Certification Tools for Green Building
BREEAM International New Construction 2013

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Easlár, BRE Associate
What is BREEAM?

Building Research Establishment Environmental Assessment Method

• World’s leading and most widely used environmental assessment method for buildings

• The BREEAM rating benchmark levels enable a client or other stakeholder to compare an individual building’s performance with other BREEAM rated buildings and the typical sustainability performance of new or major refurbished non-domestic buildings in the UK

• 4 key aims:
  1. To mitigate the life cycle impacts of buildings on the environment
  2. To enable buildings to be recognised according to their environmental benefits
  3. To provide a credible, environmental label for buildings
  4. To stimulate demand for sustainable buildings
BREEAM as a Requirement - UK & Northern Ireland

A number of key bodies have implement BREEAM as a requirement, including:

**Many Local Authorities throughout the UK**
Incorporate BREEAM standards as part of supplementary planning guidance

**Scottish Government Health Directorates**
All New build NHS buildings to achieve a minimum ‘Excellent’ BREEAM rating and refurbishments a ‘Very Good’

**Scottish Funding Council**
All New build Education buildings to achieve a minimum ‘Excellent’ BREEAM rating and refurbishments a ‘Very Good’ and Post Occupancy Evaluation mandatory

**Welsh Assembly Government**
Welsh Planning Policy requires that planning applications are required to meet BREEAM 'Very Good' standard and achieve the mandatory credits for 'Excellent' under issue Ene1 - Reduction of CO₂ Emissions

**Central Government**
DEFRA – through the Government Buying Standards requires all buildings on the Government Estate to achieve a minimum BREEAM rating of ‘Excellent’ for new builds a minimum BREEAM rating of ‘Very Good’ for all major refurbishments

**Northern Ireland Executive**
Ensure that all new or refurbished buildings occupied by Departments undergo BREEAM assessment (or CEEQUAL equivalent) and meet at least 'Very Good' standard
BREEAM Activity in Ireland

A number of Projects have achieved BREEAM ratings or are working towards them in Ireland:

- **Prisons** - Irish Prison Service have developed their own version of the standard for all new build and major refurbishment projects. Midlands Prison completed interim assessment.
- **Universities** - University College Dublin, University of Limerick, and DiT Grangegorman using BREEAM on new build projects
- **Commercial Office Buildings** - RDS Simmons court, Grand Canal Square Offices
- **Hospitals** - Mater Hospital, National Forensic Mental Health Service Hospital
- **Council Offices** - Roscommon Decentralised Offices, Dept of Education Offices, Athlone
- **Industrial/Multinationals** - Danone, Diageo, Apple, Flavour Manufacturing Wexford
- **Utilities** - Bord Gais Network Services, ESB HQ Dublin
BREEAM International

- Banner under which all BREEAM assessments outside the UK are undertaken

Includes:
- Regional standard Schemes
- ‘One off’ tailored assessments
- Country specific schemes
Life cycle stages of BREEAM

- Communities
- New Construction
- Demolition
- In-Use
- Refurb.
# Whole Life Assessment

<table>
<thead>
<tr>
<th>Inception</th>
<th>Outline Design</th>
<th>Detailed Design</th>
<th>Construction</th>
<th>Occupation</th>
<th>Refurbishment</th>
<th>Occupation</th>
<th>End of Life</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BREEAM Communities</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>BREEAM Pre-Assessment Tool</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>BREEAM Refurbishment</strong></td>
<td></td>
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<tr>
<td><strong>BREEAM New Build</strong></td>
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<td></td>
<td><strong>BREEAM Refurbishment</strong></td>
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<td></td>
<td><strong>BREEAM In-Use</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
200,000 buildings now have certified BREEAM assessment ratings and over a million registered for assessment since it was first launched in 1990.

