) generated have been diverted from landfill: Diversion of waste for refurbishment and fit-out <table><tr><th colspan="3">BREEAM Credits</th></tr><tr><th>Source of waste</th><th>Volume</th><th>Tonnage</th></tr><tr><td colspan="3"><u>One Credit</u></td></tr><tr><td>Refurbishment/fit-out</td><td>85%</td><td>90%</td></tr><tr><td>Demolition</td><td>90%</td><td>95%</td></tr></table>	BREEAM Credits			Source of waste	Volume	Tonnage	<u>One Credit</u>			Refurbishment/fit-out	85%	90%	Demolition	90%	95%	All	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.	070820 MITS issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is reasonable to expect that basic diversion from landfill targets can be achieved for the project. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MITS to issue draft Contract Preliminaries text to QPS (QS). Done 070820.	QPS (QS)	
BREEAM Credits																										
Source of waste	Volume	Tonnage																								
<u>One Credit</u>																										
Refurbishment/fit-out	85%	90%																								
Demolition	90%	95%																								
Exe Wst 01.4e	Construction Waste Management - Diversion of Waste from Landfill - Exemplary	0	1	0		8. Non-hazardous construction waste generated by the building's design and refurbishment or fit-out is no greater than the exemplary level resource efficiency benchmark (outlined in Table - 62 and Table - 61). 9. The percentage of non-hazardous construction and demolition (if relevant) waste diverted from landfill meets or exceeds the exemplary level percentage benchmark Diversion of waste for refurbishment and fit-out <table><tr><th colspan="3">BREEAM Credits</th></tr><tr><th>Source of waste</th><th>Volume</th><th>Tonnage</th></tr><tr><td colspan="3"><u>Exemplary level</u></td></tr><tr><td>Refurbishment/fit-out</td><td>95%</td><td>97%</td></tr><tr><td>Demolition</td><td>95%</td><td>97%</td></tr></table> 10. Waste materials will be sorted into separate key waste groups (according to the waste streams generated by the scope of the works; the List of Wastes/European Waste Catalogue code should be referenced) either on-site or off-site through a licensed contractor for recovery. 11. 75% of difficult to manage wastes have been reused on or off-site rather than recycled, in accordance with Table - 64. Please refer to the BREEAM RFO 2014 manual for the tables.	BREEAM Credits			Source of waste	Volume	Tonnage	<u>Exemplary level</u>			Refurbishment/fit-out	95%	97%	Demolition	95%	97%	All	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.	200820 (Review with AAM) It was agreed that this 'Enhanced' Credit should be sought. Additional Information Required: - QPS (QS) to incorporate text from 'BREEAM Requirements' document into (strip out and main works) Contract Preliminaries text. 070820 MITS issued Contract Preliminaries text ('BREEAM Requirements' document) to QPS (QS). 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because it is reasonable to expect that higher diversion from landfill targets can be achieved for the project. The Credit is assigned to the QS because it will be conveyed onto the contractor by way of Contract Preliminaries/Employers Requirements. Action - MITS to issue draft Contract Preliminaries text to QPS (QS). Done 070820.	QPS (QS)	
BREEAM Credits																										
Source of waste	Volume	Tonnage																								
<u>Exemplary level</u>																										
Refurbishment/fit-out	95%	97%																								
Demolition	95%	97%																								

Wst 02	Recycled Aggregates - Recycled Aggregates	0	0	0	1. The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the following minimum % levels (by weight or volume) to contribute to the total amount of recycled or secondary aggregate: Structural Frame 15%, Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads 30%, Building foundations 20%, Concrete road surfaces 15%, Pipe bedding 100%, Granular fill and capping 100%. 2. The total amount of recycled 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 project. Where the minimum level in criterion 1 is not met for an application, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified. 3. The recycled or secondary aggregates are EITHER: b. Construction, demolition and excavation waste obtained on-site or off-site; OR c. Secondary aggregates obtained from a non-construction post-consumer industrial by product source. By products of industrial processes that can be processed to produce secondary aggregates. Secondary aggregates are subdivided into manufactured and natural, depending on their source. - Recognised non-construction post-consumer or post-industrial by products include: - China clay waste - Slate overburden - Pulverised Fuel Ash (PFA) - Ground Granulated Blast Furnace Slag (GGBFS) - Air cooled blast furnace slag - Steel slag - Furnace Bottom Ash (FBA) - Incinerator bottom ash - Foundry sands - Recycled glass - Recycled plastic - Spent oil shale - Colliery spoil - Municipal solid waste treatment residues.	If Part 1	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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment. Use of high grade aggregate, including secondary aggregate and recycled aggregates is not expected for the project.		
