

# BREEAM PRE- ASSESSMENT (ARENA – FULLY FITTED)



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# 1.0 INTRODUCTION

- 1.0 Greengage Environmental Ltd were commissioned by the Council of the City and County of Swansea (the ‘applicant’) to undertake a BREEAM pre-assessment for the proposed Swansea Central development within the administrative boundary of the City of Swansea.
- 1.1 This BREEAM pre-assessment report details the credits currently targeted by the design and presents an assessment strategy to achieve the best possible BREEAM rating. The assessment outlined in this document provides a strategy for the Arena building on site that is being specified as fully fitted. It therefore includes all building elements of the building from fabric to Cat- A and B fit out.
- 1.2 In accordance with commitments made for the scheme, and what is considered appropriate and achievable for the arena building, a ‘Very Good’ rating has been targeted as the minimum performance standard. An aspiration remains to achieve an ‘Excellent’ rating if feasible. As the design progresses, credits targeted will be regularly reviewed to determine the highest rating possible.

## 2.0 BREEAM

### BACKGROUND

- 2.1 The Building Research Establishment's Environmental Assessment Method (BREEAM) is a nationally recognised means of reviewing and improving the environmental performance of buildings. There are several BREEAM methodologies in place to assess different types of projects e.g. BREEAM New Construction for new buildings and BREEAM Refurbishment and Fit-Out for refurbishment or fit-out projects. This assessment provides a strategy for the arena building which will be fully fitted on handover to the operator and is therefore being assessed in this way. This has been undertaken using the BREEAM New Construction 2014 Fully Fitted methodology, which is appropriate to establish a credit framework for the project at this stage of works.
- 2.2 Used as a design tool, BREEAM will assess the environmental performance of new build buildings and refurbishments, providing a framework for improvement and an auditable demonstration of good design practice.

### BREEAM CATEGORIES

- 2.3 BREEAM considers key global and local environmental issues and the internal environment for building occupants under various categories, covering:
- **Management** – rewards good construction site practices, provision of information to building occupants and security;
  - **Health & Wellbeing** – promotes a healthy internal environment;
  - **Energy** – rewards energy efficiency and renewable energy generation;
  - **Transport** – encourages locations with good access to public transport;
  - **Water** – promotes water efficiency and water recycling;
  - **Materials** – rewards the responsible sourcing of materials;
  - **Waste** – encourages good waste management practices and recycling;
  - **Land Use & Ecology** – encourages ecological enhancement and use of land already built on; and
  - **Pollution** – promotes measures to reduce air and water pollution.

### CATEGORY WEIGHTINGS

- 2.4 Each BREEAM category is allocated an environmental weighting factor, which is dependent on the credits applicable to the scope of work and the type of assessment being undertaken, as

appropriate to the project. The total available score for each BREEAM category can be found in Section 5.

- 2.5 In addition to this, there are varying numbers of credits within each category; the result is that not all credits carry equal value and some credits have a higher individual percentage score than others.

## BREEAM RATINGS

- 2.6 At the certified assessment stage, the building is assessed against the BREEAM criteria and credits are awarded where it can be demonstrated, by an auditable trail of supporting evidence, that the BREEAM credit requirements have been met. The overall environmental performance across the categories is calculated as a percentage score and expressed as a single rating on a scale of Pass, Good, Very Good, Excellent or Outstanding.

**Table 1: BREEAM Ratings and percentage scores**

Rating	Percentage Score
UNCLASSIFIED	<30
PASS	≥30
GOOD	≥45
VERY GOOD	≥55
EXCELLENT	≥70
OUTSTANDING	≥85

## MINIMUM RATING REQUIREMENT CREDITS

- 2.7 Under Management, Energy, Water, Materials, Waste and Land Use & Ecology, there are minimum credit requirements that need to be obtained for each BREEAM rating i.e. specific credits that will need to be achieved before a particular BREEAM rating can be awarded. All other credits are flexible.
- 2.8 The following minimum standards are required to reach the targeted ‘Very Good’ rating:

**Table 2: BREEAM Very Good minimum standards**

Credit	Minimum Standard
Ene 02: Energy monitoring	One credit (First sub-metering credit)
Wat 01: Water consumption	One credit
Wat 02: Water monitoring	Criterion 1 only
Mat 03: Responsible sourcing of materials	Criterion 1 only
LE 03: Minimising impact on existing site ecology	One credit

## 3.0 THE ASSESSMENT PROCESS

### THE PRE-ASSESSMENT

- 3.1 The purpose of a BREEAM pre-assessment is to:
- Confirm those credits that have been identified as a framework for the minimum targeted rating; and
  - Confirm the supporting information to be submitted at the certified assessment stage and thereby enable the team to address BREEAM requirements at the earliest opportunity, and the appropriate stage in the design, with the aim of reducing the need for design reiterations.
- 3.2 A certified assessment is third party verified by the Building Research Establishment (BRE) ensuring comparable benchmarking and high standards of assessment across the UK. Carried out by trained assessors, BREEAM provides an easily understood, independent and transparent label of environmental performance. In addition, to ensure high standards of BREEAM assessors and assessments, all BREEAM schemes are operated under a Competent Person Scheme, which is UKAS accredited as meeting the requirements of ISO 17024.

### THE DESIGN STAGE (DS) ASSESSMENT

- 3.3 Following completion of detailed design, the appropriate supporting evidence in the form of detailed drawings, completed specifications, and manufacturers' information etc. is available and therefore, the certified DS assessment can be undertaken. During the certified assessment, the relevant information is collected from the appropriate design team members and evaluated against the BREEAM criteria requirements.
- 3.4 Following the collation and review of the outstanding information, a BREEAM DS Assessment report will be produced that will be submitted to the BRE for quality assurance and 'interim' certification of the assessment undertaken, following which, it is anticipated that the 'Interim' DS BREEAM certificates will be issued by the BRE.

### THE POST CONSTRUCTION REVIEW (PCR)

- 3.5 The PCR assessment is undertaken to confirm that buildings are built to the BREEAM DS specifications, or if there are variances from the DS these are documented, reassessed, and a new rating determined.
- 3.6 A PCR assessment comprises a site visit at or towards the end of completion, as near to handover as possible. Each issue must be reviewed, or assessed where there was no DS assessment, and documentary evidence recorded to confirm that it complies with the requirements for PCR assessment. It should be noted that because the evidence required for the PCR assessment relates to what has been, or is actually being done, for some credits to be awarded the evidence required differs from that required at the DS (for example, a written commitment to use FSC Timber at the DS has to be matched by documentation that demonstrates that the timber used was actually FSC).
- 3.7 On completion of the PCR assessment, a Final Certified BREEAM Report will be submitted to the BRE for final certification and quality assurance for the scheme.

## 4.0 THE PROPOSED DEVELOPMENT'S BREEAM PERFORMANCE

- 4.1 Liaison with the design team was undertaken to identify the opportunities and constraints of the proposed development site and to confirm where credits can be targeted, in correspondence with the project team.
- 4.2 This BREEAM pre-assessment report has set out a possible BREEAM pathway for the arena building that is being constructed to a fully fitted specification for handover to the building operator.
- 4.3 The pre-assessment BREEAM score that can be achieved for the building is 60.61%, which is equivalent to a BREEAM rating of 'Very Good'.
- 4.4 The credit framework identified within this report for pursuing the target rating is based on a number of assumptions that will need to be substantiated by team members during the detailed design stage, prior to final confirmation of their feasibility. As such, the pathway identifies one possible route to achieving a rating, but as the design evolves, the credits that can or cannot be targeted may change.
- 4.5 It should also be noted that the strategy outlined in this report may vary when building specific assessments are undertaken for each building type on the site. There will be some minor variation when detailed pre-assessments are undertaken for each of the building types, however at this stage it is possible to group them together to provide an indication of those credits that can be targeted.
- 4.5 We would always recommend that a score of at least 4 or 5 percent above this minimum score is aimed for during the design stages and achieved at the final certification stage. This is to ensure that during the project's progress as well as the BRE third party review of the certified final report, in the event that a credit was lost or disputed and revoked, the target rating would still be likely to be achieved. The credit pathway set out provides this 'buffer' above the 'Very Good' rating boundary.
- 4.6 The credit summary tables indicating the proposed development's performance against the BREEAM 2014 New Construction scheme are provided in Section 5.
- 4.7 A breakdown summary of the targeted BREEAM credits is presented in Section 6.