See: [www.greenbooklive.com](http://www.greenbooklive.com) for list of all certified buildings
BREEAM in Ireland

Greenbooklive - http://www.greenbooklive.com
BREEAM in Ireland

• 18 Licensed Assessor Companies
• 7 BREEAM APs
• 12 Certified BREEAM Projects (post 2008)
• First BREEAM Outstanding Building - Diageo Project Phoenix Brewhouse
• 5 BREEAM Excellent Buildings, 3 Very Good, 2 Good
• 1 BREEAM In Use (Very Good Rating)
BREEAM Process

5 Key Steps:

Project Registration

Pre-assessment Estimator

Design Stage Assessment *(Certified)*

Post Construction Stage *(Certified)*

BREEAM In-use (additional to standard assessment)
# BREEAM Key Steps

<table>
<thead>
<tr>
<th>RIBA Outline Plan of Work</th>
<th>BREEAM / Code building certification</th>
<th>Stages of BREEAM communities certification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>pre-agreement</strong></td>
<td>PRE</td>
<td>Pre-agreement</td>
</tr>
<tr>
<td><strong>preparation</strong></td>
<td>A</td>
<td>Appraisal</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>Design Brief</td>
</tr>
<tr>
<td><strong>design</strong></td>
<td>C</td>
<td>Concept</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>Design Development</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Technical Design</td>
</tr>
<tr>
<td><strong>pre-construction</strong></td>
<td>F</td>
<td>Production Information</td>
</tr>
<tr>
<td></td>
<td>G</td>
<td>Tender Documentation</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>Tender Action</td>
</tr>
<tr>
<td><strong>construction</strong></td>
<td>J</td>
<td>Mobilisation</td>
</tr>
<tr>
<td></td>
<td>K</td>
<td><strong>Construction to Practical Completion</strong></td>
</tr>
<tr>
<td></td>
<td>L1</td>
<td>After Practical Completion</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td><strong>Initial Occupation Period</strong></td>
</tr>
<tr>
<td></td>
<td>L3</td>
<td>Post Occupation Evaluation</td>
</tr>
</tbody>
</table>
Categories assessed within BREEAM
<table>
<thead>
<tr>
<th>BREEAM Category</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>12%</td>
</tr>
<tr>
<td>Health and Wellbeing</td>
<td>15%</td>
</tr>
<tr>
<td>Energy</td>
<td>19%</td>
</tr>
<tr>
<td>Transport</td>
<td>8%</td>
</tr>
<tr>
<td>Water</td>
<td>6%</td>
</tr>
<tr>
<td>Materials</td>
<td>12.5%</td>
</tr>
<tr>
<td>Waste</td>
<td>7.5%</td>
</tr>
<tr>
<td>Land Use and Ecology</td>
<td>10%</td>
</tr>
<tr>
<td>Pollution</td>
<td>10%</td>
</tr>
<tr>
<td>Innovation</td>
<td>+10%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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</table>
BREEAM Scoring

<table>
<thead>
<tr>
<th>BREEAM Rating</th>
<th>% Score</th>
</tr>
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<tbody>
<tr>
<td>Outstanding</td>
<td>85%</td>
</tr>
<tr>
<td>Excellent</td>
<td>70%</td>
</tr>
<tr>
<td>Very Good</td>
<td>55%</td>
</tr>
<tr>
<td>Good</td>
<td>45%</td>
</tr>
<tr>
<td>Pass</td>
<td>30%</td>
</tr>
<tr>
<td>Unclassified</td>
<td>&lt;30%</td>
</tr>
</tbody>
</table>

- In addition to achieving the required score, ‘minimum standards’ must also be achieved for certification
## Minimum Standards – mandatory credits