Exe Wst 02e	Recycled Aggregates - Exemplary	0	0	0	4. The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the exemplary minimum levels (by weight or volume): Structural Frame 30%, Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads 75%, Building foundations 35%, Concrete road surfaces 45%, Pipe bedding 100%, Granular fill and capping 100%. Where this minimum level is not met, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified. 5. Where the total amount of recycled or secondary aggregate specified is greater than 35% (by weight or volume) of the total high grade aggregate specified for the project. Where the minimum level in criterion 1 is not met for an application, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified. 6. The contributing recycled or secondary aggregate must not be transported more than 30 km by road transport.	If Part 1	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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

Wst 03	Operational Waste - Operational Waste	1	1	0		<u>One Credit</u> - Operational waste 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 on-site, a water outlet is provided adjacent to or within the facility for cleaning and hygiene purposes. Please refer to the BREEAM RFO 2014 manual for the following building types: healthcare buildings only , multi-residential buildings with self-contained dwellings/bedsits only, multi-residential buildings with individual bedrooms and communal facilities only	If Part 1 or 4	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, if applicable. Design drawing and relevant specification clause confirming that both multi-residential buildings type comply with internal waste containers, location and composting criteria.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because provision of facilities for the storage of operational waste could be expected for the building. It is understood that here is allocated space for waste storage in the ground floor or basement within easy reach from the building users via the lifts. Action - MTTs to provide space allowances requirements to BGY to support with layout of recycle waste storage area. Done 070820. Mandatory Credit Requirement - For 'Excellent' and above - One Credit (Appropriate 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).	MC ARCH	
Wst 04	Speculative Floor and Ceiling Finishes - Speculative Floor and Ceiling Finishes	1	1	0		Office building types only 1. For tenanted areas (where the future occupant is not known), prior to full fit-out works, interior finishes (including carpets, other floor finishes, ceiling finishes and any other interior finishes) have been installed in a show area only. 2. In a building being refurbished or fitted out for a specific occupant, that occupant has selected (or agreed to) the specified interior finishes.	If Part 2 or 3	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from BGY to Main Contractor's Architect. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought.	MC ARCH	
Wst 05.1	Adaptation To Climate Change - Structural and Fabric Resilience	0	0	0		<u>One Credit</u> - Adaptation to climate change – 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.	If Part 1	A copy of the Risk assessment report in line with the BREEAM Criteria.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
							If Part 1	Where a Climate change resilience study has been conducted to provide structural and fabric resilience to climate change	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
							If Part 1	Where a Climate change resilience study has been conducted to provide structural and fabric resilience to climate change	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