## 5.0 BREEAM PRE-ASSESSMENT CREDIT SUMMARY

Table 3: BREEAM credit summary

		Available	Targeted
<b>Man 01</b>	Project brief and design	4	4
<b>Man 02</b>	Life cycle cost and service life planning	4	1
<b>Man 03</b>	Responsible construction practices	6	6
<b>Man 04</b>	Commissioning and handover	4	3
		<b>21</b>	<b>14</b>
<b>Hea 01</b>	Visual Comfort	4	2
<b>Hea 02</b>	Indoor Air Quality	5	3
<b>Hea 04</b>	Thermal comfort	3	3
<b>Hea 05</b>	Acoustic Performance	3	3
<b>Hea 06</b>	Safety and Security	2	2
		<b>17</b>	<b>13</b>
<b>Ene 01</b>	Reduction of energy use and carbon emissions	12	0
<b>Ene 02</b>	Energy Monitoring	2	2
<b>Ene 03</b>	External Lighting	1	1
<b>Ene 04</b>	Low carbon design	3	0
<b>Ene 06</b>	Energy efficient transportation systems	3	3
<b>Ene 08</b>	Energy Efficient Equipment	2	0
		<b>23</b>	<b>6</b>
<b>Tra 01</b>	Public Transport Accessibility	5	3
<b>Tra 02</b>	Proximity to amenities	1	1
<b>Tra 03</b>	Cyclist facilities	2	0
<b>Tra 04</b>	Maximum car parking capacity	2	0
<b>Tra 05</b>	Travel Plan	1	1
		<b>11</b>	<b>5</b>
<b>Wat 01</b>	Water Consumption	5	3
<b>Wat 02</b>	Water Monitoring	1	1
<b>Wat 03</b>	Leak Detection	2	2
<b>Wat 04</b>	Water Efficient Equipment	1	1
		<b>9</b>	<b>7</b>
<b>Mat 01</b>	Life Cycle Impacts	6	2
<b>Mat 02</b>	Hard Landscaping and Boundary Protection	1	1
<b>Mat 03</b>	Responsible Sourcing of Materials	4	2
<b>Mat 04</b>	Insulation	1	1
<b>Mat 05</b>	Designing for durability and resilience	1	1
<b>Mat 06</b>	Material efficiency	1	0
		<b>14</b>	<b>7</b>
<b>Wst 01</b>	Construction Waste Management	4	2
<b>Wst 02</b>	Recycled Aggregates	1	0
<b>Wst 03</b>	Operational Waste	1	1



<b>Wst 05</b>	Adaptation to climate change	1	0
<b>Wst 06</b>	Functional adaptability	1	1
		<b>8</b>	<b>4</b>
<b>LE 01</b>	Site Selection	2	1
<b>LE 02</b>	Ecological Value of Site and Protection of Ecological Features	2	2
<b>LE 03</b>	Minimising impact on existing site ecology	2	2
<b>LE 04</b>	Enhancing site ecology	2	2
<b>LE 05</b>	Long Term Impact on Biodiversity	2	2
		<b>10</b>	<b>9</b>
<b>Pol 01</b>	Impact of Refrigerants	3	1
<b>Pol 02</b>	NOx emissions	3	3
<b>Pol 03</b>	Surface Water Run Off	5	4
<b>Pol 04</b>	Reduction of Night Time Light Pollution	1	1
<b>Pol 05</b>	Noise Attenuation	1	1
		<b>13</b>	<b>10</b>
<b>Man 03</b>	Responsible construction practices	1	0
<b>Man 05</b>	Aftercare	1	0
<b>Hea 01</b>	Visual Comfort	1	0
<b>Hea 02</b>	Indoor Air Quality	2	0
<b>Ene 01</b>	Reduction of energy use and carbon emissions	5	0
<b>Wat 01</b>	Water Consumption	1	0
<b>Mat 01</b>	Life Cycle Impacts	3	0
<b>Mat 03</b>	Responsible Sourcing of Materials	1	0
<b>Wst 01</b>	Construction Waste Management	1	0
<b>Wst 02</b>	Recycled Aggregates	1	0
<b>Wst 05</b>	Adaptation to climate change	1	0
<b>AI</b>	Approved Innovation	1	0
		<b>Max 10</b>	<b>0</b>

## 6.0 DETAILED CREDIT ASSUMPTIONS

6.1 The detailed credit assumptions for the BREEAM strategy are set out below.

## MANAGEMENT

<b>Man 01: Project brief and design</b>		
<b>Targeted: 4 of 4</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	Prior to completion of the Concept Design (RIBA Stage 2 or equivalent), the project delivery stakeholders (see Relevant definitions) have met to identify and define their roles, responsibilities and contributions for each of the key phases of project delivery.	One credit targeted
Requirement 2	In defining the roles and responsibilities for each key phase of the project, the following must be considered:  End user requirements Aims of the design and design strategy Particular installation and construction requirements/limitations Occupiers budget and technical expertise in maintaining any proposed systems Maintainability and adaptability of the proposals Requirements for the production of project and end user documentation Requirements for commissioning, training and aftercare support	
Requirement 3	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.	
<b>Credit 2</b> - 1 credit where;		

Requirement 4	Prior to completion of the Concept Design stage, all relevant third party stakeholders have been consulted by the design team and this covers the minimum consultation content (see compliance note CN3).	One credit targeted
Requirement 5	The project must demonstrate how the stakeholder contributions and outcomes of the consultation exercise have influenced or changed the Initial Project Brief and Concept Design.	
Requirement 6	Prior to completion of the detailed design (RIBA Stage 4, Technical Design or equivalent), consultation feedback has been given to, and received by, all relevant parties.	
<b>Credit 3 - 1 credit where;</b>		
Requirement 8	A Sustainability Champion has been appointed to facilitate the setting and achievement of BREEAM performance target(s) for the project. The design stage Sustainability Champion is appointed to perform this role during the feasibility stage (Stage 1, Preparation and Brief stage, as defined by the RIBA Plan of Work 2013 or equivalent).	One credit targeted
Requirement 9	The defined BREEAM performance target(s) has been formally agreed (see Relevant definitions) between the client and design/project team no later than the Concept Design stage (RIBA Stage 2 or equivalent).	
Requirement 10	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.	
<b>Credit 4 - 1 credit where;</b>		
Requirement 11	The Sustainability Champion criteria 8, 9 and 10 have been achieved.	One credit targeted

Requirement 12	<p>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.</p> <p>Note: 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.</p>	
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<b>Man 02: Life cycle cost and service life planning</b>		
<b>Targeted: 1 of 4</b>		
<b>Credit 1 – Up to 2 credits where;</b>		
Requirement 1	An outline, entire asset 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.	Credit not targeted
Requirement 2	The elemental LCC: Provides an indication of future replacement costs over a period of analysis as required by the client (e.g. 20, 30, 50 or 60 years); and Includes service life, maintenance and operation cost estimates.	
Requirement 3	Demonstrate, using appropriate examples provided by the design team, how the elemental LCC plan has been used to influence building and systems designs/specification to minimise life cycle costs and maximise critical value.	
<b>Credit 2 – 1 credit where;</b>		
Requirement 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 and includes the following component types (where present):	Credit not targeted

	Envelope e.g. cladding, windows and/or roofing; Services e.g. heat source, cooling source and/or controls; Finishes e.g. walls, floors and/or ceilings; and External spaces e.g. alternative hard landscaping, boundary protection.	
Requirement 5	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.	
<b>Credit 3 – 1 credit where;</b>		
Requirement 6	Report the capital cost for the building in pounds per square metre via the BREEAM Assessment Scoring and Reporting tool, Assessment Scoring tab, Management section	One credit targeted

<b>Man 03: Responsible construction practices</b>		
<b>Targeted: 6 of 6</b>		
<b>Pre-requisite</b>		
Requirement 1	All timber and timber based products used on the project is 'Legally harvested and traded timber' (see Relevant definitions).  Note: For other materials, there are no pre-requisite requirements at this stage.	Pre-requisite assumed
<b>Credit 1 - 1 credit where;</b>		
Requirement 2	The principal contractor operates an environmental management system (EMS) covering their main operations. The EMS must be either:  third party certified, to ISO 14001/EMAS or equivalent standard; or have a structure that is in compliance with BS 8555:2003 and has reached phase four of the implementation stage, 'implementation	One credit targeted

	and operation of the environmental management system', and has completed phase audits one to four, as defined in BS 8555.	
Requirement 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.	
<b>Credit 2 - 1 credit where;</b>		
Requirement 4	<p>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).</p> <p>To do this the Sustainability Champion will ideally be site based or will visit the site regularly to carry out spot checks, with the relevant authority to do so and require action to be taken to address shortcomings in compliance. The Sustainability Champion will monitor site activities with sufficient frequency (see compliance note CN6) to ensure that risks of noncompliance are minimised. They will report on progress at relevant project team meetings including identifying potential areas of non-compliance and any action needed to mitigate.</p>	One credit targeted
Requirement 5	The defined BREEAM performance target forms a requirement of the principal contractor's contract (see compliance note Man 01 Project brief and design – CN5 and in Man 01 Project brief and design – Relevant definitions).	
Requirement 6	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 certification report.	
<b>Credit 3 – Up to 2 credits where;</b>		
Requirement 7	<p>Where the principal contractor has used a 'compliant' organisational, local or national considerate construction scheme and their performance against the scheme has been confirmed by independent assessment and verification. The BREEAM credits can be awarded as follows:</p> <p>One credit where the contractor achieves 'compliance' with the criteria of a compliant scheme. Two credits where the contractor significantly exceeds 'compliance' with the criteria of the scheme. Refer to the Relevant definitions section for a list of compliant schemes and therefore how performance, as determined by a compliant scheme, translates in to BREEAM credits.</p>	Two credits targeted
<b>Credit 4 – Up to 2 credits where;</b>		
Requirement 8	<p>Responsibility has been assigned to an individual(s) for monitoring, recording and reporting energy use, water consumption and transport data (where measured) resulting from all on-site construction processes (and dedicated off-site monitoring) throughout the build programme.</p> <p>To ensure the robust collection of information, this individual(s) must have the appropriate authority and responsibility to request and access the data required. Where appointed, the Sustainability Champion could perform this role.</p>	Two credits targeted
Requirement 9	<p><b>First monitoring credit: Utility consumption - Energy</b></p> <p>Criterion 8 is achieved.</p>	