<table>
<thead>
<tr>
<th>BREEAM issue</th>
<th>PASS</th>
<th>GOOD</th>
<th>VERY GOOD</th>
<th>EXCELLENT</th>
<th>OUTSTANDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man 01: Sustainable procurement</td>
<td>One credit</td>
<td>One credit</td>
<td>One credit</td>
<td>One credit</td>
<td>Two credits</td>
</tr>
<tr>
<td>Man 02: Responsible construction practices</td>
<td></td>
<td></td>
<td></td>
<td>One credit</td>
<td>Two credits</td>
</tr>
<tr>
<td>Man 04a: Stakeholder participation</td>
<td>One credit (Building user information)</td>
<td>One credit (Building user information)</td>
<td>One credit (Building user information)</td>
<td>One credit (Building user information)</td>
<td></td>
</tr>
<tr>
<td>Man 04b: Stakeholder participation</td>
<td>One credit (Building user information)</td>
<td>One credit (Building user information)</td>
<td>One credit (Building user information)</td>
<td>Three credits (Building user information and Adaptable design)</td>
<td></td>
</tr>
<tr>
<td>Hea 01: Visual comfort</td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
</tr>
<tr>
<td>Hea 02: Indoor air quality</td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
</tr>
<tr>
<td>Hea 04: Water quality</td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
</tr>
<tr>
<td>Hea 08: Private space</td>
<td>None</td>
<td></td>
<td></td>
<td>One credit</td>
<td></td>
</tr>
<tr>
<td>Ene 01: Reduction of CO₂ emissions</td>
<td></td>
<td></td>
<td></td>
<td>Six credits</td>
<td>Ten credits</td>
</tr>
<tr>
<td>Ene 02a: Energy monitoring</td>
<td></td>
<td></td>
<td>One credit</td>
<td>One credit</td>
<td>One credit</td>
</tr>
<tr>
<td></td>
<td>(First sub-metering credit)</td>
<td>(First sub-metering credit)</td>
<td>(First sub-metering credit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ene 04: Low or zero carbon technologies</td>
<td></td>
<td></td>
<td></td>
<td>One credit</td>
<td>One credit</td>
</tr>
<tr>
<td>Wat 01: Water consumption</td>
<td></td>
<td></td>
<td>One credit</td>
<td>One credit</td>
<td>Two credits</td>
</tr>
<tr>
<td>Wat 02: Water monitoring</td>
<td></td>
<td></td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
<td>Criterion 1 only</td>
</tr>
<tr>
<td>Mat 03: Responsible Sourcing</td>
<td></td>
<td></td>
<td></td>
<td>Criterion 1 only</td>
<td></td>
</tr>
<tr>
<td>Wst 01: Construction waste management</td>
<td></td>
<td></td>
<td></td>
<td>One credit</td>
<td></td>
</tr>
<tr>
<td>Wst 03a&amp;b: Operational waste</td>
<td></td>
<td></td>
<td></td>
<td>One credit</td>
<td>One credit</td>
</tr>
</tbody>
</table>
Overview of Categories and Credits

- Energy
- Health and wellbeing
- Management
- Water
- Materials
- Pollution
- Waste
- Transport
- Land use & ecology
Management

Man 01 – Sustainable Procurement 9 credits are available

Project brief and design 1 credit
Inclusion of whole team from RIBA stage B - Client/Building occupier/Design team/Contractor
Training for Occupant/Building Manager

BREEAM AP Involvement 3 credits
RIBA Stages B to E and F to L

Commissioning and handover 3 credits
• Thermographic survey
• Initial commissioning

Aftercare 2 credits
• Seasonal commissioning
• Energy and water monitoring
Management Credits

Man 02 - Responsible construction practices

2 credits where the construction site is managed in an environmentally and socially considerate, responsible and accountable manner

One credit
Where the principal contractor achieves six items in each of the four sections within Checklist A1

Two credits
Where the principal contractor achieves all items in each of the four sections within Checklist A1 AND the contractor’s performance has been confirmed by independent assessment and verification.

Man 03 - Construction site impacts

5 credits where the principal contractor is committed to monitoring and reporting on site activities including energy and water use, material sourcing and any Environmental Management Systems that are operational.
Management Credits cont.

Man 04 - Stakeholder participation
4 credits where the project team design, plan and deliver accessible functional and inclusive buildings in consultation with current and future building users and other stakeholders, in the following areas:

1 credit – Consultation

1 credit - Inclusive and accessible design

1 credit - Building user information

1 credit - Post Occupancy Evaluation (POE) and information dissemination
Man 05 - Life cycle cost and service life planning

1 credit where a Life Cycle Cost (LCC) analysis has been carried out based on the proposals developed during RIBA Work Stages C/D (concept design/design development)

1 credit where the analysis demonstrates that elements in at least two of the following building components have been analysed at a strategic and system level, comparing alternative options:

a. Envelope: e.g. cladding, windows, and/or roofing
b. Services: e.g. heat source cooling source, and/or controls
c. Finishes: e.g. walls, floors and/or ceilings
d. External spaces