Exe Wst 05	Adaptation To Climate Change - Structural and Fabric Resilience Exemplary	0	0	0		<u>Exemplary Credit</u> – Responding to adaptation to climate change A holistic approach to the design and refurbishment or fit-out of the current building's life cycle, to mitigate against the impacts of climate change, is represented by the achievement of these criteria. The following outlines the exemplary level criteria to achieve an innovation Credit for this BREEAM issue: 2. Achievement of criterion 1, the structural and fabric resilience criterion in this issue, and the following criteria points or Credits: Hea 04 Thermal comfort (Link to Wst 05 issue:- to preventing increasing risks of overheating) - Criterion 7 in the second Credit of the Hea 04 issue has been achieved. Ene 01 Reduction of energy use and carbon emissions (Link to Wst 05 issue: to maximise energy efficiency contributing to low carbon emissions resulting from increasing energy demands) - At least eight Credits in this issue have been achieved. Ene 04 Low carbon design (Link to Wst 05 issue: to maximise opportunities to avoid unnecessary carbon emissions) - The Passive design analysis Credit in this issue has been achieved. Wat 01 Water consumption (Link to Wst 05: to minimise water demands in periods of drought) - A minimum of three Credits in this issue have been achieved. Mat 05 Designing for durability and resilience (Link to Wst 05 issue: to avoid increased risks of deterioration and higher maintenance demands) - Criterion 2 relating to material degradation in this issue has been achieved. Pol 03 Flood risk management and reducing surface water run-off (Link to Pol 03: to minimise the risks of increased flood risk and surface water run-off affecting the site or others) - Flood risk – a minimum of one Credit has been achieved. - Surface water run-off – two Credits have been achieved.	If Part 1	Where a Climate change resilience study has been conducted to provide structural and fabric resilience to climate change	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Wst 06	Functional Adaptability	1	1	0		<u>One Credit</u> - Functional adaptability 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 (see examples below) have been adopted in the design by Technical Design stage (RIBA Stage 4 or equivalent) in accordance with the functional adaptation strategy recommendations, where practical and cost effective. Omissions have been justified in writing to the assessor. Examples Part 1: Fabric and structure - External walls - Cladding - Ground and first floor - Roof Use of products or systems which allow easy replacements Location of structural components within the floor space Provision to add extensions or alterations to increase building capacity Parts 2 and 3: Core and local services - Mechanical and electrical - Plumbing - Stairs and lifts - Fire Inclusion of facilities management requirements and CDM feedback for future operational needs Provision of capacity in infrastructure to enable future expansion and adaptation Part 4: Interior design - Finishes - Floors - Interior walls - Connections Use of products or systems which allow easy replacements Layout in standardised grids Use of inherent finishes to allow replacement Use of standardised material sizes Identifying or recognising potential future functional requirements Efficient use of space to allow for any increase in occupancy	All	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.	061020 Twin + Earth noted that a Functional Adaptability study would be a useful undertaking for the project. MTTS issued fee proposal email to QPS(PM) 220920 (Sustainability Workshop) T+E noted that a Functional Adaptability Study could usefully be undertaken for the building. 060820 (Pre-Assessment Workshop) Credit discussed and BGY advised that they did not anticipate that a Functional Adaptability study would be fruitful for a project of this type and scope. Time Critical Action - RIBA Stage 2 - A 'Facilitator for the Functional Adaptability Strategy' is appointed and their responsibilities include compilation of a building-specific functional adaptation strategy in conjunction with the Client and Design Team, including recommendations for measures to be incorporated to facilitate future adaptation. Additional Team Appointment - A Facilitator for the Functional Adaptability Strategy must be appointed.	QPS (PM)	
						All	Implementation of adaptability measures to accommodate future changes	220920 (Sustainability Workshop) As above.			
								060820 (Pre-Assessment Workshop) As above.			

							All	Implementation of adaptability measures to accommodate future changes	220920 (Sustainability Workshop) As above. 060820 (Pre-Assessment Workshop) As above.		