Requirement 10	Monitor and record data on principal constructor's and subcontractors' energy consumption in kWh (and where relevant, litres of fuel used) as a result of the use of construction plant, equipment (mobile and fixed) and site accommodation.
Requirement 11	Report the total carbon dioxide emissions (total kgCO <sub>2</sub> /project value) from the construction process via the BREEAM Assessment Scoring and Reporting tool.
Requirement 12	<b>First monitoring credit: Utility consumption - Water</b>  Criterion 8 is achieved.
Requirement 13	Monitor and record data on principal constructor's and subcontractors' potable water consumption (m <sup>3</sup> ) arising from the use of construction plant, equipment (mobile and fixed) and site accommodation.
Requirement 14	Using the collated data, report the total net water consumption (m <sup>3</sup> ), i.e. consumption minus any recycled water use, from the construction process via the BREEAM Assessment Scoring and Reporting tool.
Requirement 15	<b>Second monitoring credit: Transport of construction materials &amp; waste</b>  Criterion 8 is achieved.
Requirement 16	Monitor and record data on transport movements and impacts resulting from delivery of the majority of construction materials to site and construction waste from site. As a minimum, this must cover:  Transport of materials from the factory gate to the building site, including any transport, intermediate storage and distribution. See Relevant definitions.

	<p>Scope of this monitoring must cover the following as a minimum:</p> <p>Materials used in major building elements (i.e. those defined in BREEAM issue Mat 01 Life cycle impacts), including insulation materials.</p> <p>Ground works and landscaping materials.</p> <p>Transport of construction waste from the construction gate to waste disposal processing/recovery centre gate. Scope of this monitoring must cover the construction waste groups outlined in the project's waste management plan.</p>
Requirement 17	Using the collated data, report separately for materials and waste, the total fuel consumption (litres) and total carbon dioxide emissions (kgCO2 eq), plus total distance travelled (km) via the BREEAM Assessment Scoring and Reporting tool.

<b>Man 04: Commissioning and handover</b>		
<b>Targeted: 3 of 4</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	A schedule of commissioning and testing that identifies and includes a suitable timescale for commissioning and recommissioning of all complex and non-complex building services and control systems and testing and inspecting building fabric.	One credit targeted
Requirement 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, refer to compliance note CN5 on BMS commissioning procedures.	

Requirement 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.	
Requirement 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.	
<b>Credit 2 - 1 credit where;</b>		
Requirement 5	The commissioning and testing schedule and responsibilities credit (credit 1) is achieved.	One credit targeted
Requirement 6	For buildings with complex building services and systems, a specialist commissioning manager is appointed during the design stage (by either the client or the principal contractor) with responsibility for:  Undertaking design reviews and giving advice on suitability for ease of commissioning. Providing commissioning management input to construction programming and during installation stages. Management of commissioning, performance testing and handover/post-handover stages. Where there are simple building services, this role can be carried out by an appropriate project team member (see criterion 3), provided they are not involved in the general installation works for the building services system(s).	
<b>Credit 3 - 1 credit where;</b>		
Requirement 7	The commissioning and testing schedule and responsibilities credit is achieved.	Credit not targeted

Requirement 8	The integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths is quality assured through completion of post construction testing and inspection. Dependent on building type or construction, this can be demonstrated through the completion of a thermographic survey as well as an airtightness test and inspection (see compliance notes CN6 and CN7. The survey and testing is undertaken by a Suitably Qualified Professional (see Relevant definitions) in accordance with the appropriate standard.	
Requirement 9	Any defects identified in the thermographic survey or the airtightness testing reports are rectified prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building/element.	
<b>Credit 4 – 1 credit where</b>		
Requirement 10	A Building User Guide (BUG) is developed prior to handover for distribution to the building occupiers and premises managers (see Relevant definitions).	One credit targeted
Requirement 11	A training schedule is prepared for building occupiers/premises managers, timed appropriately around handover and proposed occupation plans, which includes the following content as a minimum:  The building's design intent The available aftercare provision and aftercare team main contact(s), including any scheduled seasonal commissioning and post occupancy evaluation Introduction to, and demonstration of, installed systems and key features, particularly building management systems, controls and their interfaces Introduction to the Building User Guide and other relevant building documentation, e.g. design data, technical guides,	

	<p>maintenance strategy, operations and maintenance (O&amp;M) manual, commissioning records, log book etc. Maintenance requirements, including any maintenance contracts and regimes in place.</p>	
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## HEALTH & WELLBEING

<b>Hea 01: Visual Comfort</b>		
<b>Targeted: 2 of 4</b>		
<b>Credit 1 – 1 credit where;</b>		
Requirement 1	The potential for disabling glare has been designed out of all relevant building areas using a glare control strategy, either through building form and layout and/or building design measures.	One credit targeted
Requirement 2	<p>The glare control strategy avoids increasing lighting energy consumption, by ensuring that:</p> <p>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 facade</p> <p>AND</p> <p>b. The use or location of shading does not conflict with the operation of lighting control systems.</p>	
<b>Credit 2 - 1 credit where;</b>		
Requirement 3	<p>Daylighting criteria have been met using either of the following options:</p> <p>The relevant building areas meet good practice daylight factor(s) and other criterion as outlined in Table - 10 and Table - 11.</p> <p>OR</p> <p>The relevant building areas meet good practice average and minimum point daylight illuminance criteria as outlined in Table - 12.</p>	Credit not targeted

<b>Credit 3 - 1 credit where;</b>		
Requirement 4	95% of the floor area in relevant building areas is within 7m of a wall which has a window or permanent opening that provides an adequate view out.	Credit not targeted
Requirement 5	The window/opening must be $\geq 20\%$ of the surrounding wall area (refer to Relevant definitions in the Additional information section). Where the room depth is greater than 7m, compliance is only possible where the percentage of window/opening is the same as, or greater than, the values in table 1.0 of BS 8206.	
Requirement 6	In addition, the building type criteria in Table - 13 are applicable to view out criteria.	
<b>Credit 4 - 1 credit where;</b>		
Requirement 7	<b>Internal lighting</b> All fluorescent and compact fluorescent lamps are fitted with high frequency ballasts.	One credit targeted
Requirement 8	Internal lighting in all relevant areas of the building is designed to provide an illuminance (lux) level appropriate to the tasks undertaken, accounting for building user concentration and comfort levels. This can be demonstrated through a lighting design strategy that provides illuminance levels in accordance with the SLL Code for Lighting 2012 and any other relevant industry standard.	
Requirement 9	For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 7 sections 3.3, 4.6, 4.7, 4.8 and 4.9. This gives recommendations highlighting:  Limits to the luminance of the luminaires to avoid screen reflections. (Manufacturers' data for the luminaires should be sought to confirm this.)	

	<p>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.</p> <p>Recommendations for direct lighting, ceiling illuminance, and average wall illuminance.</p>
Requirement 10	<p><b>External lighting</b></p> <p>All external lighting located within the construction zone is designed to provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night. To demonstrate this, external lighting provided is specified in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas and BS EN 12464-2:2014 Light and lighting - Lighting of work places - Part 2: Outdoor work places.</p>
Requirement 11	<p><b>Zoning and occupant control</b></p> <p>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:</p> <p>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</p>



	<p>Dining, restaurant, café areas: separate zoning of servery and seating/dining areas</p> <p>Retail: separate zoning of display and counter areas</p> <p>Bar areas: separate zoning of bar and seating areas</p> <p>Wards or bedded areas: zoned lighting control for individual bed spaces and control for staff over groups of bed spaces</p> <p>Treatment areas, dayrooms, waiting areas: zoning of seating and activity areas and circulation space with controls accessible to staff.</p>
Requirement 12	Areas used for teaching, seminar or lecture purposes have lighting controls provided in accordance with CIBSE Lighting Guide 5.
Requirement 13	In addition, meet the building type criteria in Table - 14 (where relevant).