1 credit where the model outlined in the first LCC credit is updated during RIBA Work Stages D/E (design development/technical design) AND a maintenance strategy has been developed, informed by the LCC analysis and includes:

a. The extent to which maintenance has been designed out and how systems have been included in the specification to facilitate safe, efficient and cost-effective operation and maintenance.
b. How the removal and replacement of major plant and equipment, within the design life of the building, has been facilitated by the building design and specification (lay-out/access etc.).
c. A management plan for the landscaping, if appropriate.
2_Health and Wellbeing

Hea 01 - Visual comfort

**Pre-requisite** - All fluorescent and compact fluorescent lamps are fitted with high frequency ballasts.

- lighting in buildings accounts for 20% to 40% of total energy costs, it also has an impact on the health and wellbeing of building occupants

**2 credits Daylighting Levels**
Where best practice in Daylighting levels have been achieved.

**1 credit Glare Control and View Out**
Where the potential for disabling glare has been designed out of all relevant building areas either through building layout (e.g. low eaves) and/or building design (e.g. Blinds) and where all positions within relevant building areas are within Xm of a wall which has a window or permanent opening that provides an adequate view out

**1 credit Internal and external lighting levels and zoning** (for relevant areas in non residential buildings)
Specific lux levels have been achieved for different areas in accordance with CIBSE and lighting controls and zones are appropriate for building users.
Hea 02 & Hea 03 Health and Wellbeing

Hea 02 - Indoor air quality

**Pre-requisite** - Materials containing asbestos are prohibited from being specified and used within the building

1 credit where an indoor air quality plan has been produced and ventilation design takes into account sources of pollution

2 credits where paints, products and finishes are specified in accordance with relevant standards for emission levels for VOCs

- *Exposure to high VOC emissions can negatively impact on the health of occupants, particularly those with respiratory problems*

1 credit where the occupied spaces of the building are designed to be capable of providing fresh air entirely via a natural ventilation strategy

Hea 03 Thermal comfort

1 credit where modelling demonstrates that the building design and services strategy can deliver thermal comfort levels in occupied spaces in accordance with the criteria set out in ISO 7730:2005

1 credit where it can be shown that thermal modelling analysis has informed the temperature control strategy for the building and its users

- *for every degree over 27oC there can be a significant reduction in occupant performance*
Hea 04 Water Quality

Hea 04 - Water quality

This requirement is mandatory

1. To avoid legionella, all water systems in the building are designed in compliance with the measures outlined in the Health and Safety Executive’s “Legionnaires' disease - The control of legionella bacteria in water systems”, Approved Code of Practice and Guidance, 2000 and, where relevant, other industry/sector best practice guidance.

1 credit where the risk of water contamination in building services is minimised through design and clean, fresh sources of water have been provided for building users.
Hea 05

Hea 05 - Acoustic performance

Pre-requisite - A suitably qualified acoustician (see Relevant definitions) is appointed by the client at the appropriate stage in the procurement process (but no later than completion of outline design)

2 credits where the buildings’ acoustic performance including sound insulation meet the appropriate standards for its purpose

- Ensuring internal environments and specialist areas achieve optimum performance
Hea 06 & Hea 07 Health and Wellbeing

Hea 06 - Safe Access

1 credit where measures that promote low risk, safe and secure access to and use of the building have been implemented. Includes:

- Footpaths
- Cycle Paths
- Vehicle Delivery Access

Hea 07 - Natural Hazards (Probably not applicable in Ireland)

1 credit where steps have been taken to reduce or negate the impact of a natural hazard on the building.

- Floods (addressed in Pol 03 Surface water run-off)
- Natural disasters of geological origin such as volcanic eruptions, earthquakes and landslides
- Natural disasters of climatic or meteorological origin such as droughts, avalanches, wave surges including tsunamis and tidal waves, and wind storms including cyclones, hurricanes, tornadoes, tropical storms, and typhoons
- Wildfires.
Ene 01 Energy

Ene 01 - Reduction of CO2 emissions

15 credits where the building is buildings designed to minimise operational energy demand, consumption and CO2 emissions