LUE 02	Protection of Ecological Features - Protecting Ecological Value	1	1	0		<u>One Credit</u> - Protection of ecological features 1. All existing features of ecological value within and surrounding the refurbishment or fit-out zone and site boundary area are adequately protected from damage during clearance, site preparation and refurbishment or fit-out activities in line with BS42020: 2013. 2. In all cases, the principal contractor is required to construct ecological protection recommended by the Suitably Qualified Ecologist (SQE), prior to any preliminary site refurbishment or fit-out or preparation works (e.g. erection of temporary site facilities). Features requiring protection during site clearance and refurbishment or fit-out in accordance with BS 42020: 2013 to maintain their presence and ecological value, which include as a minimum: 1. Trees determined to be of value using one of the following measures: a. More than 10 years old (or where age is unknown where the trunk diameter is over 100mm). b. Tree of significant ecological value (as defined by BS 5837: 2012 and confirmed by the Suitably Qualified Ecologist or qualified arboriculturalist). 2. Hedges and natural areas requiring protection. 3. Watercourses and wetland areas. 4. Nesting or roosting opportunities for birds or bats within the building (information on the protection of roosting and/or nesting opportunities in existing buildings for bats and birds can be found in the following guidance: - Birds in your building - what to look for, RSPB. www.rspb.org.uk/advice/helpingbirds. - Bats and buildings vol.1: bats in the built environment series, Bat Conservation Trust, 2011 www.bats.org.uk/pages/existing_buildings. Note: Where a tree is deemed to create a significant danger to the public or occupants by a statutory body or qualified arboriculturalist, then that feature may be exempt from this issue.	If Part 1 or if landscaping within scope of works	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.	240920 QPS (PM) advised that Greengage would undertake the role of Suitably Qualified Ecologist. Responsible Party updated from QPS (ECO) to Greengage. Additional Information Required: - Greengage to provide Ecology Report. 240920 QPS (PM) advised that Greengage would undertake the role of Suitably Qualified Ecologist. Responsible Party updated from QPS (ECO) to Greengage. 060820 (Pre-Assessment Workshop) Credit discussed and it was noted that, as removal of trees is currently expected as part of the landscaping works, this should be shown as a 'high risk' Credit. Action - QPS to provide details of Ecologist when appointed/instructed. Time Critical Action - RIBA Stage 1 - A Suitably Qualified Ecologist is appointed to produce an Ecology Report based on a site survey. The principal contractor is required to construct ecological protection recommend by the Suitably Qualified Ecologist (SQE), prior to any preliminary site refurbishment or fit-out or preparation works (e.g. erection of temporary site facilities). Additional Team Appointment - A Suitably Qualified Ecologist must be appointed.	GREEN	
LUE 04	Ecological Enhancement - Ecological Enhancement	0	0	0		<u>One Credit</u> - Ecologist's report and recommendations 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. The suitably qualified ecologist must carry out site surveys of existing site ecology, on which their report is based (or to provide verification where the report is prepared by others) at the Concept Design stage (RIBA Stage 2 or equivalent) in order to facilitate and maximise potential ecological enhancement. 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 refurbishment or fit-out. Please refer to the BREEAM RFO 2014 manual for simple buildings and for HM Prison sites.	If Part 1 or if landscaping within scope of works	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	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

LUE 05	Long Term Impact on Biodiversity	2	2	0	Up to two Credits 1. Where a Suitably Qualified Ecologist (SQE) is appointed prior to commencement of activities on-site and they confirm that all relevant UK and EU legislation relating to the protection and enhancement of ecology has been complied with during the refurbishment or fit-out process. 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. This is to be handed over to the building owner/occupants for use by the grounds maintenance staff. Where additional measures to improve the assessed site's long term biodiversity are adopted: - The principal contractor nominates a Biodiversity Champion with the authority to influence site activities and ensure that detrimental impacts on site biodiversity are minimised in line with the recommendations of a Suitably Qualified Ecologist. - The principal contractor trains the site workforce on how to protect site ecology during the project. Specific training must be carried out for the entire site workforce to ensure they are aware of how to avoid damaging site ecology during operations on-site. Training should be based on the findings and recommendations for protection of ecological features highlighted within a report prepared by a Suitably Qualified Ecologist. - The principal contractor records actions taken to protect biodiversity and monitor their effectiveness throughout key stages of the