<b>Hea 02: Indoor Air Quality</b>		
<b>Targeted: 3 of 5</b>		
<b>Credit 1 – 1 credit where;</b>		
Requirement 1	<p>An indoor air quality plan has been produced, with the objective of facilitating a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during occupation of the building. The indoor air quality plan must consider the following:</p> <ul style="list-style-type: none"> <li>a. Removal of contaminant sources</li> <li>b. Dilution and control of contaminant sources</li> <li>c. Procedures for pre-occupancy flush out</li> <li>d. Third party testing and analysis</li> <li>e. Maintaining indoor air quality in-use</li> </ul>	One credit targeted
<b>Credit 2 - 1 credit where;</b>		

Requirement 2	<p>The building has been designed to minimise the concentration and recirculation of pollutants in the building as follows:</p> <p>Provide fresh air into the building in accordance with the criteria of the relevant standard for ventilation.</p>	One credit targeted
Requirement 3	<p>Design ventilation pathways to minimise the build-up of air pollutants in the building, as follows:</p> <p>In air conditioned and mixed mode buildings/spaces:</p> <p>The building's air intakes and exhausts are over 10m apart and intakes are over 20m from sources of external pollution. OR 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 13779:2007 Annex A2.</p> <p>In naturally ventilated buildings/spaces: openable windows/ventilators are over 10m from sources of external pollution.</p>	
Requirement 4	<p>Where present, HVAC systems must incorporate suitable filtration to minimise external air pollution, as defined in BS EN 13779:2007 Annex A3.</p>	
Requirement 5	<p>Areas of the building subject to large and unpredictable or variable occupancy patterns have carbon dioxide (CO2) or air quality sensors specified and:</p> <p>In mechanically ventilated buildings/spaces: sensor(s) are linked to the mechanical ventilation system and provide demand-controlled ventilation to the space.</p> <p>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</p>	

	with the ability to adjust the quantity of fresh air, i.e. automatic opening windows/roof vents.	
<b>Credit 3 – 1 credit where;</b>		
Requirement 6	All decorative paints and varnishes specified meet the criteria in Table - 18	One credit targeted
Requirement 7	At least five of the seven remaining product categories listed in Table - 18 meet the testing requirements and emission levels criteria for volatile organic compound (VOC) emissions (listed in the table).	
<b>Credit 4 – 1 credit where;</b>		
Requirement 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).	Credit not targeted
Requirement 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.	
Requirement 10	Where VOC and formaldehyde levels are found to exceed the limits defined in criteria 10 and 11, the project team confirms the measures that have, or will be taken, in accordance with the IAQ plan, to reduce the levels to within these limits.	
Requirement 11	The testing and measurement of the above pollutants are in accordance with the following standards where relevant: a. BS ISO 16000-4: 2011 Diffusive sampling of formaldehyde in air b. BS ISO 16000-6: 2011 VOCs in air by active sampling c. BS EN ISO 16017-2: 2003 VOCs - Indoor, ambient and workplace air by passive sampling	

	d. BS ISO 16000-3: 2011 formaldehyde and other carbonyls in air by pumped sampling.	
Requirement 12	The measured concentration levels of formaldehyde ( $\mu\text{g}/\text{m}^3$ ) and TVOC ( $\mu\text{g}/\text{m}^3$ ) are reported, via the BREEAM Assessment Scoring and Reporting Tool.	
<b>Credit 5 – 1 credit where;</b>		
Requirement 13	<p>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:</p> <p>Occupied spaces of the building are designed to be capable of providing fresh air entirely via a natural ventilation strategy. The following are methods deemed to satisfy this criterion dependent upon the complexity of the proposed system:  Room depths are designed in accordance with CIBSE AM10 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  The design demonstrates that the natural ventilation strategy provides adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates. This is demonstrated using ventilation design tool types recommended by CIBSE AM10.  For a strategy that does not rely on openable windows, or which has occupied spaces with a plan depth greater than 15m, the design must demonstrate (in accordance with criterion 13i above) that the ventilation strategy can provide adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates.</p>	Credit not targeted

Requirement 14	<p>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 (see compliance note CN6).</p> <p>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.</p>
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<b>Hea 04: Thermal comfort</b>		
<b>Targeted: 3 of 3</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	Thermal modelling has been carried out using software in accordance with CIBSE AM11 Building Energy and Environmental Modelling.	One credit targeted
Requirement 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).	
Requirement 3	<p>The modelling demonstrates that:</p> <p>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).</p> <p>For naturally ventilated/free running buildings:</p>	

	<p>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).</p> <p>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.</p>	
Requirement 4	For air conditioned buildings, the PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied) indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.	
<b>Credit 2 - 1 credit where;</b>		
Requirement 5	Criteria 1 to 4 are achieved.	One credit targeted
Requirement 6	The thermal modelling demonstrates that the relevant requirements set out in criteria 3 are achieved for a projected climate change environment (see Relevant definitions).	
Requirement 7	Where thermal comfort criteria are not met for the projected climate change environment, the project team demonstrates how the building has been adapted, or designed to be easily adapted in future using passive design solutions in order to subsequently meet the requirements under criterion 6.	
Requirement 8	For air conditioned buildings, the PMV and PPD indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.	
<b>Credit 3 – 1 credit where;</b>		

Requirement 9	Criteria 1 to 4 are achieved.	One credit targeted
Requirement 10	The thermal modelling analysis (undertaken for compliance with criteria 1 to 4) has informed the temperature control strategy for the building and its users.	
Requirement 11	<p>The strategy for proposed heating/cooling system(s) demonstrates that it has addressed the following:</p> <p>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.</p> <p>b. The degree of occupant control required for these zones, based on discussions with the end user (or alternatively building type or use specific design guidance, case studies, feedback) considers:</p> <p>i. User knowledge of building services</p> <p>ii. Occupancy type, patterns and room functions (and therefore appropriate level of control required)</p> <p>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.,</p> <p>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).</p>	

	<p>c. How the proposed systems will interact with each other (where there is more than one system) and how this may affect the thermal comfort of the building occupants.</p> <p>d. The need or otherwise for an accessible building user actuated manual override for any automatic systems.</p>	
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<b>Hea 05: Acoustic Performance</b>		
<b>Targeted: 3 of 3</b>		
<b>Credit 1</b> - Up to 3 credits where;		
Requirement 2	<p><b>Up to two credits are available for Industrial, Retail, Prisons and 'Other' building types:</b></p> <p>Where the building meets the acoustic performance standards and testing requirements detailed in Table - 21 (see additional information) for all relevant functional areas.</p>	Three credits targeted
Requirement 3	<p><b>Up to one credit</b> 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.</p>	

<b>Hea 06: Safety and Security</b>		
<b>Targeted: 2 of 2</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	Where external site areas form part of the assessed development the following apply:	One credit targeted



	Dedicated cycle paths provide direct access from the site entrance(s) to any cycle storage provided, without the need to deviate from the cycle path and, if relevant, connect to off-site cycle paths (or other appropriate safe route) where these run adjacent to the development's site boundary.	
Requirement 2	Footpaths on-site provide direct access from the site entrance(s) to the building entrance(s) and connect to public footpaths off-site (where existing), providing practical and convenient access to local transport nodes and other off-site amenities (where existing).	
Requirement 3	Where provided, drop-off areas are designed off/adjoining to the access road and provide direct access to pedestrian footpaths, therefore avoiding the need for the pedestrian to cross vehicle access routes.	
Requirement 4	Dedicated pedestrian crossings are provided where pedestrian routes cross vehicle access routes, and appropriate traffic calming measures are in place to slow traffic down at these crossing points.	
Requirement 5	For large developments with a high number of public users or visitors, pedestrian footpaths must be signposted to other local amenities and public transport nodes off-site (where existing).	
Requirement 6	The lighting for access roads, pedestrian routes and cycle lanes is compliant with the external lighting criteria defined in Hea 01 Visual comfort, i.e. in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas.	
Requirement 7	Where vehicle delivery access and drop-off areas form part of the assessed development, the following apply:  Delivery areas are not directly accessed through general parking areas and do not cross or share pedestrian and cyclist routes and	

	other outside amenity areas accessible to building users and general public.	
Requirement 8	There is a dedicated parking/waiting area for goods vehicles with appropriate separation from the manoeuvring area and staff and visitor car parking.	
Requirement 9	Parking and turning areas are designed for simple manoeuvring according to the type of delivery vehicle likely to access the site, thus avoiding the need for repeated shunting.	
Requirement 10	There is a dedicated space for the storage of refuse skips and pallets away from the delivery vehicle manoeuvring area and staff/visitor car parking (if appropriate given the building type/function).	
<b>Credit 2 - 1 credit where;</b>		
Requirement 11	A suitably qualified security specialist (SQSS) conducts an evidence-based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent).	One credit targeted
Requirement 12	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.	
Requirement 13	The recommendations or solutions proposed by the SQSS are implemented (see CN9). Any deviation from those recommendations or solutions will need to be justified, documented and agreed in advance with a suitably qualified security specialist.	

## ENERGY

<b>Ene 01: Reduction of energy use and carbon emissions</b>		
<b>Targeted: 0 of 12</b>		
<b>Credit 1</b> - Up to 12 credits where;		
Requirement 1	Calculate an Energy Performance Ratio for New Constructions (EPRNC). Compare the EPRNC achieved with the benchmarks in Table - 25 and award the corresponding number of BREEAM credits.	Zero credits targeted
<b>Ene 02: Energy Monitoring</b>		
<b>Targeted: 2 of 2</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	Energy metering systems are installed that enable at least 90% of the estimated annual energy consumption of each fuel to be assigned to the various end-use categories of energy consuming systems (see Methodology).	One credit targeted
Requirement 2	The energy consuming systems in buildings with a total useful floor area greater than 1,000m <sup>2</sup> are metered using an appropriate energy monitoring and management system.	
Requirement 3	The systems in smaller buildings are metered either with an energy monitoring and management system or with separate accessible energy sub-meters with pulsed or other open protocol communication outputs, to enable future connection to an energy monitoring and management system (see Relevant definitions).	
Requirement 4	The end energy consuming uses are identifiable to the building users, for example through labelling or data outputs.	
<b>Credit 2</b> - 1 credit where;		

Requirement 5	An accessible energy monitoring and management system or separate accessible energy sub-meters with pulsed or other open protocol communication outputs to enable future connection to an energy monitoring and management system are provided, covering a significant majority of the energy supply to tenanted areas or, in the case of single occupancy buildings, relevant function areas or departments within the building/unit.	One credit targeted
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**Ene 03: External Lighting**

**Targeted: 1 of 1**

**Credit 1 - 1 credit where;**

Requirement 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:	One credit targeted
Requirement 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.	
Requirement 3	All external light fittings are automatically controlled for prevention of operation during daylight hours and presence detection in areas of intermittent pedestrian traffic.	

**Ene 04: Low carbon design**

**Targeted: 0 of 3**

**Credit 1 - 1 credit where;**

Requirement 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.	Credit not targeted
Requirement 2	The project team carries out an analysis of the proposed building design/development to influence decisions made during Concept Design stage (RIBA Stage 2 or equivalent) and identify opportunities for the implementation of passive design solutions that reduce demands for energy consuming building services (see compliance note CN4).	
Requirement 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 (see compliance note CN16).	
<b>Credit 2 – 1 credit where;</b>		
Requirement 4	The passive design analysis credit (credit 1) is achieved.	Credit not targeted
Requirement 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.	
Requirement 6	The building uses ANY of the free cooling strategies listed in compliance note CN5 to reduce the cooling energy demand, i.e. it does not use active cooling.	
<b>Credit 3 – 1 credit where;</b>		
Requirement 7	A feasibility study has been carried out by the completion of the Concept Design stage (RIBA Stage 2 or equivalent) by an energy specialist (see Relevant definitions) to establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy source(s) for the building/development (see compliance note CN7).	Credit not targeted

Requirement 8	A local LZC technology/technologies has/have been specified for the building/development in line with the recommendations of this feasibility study and this method of supply results in a meaningful reduction in regulated carbon dioxide (CO2) emissions (see compliance note CN16).	
<b>Ene 08 Energy Efficient Equipment</b>		
<b>Targeted: 0 of 2</b>		
<b>Credit 1 – 2 credits where;</b>		
Requirement 1	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.	Credits not targeted
Requirement 2	Identify the systems and/or processes that use a significant proportion of the total annual unregulated energy consumption of the development and its operation.	
Requirement 3	Demonstrate a meaningful reduction in the total annual unregulated energy consumption of the building. See Table - 28  Table - 28 contains solutions deemed to satisfy compliance for common examples of significant contributors to unregulated energy consumption, for a number of different building types/functions.	

## TRANSPORT

<b>Tra 01: Public Transport Accessibility</b>		
<b>Targeted: 3 of 5</b>		
<b>Credit 1</b> - Up to 5 credits where;		
Requirement 1	<p><b>Up to 5 credits - Accessibility Index</b></p> <p>The public transport Accessibility Index (AI) for the assessed building is calculated and BREEAM credits awarded in accordance with the table of building types, AI benchmarks and BREEAM credits in Table - 29 (see checklists and tables).</p>	Three credits targeted
Requirement 2	<p>The Accessibility Index is determined by entering the following information in to the BREEAM Tra 01 calculator:</p> <p>The distance (m) from the main building entrance to each compliant public transport node</p> <p>The public transport type(s) serving the compliant node e.g. bus or rail</p> <p>The average number of services stopping per hour at each compliant node during the operating hours of the building for a typical day (see compliance notes and Table - 30 in the Additional Information section).</p> <p><b>OR</b></p>	
Requirement 3	<p><b>One credit - Dedicated bus service</b></p> <p>For buildings with a fixed shift pattern, i.e. where building users will predominantly arrive/depart at set times, one credit can be awarded where the building occupier provides, or commits to providing a dedicated bus service to and from the building at the beginning and end of each shift/day.</p>	

	This credit is only available in cases where a development is unable to achieve any of the available credits using the Accessibility Index criteria (i.e. its location has a low public transport Accessibility Index).
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<b>Tra 02: Proximity to amenities</b>		
<b>Targeted: 1 of 1</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	Where the building is located within close proximity of, and accessible to, local amenities which are likely to be frequently required and used by building occupants, as outlined in Table - 31	One credit targeted
Requirement 2	Where a building type is indicated to have core amenities (Labelled as C in Table - 31) at least two of these must be provided as a part of the total number required. The remaining number of amenities required can be met using any other applicable amenities (including any remaining core amenities).	

<b>Tra 03: Cyclist facilities</b>		
<b>Targeted: 0 of 2</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	Compliant cycle storage spaces that meet the minimum levels set out in Table - 32 (see checklists and tables) are installed.	Credit not targeted
<b>Credit 2</b> - 1 credit where;		
Requirement 2	Criterion 1 has been achieved.	Credit not targeted
Requirement 3	At least two of the following types of compliant cyclist facilities have been provided for all staff and pupils (where appropriate)	



	(see relevant definitions for the scope of each compliant cyclist facilities:  Showers Changing facilities Lockers Drying spaces
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<b>Tra 05: Travel Plan</b>		
<b>Targeted: 1 of 1</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	A travel plan has been developed as part of the feasibility and design stages.	One credit targeted
Requirement 2	A site specific travel assessment/statement has been undertaken to ensure the travel plan is structured to meet the needs of the particular site and covers the following (as a minimum):  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.	
Requirement 3	The travel plan includes a package of measures to encourage the use of sustainable modes of transport and movement of people and goods during the buildings operation and use.	

Requirement 4	If the occupier is known, they must be involved in the development of the travel plan and they must confirm that the travel plan will be implemented post construction and be supported by the buildings management in operation.	
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## WATER

<b>Wat 01: Water Consumption</b>		
<b>Targeted: 3 of 5</b>		
<b>Credit 1 - Up to 5 credits where;</b>		
Requirement 1	An assessment of the efficiency of the building's domestic water-consuming components is undertaken using the BREEAM Wat 01 calculator.	Three credits targeted
Requirement 2	The water consumption (L/person/day) for the assessed building is compared against a baseline performance and BREEAM credits awarded based upon Table - 35.	
Requirement 3	The efficiency of the following 'domestic scale' water-consuming components must be included in the assessment (where specified):  WCs Urinals Taps (wash hand basins and where specified kitchen taps and waste disposal unit) Showers Baths Dishwashers (domestic and commercial sized) Washing machines (domestic and commercial or industrial sized). The BREEAM Wat 01 calculator defines the building types and activity areas for which the above components must be assessed.	
Requirement 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.	

Requirement 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+A1:2013 Rainwater Harvesting Systems - Code of practice.
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<b>Wat 02: Water Monitoring</b>		
<b>Targeted: 1 of 1</b>		
<b>Credit 1 - 1 credit where;</b>		
Requirement 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.	One credit targeted
Requirement 2	Water-consuming plant or building areas, consuming 10% or more of the building's total water demand, are either fitted with easily accessible sub-meters or have water monitoring equipment integral to the plant or area (see Compliance notes).	
Requirement 3	Each meter (main and sub) has a pulsed or other open protocol communication output to enable connection to an appropriate utility monitoring and management system, e.g. a building management system (BMS), for the monitoring of water consumption (see Relevant definitions).	
Requirement 4	If the site on which the building is located has an existing BMS, managed by the same occupier/owner (as the new building), the pulsed/digital water meter(s) for the new building must be connected to the existing BMS.	