refurbishment or fit-out process. The requirement commits the principal contractor to make such records available where publicly requested. - Where a new ecologically valuable habitat appropriate to the local area is created. This includes a habitat that supports nationally, regionally or locally important biodiversity, and/or which is nationally, regionally or locally important itself; including any UK Biodiversity Action Plan (UK BAP) priority habitats, Local Biodiversity Action Plan (LBAP) habitats, those protected within statutory sites (e.g. SSSIs), or those within non-statutory sites identified in local plans. Local biodiversity expertise should be sought during the Preparation and Brief (RIBA Stage 1 or equivalent) to help identify species of local biodiversity importance on-site and ensure that the proposals support local priorities. - Where flora and/or fauna habitats exist on-site, the contractor programmes site works to minimise disturbance to wildlife. For example, site preparation, ground works, and soft landscape works have been, or will be, scheduled at an appropriate time of year to minimise disturbance to wildlife. Timing of works may have a significant impact on, for example, breeding birds, flowering plants, seed germination, amphibians etc. Actions such as phased clearance of vegetation may help to mitigate ecological impacts. This additional requirement will be achieved where a clear plan has been produced detailing how activities will be timed to avoid any impact on site biodiversity in line with the recommendations of a Suitably Qualified Ecologist. If Part 1 or if landscaping within scope of works	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.	240920 QPS (PM) advised that Greengage would undertake the role of Suitably Qualified Ecologist. Responsible Party updated from QPS (ECO) to Greengage. Additional Information Required: - Greengage to provide Ecology Report. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because appropriate measures are likely to be achievable. QPS to provide details of Ecologist when appointed/instructed. Action - QPS to provide details of Ecologist when appointed/instructed. Time Critical Action - RIBA Stage 5 - A 'Biodiversity Champion' is appointed and their responsibilities include influencing site activities and ensuring that detrimental impacts on site biodiversity are minimised in line with the recommendations of the Suitably Qualified Ecologist.. Additional Team Appointment - A Biodiversity Champion must be appointed (in addition to the Suitable Qualified Ecologist)	GREEN
Pol 01.1	Impact of Refrigerants - Impact of Refrigerants	2	1	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: Pre-requisite 2. All systems (with electric compressors) must comply with the requirements of BS EN 378:20081 (parts 2 and 3) and where refrigeration systems containing ammonia are installed, the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice2. 3. Where the systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELCO2e) of ≤ 100 kgCO2e/kW cooling/heating capacity. To calculate the DELCO2e 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 One Credit - Impact of refrigerant 5. Where the systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELCO2e) of ≤ 1000 kgCO2e/kW cooling/heating capacity. If Parts 2 OR 3 and 4 if local cooling specified	Communication records, Construction specification, Other third party information, Completed copy of the Pol01 calculator tool	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because a compliant cooling system may be specified for the building.	MC M+E

Pol 01.2	Impact of Refrigerants - Leak Detection	1	1	0		One Credit - Leak detection 6. Where systems using refrigerants have a permanent automated refrigerant leak detection system installed; OR where an inbuilt automated diagnostic procedure for detecting leakage is installed. In all instances a robust and tested refrigerant leak detection system must be installed and must be capable of continuously monitoring for leaks. 7. The system must be capable of automatically isolating and containing the remaining refrigerant(s) charge in response to a leak detection incident An example of a system which would meet criterion 7 could be one which initiates an automated shut down and pump down of the refrigerant into a separate storage tank.	If Parts 2 OR 3 and 4 if local cooling specified	A specification, schedule or drawings highlighting the scope of the refrigerant leak detection and containment systems within the building.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer.	MC M+E	
Pol 02	NOx Emissions	3	0	0		Up to three Credits (all building types except Industrial) 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% excessO2) as follows: NOx Emission levels for heating and hot water (mg/kWh) Credits ≤ 100 mg/kWh 1 Credit ≤ 70 mg/kWh 2 Credits ≤ 40 mg/kWh 3 Credits 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.	If Parts 2 OR 3 and 4 if local heating specified	A specification or schedule confirming the NOx emissions levels for heating and hot water systems.	060820 (Pre-Assessment Workshop) Credit discussed and MTTs noted that they do not recommend that the Credit is sought, as the proposed VRF system is unlikely to be allow compliance with the NOX emission requirements to be achieved.		