<b>Wat 03: Leak Detection</b>
<b>Targeted: 2 of 2</b>
<b>Credit 1 - 1 credit where;</b>

Requirement 1	<p>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:</p> <p>A permanent automated water leak detection system that alerts the building occupants to the leak OR an in-built automated diagnostic procedure for detecting leaks is installed. 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.</p> <p>Able to identify different flow and therefore leakage rates, e.g. continuous, high and/or low level, over set time periods. Programmable to suit the owner/occupiers' water consumption criteria.</p> <p>Where applicable, designed to avoid false alarms caused by normal operation of large water-consuming plant such as chillers.</p>	One credit targeted
<b>Credit 2</b> - 1 credit where;		
Requirement 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).	One credit targeted

<b>Wat 04: Water efficient equipment</b>		
<b>Targeted: 1 of 1</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	The design team has identified all unregulated water demands that could be realistically mitigated or reduced.	One credit targeted
Requirement 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.	
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## MATERIALS

<b>Mat 01: Life Cycle Impacts</b>		
<b>Targeted: 2 of 6</b>		
<b>Credit 1</b> - Up to 6 credits where;		
Requirement 1	BREEAM awards credits on the basis of the building's quantified environmental life cycle impact through assessment of the main building elements, as set out in Table - 38:	Two credits targeted
Requirement 2	<p>Credits are awarded on the basis of the total number of points achieved, as set out in Table - 39 below, and calculated using the BREEAM Mat 01 calculator. This points score is based on the Green Guide rating(s) achieved for the specifications that make up the main building elements (as in Table - 38).</p> <p>Note: Where an independently verified third party Environmental Product Declaration (EPD), covering part of or the whole life cycle, is available for a material or product that forms part of an assessed building element, this can be used to increase the contribution of that element to the building's Mat 01 performance. (Refer to Calculation procedure where a specific Environmental Product Declaration (EPD) is available for a material in the Methodology section for more details.)</p>	
Requirement 3	Life cycle greenhouse gas emissions (kgCO <sub>2</sub> eq.) for each element are also required to be reported based on a 60-year building life. Where specific data is not available for a product or element, generic data should be used. Generic data can be obtained from the online Green Guide for each element and must be entered in to the BREEAM Mat 01 calculator.	
<b>Mat 02: Hard Landscaping and Boundary Protection</b>		

<b>Targeted: 1 of 1</b>		
<b>Credit 1 - 1 credit where;</b>		
Requirement 1	Where at least 80% of all external hard landscaping and 80% of all boundary protection (by area) in the construction zone achieves an A or A+ rating, as defined in the Green Guide to Specification. Green Guide ratings for the specification(s) of each element can be found at <a href="http://www.thegreenguide.org.uk">www.thegreenguide.org.uk</a>	One credit targeted

<b>Mat 03: Responsible Sourcing of Materials</b>		
<b>Targeted: 2 of 4</b>		
<b>Pre-requisite</b>		
Requirement 1	All timber and timber based products used on the project is 'Legally harvested and traded timber' (see Relevant definitions).  Note:  It is a minimum requirement for achieving a BREEAM rating (for any rating level) that compliance with criterion 1 is confirmed. For other materials there are no pre-requisite requirements at this stage.	Pre-requisite assumed
<b>Credit 1 - 1 credit where;</b>		
Requirement 2	The principal contractor sources materials for the project in accordance with a documented sustainable procurement plan (see the Relevant definitions in the Additional information section).	One credit targeted
<b>Credit 2 – Up to 3 credits where;</b>		
Requirement 3	The available RSM credits (refer to Table - 43) can be awarded where the applicable building materials (refer to Table - 44) are responsibly sourced in accordance with the BREEAM	One credit targeted



	methodology, as defined in steps 1 to 2 in the Methodology section.	
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<b>Mat 04: Insulation</b>		
<b>Targeted: 1 of 1</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	Any new insulation specified for use within the following building elements must be assessed:  External walls Ground floor Roof Building services	One credit targeted
Requirement 2	The Insulation index for the building fabric and services insulation is the same as or greater than 2.5. See Mat 04 Insulation section for a description of calculating the Insulation index.	

<b>Mat 05: Designing for durability and resilience</b>		
<b>Targeted: 1 of 1</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	<b>Protecting vulnerable parts of the building from damage.</b>  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:	One credit targeted

	<p>Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc.).</p> <p>Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas.</p> <p>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.</p>	
Requirement 2	<p><b>Protecting exposed parts of the building from material degradation</b></p> <p>The relevant building elements incorporate appropriate design and specification measures to limit material degradation due to environmental factors. (See Methodology for the process to assess this criterion).</p> <p>See Table - 47 in the Checklists and tables section for a list of applicable elements, environmental factors and material degradation effects to consider.</p>	

<b>Mat 06: Material efficiency</b>		
<b>Targeted: 0 of 1</b>		
<b>Credit 1 - 1 credit where;</b>		
Requirement 1	<p>Opportunities have been identified, and appropriate measures investigated and implemented, to optimise the use of materials in building design, procurement, construction, maintenance and end of life</p>	Credit not targeted

Requirement 2	The above is carried out by the design/construction team in consultation with the relevant parties (see CN3) at each of the following RIBA stages:  Preparation and Brief Concept Design Developed Design Technical Design Construction.	
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## WASTE

<b>Wst 01: Construction Waste Management</b>		
<b>Targeted: 2 of 4</b>		
<b>Credit 1 - Up to 3 credits where;</b>		
Requirement 1	Up to three credits  Where a Resource Management Plan (RMP) has been developed covering the non-hazardous waste related to on-site construction and dedicated off-site manufacture or fabrication (including demolition and excavation waste) generated by the building's design and construction (see CN3).	One credit targeted
Requirement 2	Where construction waste related to on-site construction and dedicated off-site manufacture/fabrication (excluding demolition and excavation waste) meets or is lower than that shown in Table - 48:	
Requirement 3	Where existing buildings on the site will be demolished a pre-demolition audit of any existing buildings, structures or hard surfaces is completed to determine if, in the case of demolition, refurbishment/reuse is feasible and, if not, to maximise the recovery of material from demolition for subsequent high grade/value applications. The audit must be referenced in the RMP and cover:  Identification of the key refurbishment/demolition materials. Potential applications and any related issues for the reuse and recycling of the key refurbishment and demolition materials in accordance with the waste hierarchy.	
<b>Credit 2 - 1 credit where;</b>		

Requirement 4	The following percentages of non-hazardous construction (on-site and off-site manufacture/fabrication in a dedicated facility), demolition and excavation waste (where applicable) generated by the project have been diverted from landfill as shown in Table - 49.	One credit targeted
Requirement 5	Waste materials will be sorted into separate key waste groups as per Table - 50 (according to the waste streams generated by the scope of the works) either on-site or through a licensed contractor for recovery.	

<b>Wst 02: Recycled Aggregates</b>		
<b>Targeted: 0 of 1</b>		
<b>Credit 1 - 1 credit where;</b>		
Requirement 1	The percentage of high-grade aggregate that is recycled and/or secondary aggregate, specified in each application (present) must meet the following minimum % levels (by weight or volume) to contribute to the total amount of recycled and/or secondary aggregate, as specified in table -48.	Credit not targeted
Requirement 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 development. Where the minimum level in criterion 1 is not met for an application, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified.	
Requirement 3	The recycled and/or secondary aggregates are EITHER:  Construction, demolition and excavation waste obtained on-site or off-site OR	

	Secondary aggregates obtained from a non-construction post-consumer industrial by product source (see Relevant definitions section).
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<b>Wst 03: Operational Waste</b>		
<b>Targeted: 1 of 1</b>		
<b>Credit 1 - 1 credit where;</b>		
Requirement 1	<p>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:</p> <p>Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams</p> <p>Accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractors</p> <p>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.</p>	One credit targeted
Requirement 2	<p>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:</p> <p>Static waste compactor(s) or baler(s); situated in a service area or dedicated waste management space.</p> <p>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.</p>	

	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.	
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**Wst 05: Adaptation to climate change**

**Targeted: 0 of 1**

**Credit 1** - 1 credit where;

Requirement 1	<p>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:</p> <p>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:</p> <p>Hazard identification Hazard assessment Risk estimation Risk evaluation Risk management</p>	Credit not targeted
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**Wst 06: Functional adaptability**

**Targeted: 1 of 1**

**Credit 1** - 1 credit where;

Requirement 1	A building-specific functional adaptation strategy study has been undertaken by the client and design team by Concept Design	One credit targeted
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	(RIBA Stage 2 or equivalent), which includes recommendations for measures to be incorporated to facilitate future adaptation.	
Requirement 2	Functional adaptation measures have been implemented (RIBA Stage 4 or equivalent) in accordance with the functional adaptation strategy recommendations, where practical and cost effective. Omissions have been justified in writing to the assessor.	



## LAND USE & ECOLOGY

<b>LE 01: Site Selection</b>		
<b>Targeted: 1 of 2</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	At least 75% of the proposed development's footprint is on an area of land which has previously been occupied by industrial, commercial or domestic buildings or fixed surface infrastructure.	One credit targeted
<b>Credit 2</b> – 1 credit where;		
Requirement 2	A contaminated land specialist's site investigation, risk assessment and appraisal has deemed land within the site to be affected by contamination. The site investigation, risk assessment and appraisal have identified: The degree of contamination The contaminant sources/types The options for remediating sources of contamination which present an unacceptable risk	Credit not targeted
Requirement 3	The client or principal contractor confirms that remediation of the site will be carried out in accordance with the remediation strategy and its implementation plan as recommended by the contaminated land specialist.	

<b>LE 02: Ecological Value of Site and Protection of Ecological Features</b>		
<b>Targeted: 2 of 2</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	Land within the construction zone is defined as 'land of low ecological value' using either:	One credit targeted

	<p>The BREEAM checklist for defining land of low ecological value (see Table -52); OR</p> <p>A Suitably Qualified Ecologist (SQE) who has identified the land as being of 'low ecological value' within an ecological assessment report, based on a site survey.</p>	
<b>Credit 2</b> - 1 credit where;		
Requirement 2	All existing features of ecological value within and surrounding the construction zone and site boundary area are adequately protected from damage during clearance, site preparation and construction activities in line with BS42020: 2013.	One credit targeted
Requirement 3	In all cases, the principal contractor is required to construct ecological protection recommended by the SQE, prior to any preliminary site construction or preparation works (e.g. clearing of the site or erection of temporary site facilities).	