Pol 03.1	Flood Risk and Reducing Surface Water Run-Off - Flood Risk Management	2	2	0		<u>Low flood risk</u> 1. Where flood maps from the appropriate statutory body (see Relevant definitions)confirm the refurbishment or fit-out is situated in a flood zone that is defined as having a low annual probability of flooding; OR 2. The project meets the requirements for avoidance of flooding in accordance with Checklist 1, e.g. where the refurbishment or fit-out zone is of a floor level that is 0.3m higher than the obtained/estimated flood level and safe access/escape routes are available/present <u>Medium/high flood risk</u> 3. Where criterion 4 and either criterion 5 or 6 have been met 4. Where flood maps from the appropriate statutory body (see Relevant definitions) confirm the site has a medium or high flood risk and a site specific FRA has been undertaken (as relevant to size of project in accordance with CN7). The FRA must take all current and future sources of flooding into consideration in accordance with compliance note. 5. Where the refurbishment or fit-out zone achieves avoidance from flooding through either: a. the refurbishment and fit-out zone is located entirely on the first floor or above and a flood emergency plan has been developed in accordance with 'Would your business stay afloat? A Guide to preparing your business for flooding', Environment Agency, 2011 b. As a result of the building's floor level or measures to keep water away, the building is defined as achieving avoidance from flooding by following Checklist A-1, Checklists and tables. 6. Where avoidance is not possible, two Credits are achieved where a full flood resilience/resistance strategy is implemented for the building's scope of works in accordance with recommendations made by a Suitably Qualified Building Professional (The following aspects of the design should be addressed for the relevant parts, in accordance with best practice guidance: a. Part 1: Fabric – using flood resilient materials and flood protection measures for the building fabric, e.g. waterproof materials, impermeable membranes, flood barriers, safe access/exit points in the event of a flood etc. b. Part 2: Core services – core services and associated infrastructure (including equipment and vulnerable pipes/ducts/cables etc.) should be located/specified so as to protect services from flooding damage, e.g. location/routing/height, protection of building apertures (such as intakes/extracts/ventilation), non-return valves etc. c. Part 3: Local services – the location/height of local services such as sockets, vents etc. and the location of the wiring/pipework/ductwork in relation to the flood level and other measures to protect local services. d. Part 4: Interior – the proposed function of spaces that are below the flood level (e.g. sacrificial spaces) should be limited to those which are not susceptible to flood damage, and the resilience of materials used for partitions, walls, floors, ceiling finishes, furniture and fittings and the location of equipment in relation to the flood level, e.g. avoid storing flood sensitive materials and functions in spaces that are below the flood level.	All	Low flood risk A copy of the flood risk assessment in accordance with BREEAM requirements confirming the development is situated in a low flood risk zone. A copy of the relevant flooding map (if available). A letter confirming that an appropriate consultant has been appointed to demonstrate the compliance with the relevant BREEAM criteria. Medium/high flood risk 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.	240920 MTTs reviewed process of using Environment Agency online flood maps as evidence for this Credit and note that BRE Knowledge Base Compliance Note states 'EA confirmation is no more robust or detailed than reference to flood maps, which are not in themselves compliant without a FRA.' Accordingly, a formal FRA will be required. Responsible Party updated from MTTs to QPS(FRA) for QPS to procure a Flood Risk Assessment. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that two Credits should be sought because the site is expected to have a low risk of flooding, based on Environment Agency flood maps. Action -MTTs to verify that EA flood maps are sufficient for the purposes of this Credit. Additional Team Appointment - A Flood Risk Assessor and/or a Suitably Qualified Building Professional must be appointed if EA flood maps are insufficient.	QPS (PM)	

Pol 03.2	Flood Risk and Reducing Surface Water Run-Off - Surface Water Run-Off	0	0	0	One Credit - neutral impact on surface water 7. There is no increase in the impermeable surfaces as a result of the refurbishment works; OR 8. If there is an increase in the impermeable surface as a result of the refurbishment works then the following must be met: a. Hard standing areas - where there is an extension or increase in the hardstanding areas and hence an increase in the total impermeable area as a result of the refurbishment works, the hardstanding area must be permeable or be provided with on-site SuDS to allow full infiltration of the additional volume, to achieve the same end result. The permeable hardstanding must include all pavements and public rights of way, car parks, driveways and non-adoptable roads, but exclude footpaths that cross soft landscaped areas which will drain onto a naturally