<b>LE 03: Minimising impact on existing site ecology</b>		
<b>Targeted: 2 of 2</b>		
<b>Credit 1</b> - Up to 2 credits where;		
Requirement 1	<p><b>Two credits</b></p> <p>The change in ecological value of the site is equal to or greater than zero plant species, i.e. no negative change, using the methods outlined in either (a) or (b) below:</p> <p>Determine the following information and input this data in to the BREEAM LE 03/LE 04 calculator:</p>	Two credits targeted

	<p>The broad habitat type(s) that define the landscape of the assessed site in its existing pre-developed state and proposed state (see Table - 53). Area (m2) of the existing and proposed broad habitat types. <b>OR</b></p> <p>Where a Suitably Qualified Ecologist (SQE) has been appointed and, based on their site survey, they confirm the following and either the assessor or ecologist inputs this data in to the BREEAM LE 03/LE 04 calculator:</p> <p>The broad habitat types that define the landscape of the assessed site in its existing pre-developed state and proposed state. Area (m2) of the existing and proposed broad habitat plot types. Average total taxon (plant species) richness within each habitat type. <b>OR</b></p>	
Requirement 2	<p><b>One credit</b></p> <p>Where the change in ecological value of the site is less than zero but equal to or greater than minus nine plant species i.e. a minimal change, use the methods outlined in either 1(a) or (b) above.</p>	

<b>LE 04: Enhancing site ecology</b>		
<b>Targeted: 2 of 2</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	A suitably qualified ecologist (SQE) has been appointed by the client or their project representative by the end of the	One credit targeted

	Preparation and Brief stage (RIBA Stage 1 or equivalent) to advise on enhancing the ecology of the site at an early stage.	
Requirement 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 (see also CN4).	
Requirement 3	The early stage advice and recommendations of the Ecology Report for the enhancement of site ecology have been, or will be, implemented in the final design and build.	
<b>Credit 2</b> - 1 credit where;		
Requirement 4	The criteria of the first credit are met.	One credit targeted
Requirement 5	The recommendations of the Ecology Report for the enhancement of site ecology have been implemented in the final design and build, and the SQE confirms that this will result in an increase in ecological value of the site, with an increase of six plant species or greater (refer also to Compliance note CN8 for alternative means of compliance).	
Requirement 6	The increase in plant species has been calculated using the BREEAM LE 03/LE 04 calculator, using actual plant species numbers.	

<b>LE 05: Long Term Impact on Biodiversity</b>		
<b>Targeted: 2 of 2</b>		
<b>Credit 1</b> - Up to 2 credits where;		
Requirement 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	Two credits targeted

	enhancement of ecology has been complied with during the design and construction process.	
Requirement 2	Where a landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion in accordance with BS 42020:2013 Section 11.1. This is to be handed over to the building owner/occupants for use by the grounds maintenance staff.	
Requirement 3	<p>Where additional measures to improve the assessed site's long term biodiversity are adopted, according to Table - 55.</p> <ul style="list-style-type: none"> <li>• <b>One credit</b> where at least 2 additional measures are adopted</li> <li>• <b>Two credits</b> where at least 4 additional measures are adopted</li> </ul> <p>Where the Suitably Qualified Ecologist (SQE) confirms that some of the additional measures listed in Table - 55 are not applicable to the assessed development, the credits can be awarded in accordance with the table in the Tracker Plus Additional Guidance document.</p>	

## POLLUTION

<b>Pol 01: Impact of Refrigerants</b>		
<b>Targeted: 1 of 3</b>		
<b>Credit 1</b> - Up to 3 credits where;		
Requirement 1	<p><b>Three credits - No refrigerant use</b></p> <p>Where the building does not require the use of refrigerants within its installed plant/systems.</p> <p>OR alternatively, where the building does require the use of refrigerants, the three credits can be awarded through compliance with requirements 2 to 7.</p>	One credit targeted under requirement 5
Requirement 2	<p><b>Pre-requisite</b></p> <p>All systems (with electric compressors) must comply with the requirements of BS EN 378:2008 (parts 2 and 3) and where refrigeration systems containing ammonia are installed, the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice.</p>	
Requirement 3	<p><b>Impact of refrigerant:</b></p> <p><b>2 credits:</b></p> <p>Where the systems using refrigerants have Direct Effect Life Cycle CO<sub>2</sub> equivalent emissions (DELCO<sub>2</sub>e) of ≤ 100 kgCO<sub>2</sub>e/kW cooling/heating capacity. To calculate the DELCO<sub>2</sub>e please refer to the Relevant definitions in the Additional information section and the Methodology section.</p> <p><b>OR</b></p>	

Requirement 4	Where air-conditioning or refrigeration systems are installed the refrigerants used have a Global Warming Potential (GWP) $\leq$ 10.  <b>OR</b>
Requirement 5	<b>One credit:</b>  Where the systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELC CO2e) of $\leq$ 1000 kgCO2e/kW cooling/heating capacity.

<b>Pol 02: NOx emissions</b>		
<b>Targeted: 3 of 3</b>		
<b>Credit 1</b> - Up to 3 credits where;		
Requirement 1	Where the plant installed to meet the building's delivered heating and hot water demand has, under normal operating conditions, a NOx emission level (measured on a dry basis at 0% excess O2) as follows: <ul style="list-style-type: none"> <li>• 1 Credit: <math>\leq</math> 100 mg/kWh</li> <li>• Credits: <math>\leq</math> 70 mg/kWh</li> <li>• 3 Credits: <math>\leq</math> 40 mg/kWh</li> </ul>	Three credits targeted
Requirement 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.	

<b>Pol 03: Surface Water Run Off</b>		
<b>Targeted: 4 of 5</b>		
<b>Credit 1</b> - Up to 2 credits where;		

Requirement 1	<p><b>Two credits - Low flood risk</b></p> <p>Where a site-specific flood risk assessment (FRA) confirms the development is situated in a flood zone that is defined as having a low annual probability of flooding (in accordance with current best practice national planning guidance). The FRA must take all current and future sources of flooding into consideration (see CN5).</p>	Two credits targeted
Requirement 2	<p><b>One credit - Medium / High flood risk</b></p> <p>Where a site-specific FRA confirms the development is situated in a flood zone that is defined as having a medium or high annual probability of flooding and is not in a functional floodplain (in accordance with current best practice national planning guidance). The FRA must take all current and future sources of flooding into consideration (see CN5).</p> <p><b>AND</b></p>	
Requirement 3	<p>To increase the resilience and resistance of the development to flooding, one of the following must be achieved:</p> <p>The ground level of the building and access to both the building and the site, are designed (or zoned) so they are at least 600mm above the design flood level of the flood zone in which the assessed development is located (see CN8); <b>OR</b></p> <p>The final design of the building and the wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach outlined in section 5 of BS 8533:2011.</p>	
Credit 2 - Up to 2 credits where;		



Requirement 4	<b>Pre-requisite</b>  An Appropriate Consultant is appointed to carry out, demonstrate and/or confirm the development's compliance with the following criteria:	Pre-requisite assumed
Requirement 5	<b>One credit</b>  Where drainage measures are specified to ensure that the peak rate of run-off from the site to the watercourses (natural or municipal) is no greater for the developed site than it was for the pre-development site. This should comply at the 1-year and 100-year return period events.	One credit targeted
Requirement 6	Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place.	
Requirement 7	Calculations include an allowance for climate change; this should be made in accordance with current best practice planning guidance (see definitions).	
Requirement 8	<b>One credit</b>  Where flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance); AND  EITHER	One credit targeted
Requirement 9	Drainage design measures are specified to ensure that the post development run-off volume, over the development lifetime, is no greater than it would have been prior to the assessed site's development for the 100-year 6-hour event, including an allowance for climate change (see criterion 14).	

Requirement 10	Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other Sustainable Drainage System (SuDS) techniques.	
Requirement 11	OR (only where criteria 9 and 10 for this credit cannot be achieved):  Justification from the Appropriate Consultant indicating why the above criteria cannot be achieved, i.e. where infiltration or other SuDS techniques are not technically viable options.	
Requirement 12	Drainage design measures are specified to ensure that the post development peak rate of run-off is reduced to the limiting discharge. The limiting discharge is defined as the highest flow rate from the following options:  The pre-development 1-year peak flow rate; OR The mean annual flow rate Qbar; OR 2L/s/ha. Note that for the 1-year peak flow rate the 1-year return period event criterion applies (as described in the peak run-off criteria above).	
Requirement 13	Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place.	
Requirement 14	For either option, above calculations must include an allowance for climate change; this should be made in accordance with current best practice planning guidance.	
Credit 3 - 1 credit where;		
Requirement 15	There is no discharge from the developed site for rainfall up to 5mm (confirmed by the Appropriate Consultant).	Credit not targeted

Requirement 16	In areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques.
Requirement 17	Where there is a high risk of contamination or spillage of substances such as petrol and oil (see Compliance notes for a list of areas), separators (or an equivalent system) are installed in surface water drainage systems.
Requirement 18	Where the building has chemical/liquid gas storage areas, a means of containment is fitted to the site drainage system (i.e. shut-off valves) to prevent the escape of chemicals to natural watercourses (in the event of a spillage or bunding failure).
Requirement 19	All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as Pollution Prevention Guideline 3 (PPG 3) and/or where applicable the SUDS manual. For areas where vehicle washing will be taking place, pollution prevention systems must be in accordance with Pollution Prevention Guidelines 13.
Requirement 20	A comprehensive and up-to date drainage plan of the site will be made available for the building/site occupiers.
Requirement 21	Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place.
Requirement 22	Where present, all external storage and delivery areas designed and detailed in accordance with the current best practice planning guidance (see Other information for further information).