permeable surface. b. Building extension - where there is an increase in building footprint, extending onto any previously permeable surfaces, the additional run-off caused by the area of the new extension must be managed on-site using an appropriate SuDS technique for rainfall depths up to 5mm. Two Credits - reducing run-off 9. An Appropriate Consultant (A consultant with qualifications and experience relevant to designing Suds and flood prevention measures and completing peak rate of run-off calculations. Where complex flooding calculations and prevention measures are required, this must be a specialist hydrological engineer.) has been used to design an appropriate drainage strategy for the site. 10. Either of the following criteria are met: a. There is a decrease in the impermeable area by 50% or more, from the pre-existing impermeable hard surfaces; OR b. Where run-off as a result of the refurbishment is managed on-site using source control achieving the following requirements: i. The peak rate of run-off as a result of the refurbishment for the 1 in 100 year event has been reduced by 50% from the existing site. ii. The total volume of run-off discharged into the watercourses and sewers as a result of the refurbishment, for a 1 in 100 year event of 6 hour duration has been reduced by 50%. iii. An allowance for climate change must be included for all of the above calculations; this should be made in accordance with current best practice planning guidance.	If Part 1	7-8. An appropriate consultants report detailing that there is no increase to the impermeable area or where there is an increase, the report highlights all issues in the adjacent column. 9-10. A copy of the relevant report or calculations 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, calculations 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.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Exe Pol 03.2e	Flood Risk and Reducing Surface Water Run-Off - Surface Water Run-Off Exemplary	0	0	0	The following outlines the exemplary level requirements to achieve an innovation Credit for surface water run-off: 15. Where all run-off from the developed site is managed on-site using source control, the following must be achieved to confirm compliance: a. The peak rate of run-off as a result of the refurbishment for the 1 in 1 year event is reduced to zero. b. The peak rate of run-off as a result of the refurbishment for the 1 in 100 year event is reduced to zero. c. There is no volume of run-off discharged into the watercourses and sewers as a result of the refurbishment, for a 1 in 100 year event of 6 hour duration. d. An allowance for climate change must be included for all of the above calculations, in accordance with current best practice national planning guidance. e. Where an appropriately qualified professional has been employed to provide the above calculations and design an appropriate drainage strategy for the site, ensuring all above criteria are achieved.	If Part 1	A copy of the relevant report or calculations confirming that drainage measures specified to ensure that the peak rate of run-off from the site to the watercourses meet the exemplary Credit requirements.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		

Pol 03.3	Flood Risk and Reducing Surface Water Run-Off - Minimising Watercourse Pollution	0	0	0		One Credit 11. There is no discharge from the developed site (includes new and existing hard landscaping and buildings) for rainfall up to 5mm (confirmed by the Appropriate Consultant). 12. Where suitable pollution prevention measures are put in place (or already exist) for the different sources of pollution present on the assessed site. - Low risk source of watercourse pollution: An appropriate level of pollution prevention treatment is provided, using appropriate Suds techniques - High risk source of watercourse pollution: Where there is risk of contamination or spillage of substances such as petrol and oil (For the purpose of assessing the watercourse pollution Credit, an area that presents a risk of watercourse pollution includes vehicle manoeuvring areas, car parks, waste disposal facilities, delivery and storage facilities or plant areas.), separators (or an equivalent system) are installed in surface water drainage systems. - 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). - Vehicle washing areas: Pollution prevention systems must be in accordance with Pollution Prevention Guidelines 13, see Other information section. - 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, see Other information. 13. A comprehensive and up to date drainage plan of the site will be made available for the building/site occupiers. 14. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified Suds must be in place.	If Part 1	Marked-up proposed site plan highlighting the low and high risk areas of the site. A copy of the specification or design plan confirming the type of pollution control systems specified. A letter from the design team confirming: · All water pollution prevention systems designed in accordance with PPG3 and the SUDS manual · Outlining indicative examples of compliance with PPG3 and the SUDS manual · A copy of the drainage plan will be produced and handed over to the building occupier.	060820 (Pre-Assessment Workshop) This Credit is not applicable in this assessment.		