<b>Pol 04: Reduction of Night Time Light Pollution</b>
<b>Targeted: 1 of 1</b>

<b>Credit 1 - 1 credit where;</b>		
Requirement 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 has no external lighting, one credit may be awarded as follows:	One credit targeted
Requirement 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. 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.	
Requirement 3	All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00.	
Requirement 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.	
Requirement 5	Illuminated advertisements, where specified, must be designed in compliance with ILE Technical Report 5 – The Brightness of Illuminated Advertisements.	

<b>Pol 05: Noise Attenuation</b>		
<b>Targeted: 1 of 1</b>		
<b>Credit 1 - 1 credit where;</b>		
Requirement 1	Where there are, or will be, no noise-sensitive areas or buildings within 800m radius of the assessed development.	One credit targeted

Requirement 2	<p>OR alternatively, where the building does have noise-sensitive areas or buildings within 800m radius of the development, one credit can be awarded as follows:</p> <p>Where a noise impact assessment in compliance with BS 7445 has been carried out and the following noise levels measured/determined:</p> <p>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.</p> <p>The rating noise level resulting from the new noise source (see CN4).</p>
Requirement 3	<p>The noise impact assessment must be carried out by a suitably qualified acoustic consultant holding a recognised acoustic qualification and membership of an appropriate professional body (see Relevant definitions in the Additional information section).</p>
Requirement 4	<p>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.</p>
Requirement 5	<p>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.</p>

## INNOVATION

<b>Man 03: Responsible construction practices</b>		
<b>Targeted: 0 of 1</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 17	With reference to the considerate construction criterion 7, in addition to meeting the criteria for two credits, the contractor achieves compliance with the criteria of the compliant scheme to an exemplary level of practice.	Credit not targeted

<b>Hea 01: Visual Comfort</b>		
<b>Targeted: 0 of 1</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 14	Daylighting criteria have been met using either of the following options:  Relevant building areas meet exemplary daylight factor(s) and the relevant criteria in Table - 15. OR  Relevant building areas meet exemplary average and minimum point daylight illuminance criteria in Table - 16.	Credit not targeted

<b>Ene 01: Reduction of energy use and carbon emissions</b>		
<b>Targeted: 0 of 5</b>		
<b>Credit 1</b> - Up to 5 credits where;		

Requirement 2	<b>Up to four credits</b> - Zero regulated carbon  The building achieves an EPRNC $\geq$ 0.9 and zero net regulated CO2 emissions (see Relevant definitions).	Credit not targeted
Requirement 3	An equivalent percentage of the buildings modelled 'regulated' operational energy consumption, as stipulated in Table - 26, is generated by carbon neutral on-site or near-site sources and used to meet energy demand from 'unregulated' building systems or processes.	
Requirement 4	<b>Five credits - Carbon negative</b>  The building is 'carbon negative' in terms of its total modelled operational energy consumption, including regulated and unregulated energy (see Relevant definitions in the Additional information section of this issue).	

<b>Wat 01: Water Consumption</b>		
<b>Targeted: 0 of 1</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 1	An assessment of the efficiency of the building's domestic water-consuming components is undertaken using the BREEAM Wat 01 calculator.	Credit not targeted
Requirement 2	The water consumption (L/person/day) for the assessed building is compared against a baseline performance and BREEAM credits awarded based upon Table - 35.	
Requirement 3	The efficiency of the following 'domestic scale' water-consuming components must be included in the assessment (where specified):  WCs	

	Urinals Taps (wash hand basins and where specified kitchen taps and waste disposal unit) Showers Baths Dishwashers (domestic and commercial sized) 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.
Requirement 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.
Requirement 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+A1:2013 Rainwater Harvesting Systems - Code of practice.

<b>Mat 01: Life Cycle Impacts</b>		
<b>Targeted: 0 of 3</b>		
<b>Credit 1 - 1 credit where;</b>		
Requirement 4	Where assessing four or more applicable building elements, the building achieves at least two points in addition to the total points required to achieve maximum credits under the standard BREEAM criteria (as outlined in the table above) OR	Credit not targeted
Requirement 5	Where assessing fewer than four applicable building elements, the building achieves at least one point in addition to the total points required to achieve maximum credits under the standard BREEAM criteria.	



	Where the assessed building does not specify an element listed above, see the compliance note CN3 regarding the exemplary level benchmark.	
<b>Credit 2</b> - Up to 2 credits where;		
Requirement 6	Where the design team has used an IMPACT compliant software tool (or equivalent) to measure the environmental impact of the building.	Credits not targeted
Requirement 7	Where the design team can demonstrate how the use of an IMPACT compliant software (or equivalent) has benefited the building in terms of measuring and reducing its environmental impact. See compliance note CN16.	
Requirement 8	Where the design team submit the building information model (BIM) from the IMPACT compliant software tool (or equivalent) for the assessed building to BRE Global (via the project's appointed BREEAM Assessor). See compliance note CN17.	

<b>Mat 03: Responsible Sourcing of Materials</b>		
<b>Targeted: 0 of 1</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 4	Where at least 70% of the available RSM points are achieved.	Credit not targeted

<b>Wst 01: Construction Waste Management</b>		
<b>Targeted: 0 of 1</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 6	Non-hazardous construction waste generated by the building's design and on-site construction and off-site manufacture or	Credit not targeted

	fabrication (excluding demolition and excavation waste) is no greater than the exemplary level resource efficiency benchmark (outlined in Table - 48).	
Requirement 7	The percentage of non-hazardous construction (on-site and dedicated off-site manufacture/fabrication), demolition and excavation waste (if relevant) diverted from landfill meets or exceeds the exemplary level percentage benchmark (outlined in Table - 49).	
Requirement 8	All key waste groups are identified for diversion from landfill in the RMP.	

<b>Wst 02: Recycled Aggregates</b>		
<b>Targeted: 0 of 1</b>		
<b>Credit 1 - 1 credit where;</b>		
Requirement 4	The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the exemplary minimum levels (by weight or volume), as defined in table -51. 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.	Credit not targeted
Requirement 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.	
Requirement 6	The contributing recycled or secondary aggregate must not be transported more than 30 km by road transport.	

<b>Wst 05: Adaptation to climate change</b>		
<b>Targeted: 0 of 1</b>		
<b>Credit 1 - 1 credit where;</b>		
Requirement 2	<p>Achievement of the Structural and fabric resilience criterion in this issue and the following criteria points or credits:</p> <p><b>Hea 04 Thermal comfort</b> (Link to Wst 05 issue:- to preventing increasing risks of overheating) Criterion 6 in the second credit of the Hea 04 issue has been achieved.</p> <p><b>Ene 01 Reduction of energy use and carbon emissions</b> (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.</p> <p><b>Ene 04 Low carbon design</b> (Link to Wst 05 issue: to maximise opportunities to avoid unnecessary carbon emissions) The Passive design analysis credit in this issue has been achieved.</p> <p><b>Wat 01 Water consumption</b> (Link to Wst 05: to minimise water demands in periods of drought) A minimum of three credits in this issue have been achieved.</p> <p><b>Mat 05 Designing for durability and resilience</b> (Link to Wst 05 issue: to avoid increased risks of deterioration and higher maintenance demands)</p>	Credit not targeted

	<p>Criterion 2 relating to material degradation in this issue has been achieved.</p> <p><b>Pol 03 Surface water run-off</b>          (Link to Wst 05: 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.</p>	
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<b>AI: Approved Innovation</b>		
<b>Targeted: 0 of 1</b>		
<b>Credit 1</b> - 1 credit where;		
Requirement 2	One innovation credit can be awarded for each innovation approved by BRE Global, where the building complies with the criteria defined within an Approved Innovation application form.	Credit not targeted

## 7.0 CONCLUSION

- 7.1 This BREEAM pre-assessment report has set out a pathway to achieve a 'Very Good' rating for the arena building at Swansea Central that is being constructed to a fully fitted specification.
- 7.2 The report highlights the development's sustainability credentials and environmental performance through compliance with BREEAM standards. The resulting pre-assessment BREEAM score that is likely to be achieved is 60.61%, equivalent to a 'Very Good' rating.
- 7.3 Following this pre-assessment report, a BREEAM Design Stage and eventually Post Construction Stage assessment should be undertaken to gain full BREEAM certification. The current strategy achieves a score with a 5.61% buffer score over the 55% benchmark requirement for a 'Very Good' rating. As the assessment progresses this therefore allows for potential changes to the strategy to account for variation in the scheme design.