Pol 04	Reduction of Night Time Light Pollution - Reducing Night Time Light Pollution	1	1	0		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.	If Parts 2 or 3	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from MTT to Main Contractor's M+E Engineer. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that the Credit should be sought because the Credit requirements can be quite easily met for the external lighting installation to be provided as part of the current project scope, through the use of appropriately specified external lighting fittings and timers.	MC M+E	

Pol 05	Noise Attenuation - Noise Attenuation	1	1	0	One Credit 1. Where there are, or will be, no noise-sensitive areas or buildings within 800m radius of the assessed site. OR 2. Alternatively, where the building does have noise-sensitive areas or buildings within 800m radius of the site, one Credit can be awarded as follows: a. Where a noise impact assessment in compliance with BS 74451 has been carried out and the following noise levels measured/determined: i. Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development or at a location where background conditions can be argued to be similar. ii. The rating noise level resulting from the new noise source (At the design stage of assessment, where noise-sensitive areas or buildings are present, actual measurement is unlikely to be possible due to the planned but non-existent installation. In such situations compliance can be demonstrated through the use of acousticians' calculations or by scale model investigations. For such cases BS 7445-2 states that 'as universally agreed prediction models do not exist, the method adopted should be carefully described in the acoustician's report' and that 'when available, prediction models accepted by relevant authorities should be used'. Where prediction through these methods is not possible, measurement will be necessary using either a noise source similar to that proposed or, alternatively, measurement of the actual noise from the installation (once installed); compliance with the latter approach requires a written commitment to appoint a suitably qualified acoustician to carry out the required measurements post-installation, and a further commitment to attenuate the noise source in compliance with criteria 4 and 5 of BREEAM (if proved necessary by the measurements). 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 (An individual who holds a recognised acoustic qualification and membership of an appropriate professional body. The primary professional body for acousticians in the UK is the Institute of Acoustics.). 3. The noise level from the proposed site/building, as measured in the locality of the nearest or most exposed noise-sensitive development, is a difference no greater than +5dB during the day (07:00 to 23:00) and +3dB at night (23:00 to 07:00) compared to the background noise level. 4. 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.	If Parts 1, 2 or 3	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.	141020 To reflect BREEAM responsibilities during contract, Responsible Party updated from Sandy Brown to Main Contractor's Acoustician. Additional Information Required: - Acoustician to provide acoustic report and calculations undertaken. 240920 QPS (PM) advised that Sandy Brown would undertake the role of Suitably Qualified Acoustician. Responsible Party updated from QPS(ACO) to Sandy Brown. 060820 (Pre-Assessment Workshop) Credit discussed and the Project Team concurred that one Credit should be sought since the external plant attenuation measures currently expected can be specified to meet the requirements of this Credit. Action - QPS to provide details of Acoustician when appointed/instructed. Additional Team Appointment - A Suitably Qualified Acoustician must be appointed.	MC ACO	
--------	---------------------------------------	---	---	---	--	--------------------	--	--	--------	--