- Based on the BER produced for Irish Building Regulations
- Up to 15 credits available
- LEED Equivalency Available for Ene 01
- Use BREEAM Calculator to Calculate Percentage Improvement over Building Regulations
- Calculation based on
  - Operational Energy Demand
  - Primary Energy Demand
  - CO2 Emissions from Fuel Source

Mandatory -
- 6 credits for Excellent Rating
- 10 credits for Outstanding Rating
Ene 02 – Energy Monitoring

Two credits Available
1. The following major energy consuming systems (where present) are monitored using either a Building Energy Management System (BEMS) or separate accessible energy sub-meters with a pulsed output:

- Space Heating
- Domestic Hot Water
- Humidification
- Cooling
- Fans (major)
- Lighting
- Small Power
- Other major energy consuming items where Appropriate
- Tenanted areas or floor by floor
Ene 03 Energy

Ene 03 - External lighting

1 credit where energy-efficient light fittings for external areas have been specified
Ene 04 – Low or Zero Carbon Technologies

1 credit

1. A feasibility study has been carried out by an energy specialist to establish the most appropriate local low or zero carbon (LZC) energy source for the building/development. This includes:

a. Energy generated from LZC energy source per year
b. Life cycle cost of the potential specification, accounting for payback
c. Local planning criteria, including land use and noise
d. Feasibility of exporting heat/electricity from the system
e. Any available grants
f. All technologies appropriate to the site and energy demand of the development.
g. Reasons for excluding other technologies.
h. Where appropriate to the building type, connecting the proposed building to an existing local community CHP system or source of waste heat or power

2. A local LZC energy technology has been specified for the building/development in line with the recommendations of the above feasibility study.

3. The feasibility study has been carried out at RIBA stage C (concept design) or equivalent procurement stage.

1 credit

The feasibility study includes a Life Cycle Assessment (LCA) of the carbon impact of the chosen LZC system(s), accounting for its embodied carbon emissions and operational carbon savings and emissions. The LCA study must be completed in accordance with ISO 14044:2006.
Ene 05 & Ene 06

Ene 05 - Energy efficient cold storage
3 credits for the specification of energy efficient refrigeration systems, therefore reducing operational greenhouse gas emissions resulting from the system's energy use

Ene 06 - Energy efficient transportation systems
2 credits for the specification of energy-efficient transportation systems
Ene 07 & Ene 08 Energy

Ene 07 - Energy efficient laboratory systems
2 credits where laboratory areas that are designed to minimise the CO2 emissions associated with their operational energy consumption.

Ene 08 - Energy efficient equipment
2 credits based on the procurement of energy-efficient equipment to ensure optimum performance and energy savings in operation.
Transport

Tra 01 - Public transport accessibility

Between 2 - 5 credits available when the building is in proximity of good public transport networks, thereby helping to reduce transport-related pollution and congestion.

Tra 02 - Proximity to amenities

2 credits awarded where the building is located within close proximity and accessible to amenities including:
- Food shop/outlet
- Postal facilities/post box
- Cash machine/bank
- Pharmacy
- Creche/school
- Medical centre
- Leisure/sports centre
- Outdoor open public access area
- Community centre
- Place of worship

Tra 03 - Alternative Modes of Transport

2 credits for implementing one of the following:
- Upgrades to Cycle Network
- Improvements in Local Bus Services
- Compliant Cycle Storage Facilities
- Electric Re-charging stations for Electric Vehicles
- Setting up a Car Sharing Platform
Transport

Tra 04 - Maximum car parking capacity

1 credit where 1 parking space is provided for appropriate number of building users

2 credits where less parking is provided than for first credit

Benchmarks can be found under Tra 04 in BREEAM Manual

Tra 05 - Travel plan

1 credit where a travel plan has been developed as part of the feasibility and design stages
5_Water

Wat 01 - Water consumption
5 credits based on the level of efficiency of the building’s domestic water consuming components, for the following:
• 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/industrial sized)

Wat 02 - Water monitoring
1 credit where a water meter has been specified on the mains water supply to each building
(Mandatory for all ratings above Good)
Wat 01 – Water Consumption

5 credits are available, 1 credit is mandatory

Credits are awarded on the basis of specifying sanitary products with a lower than ‘standard’ level of water consumption:

<table>
<thead>
<tr>
<th>Component</th>
<th>Baseline Specification</th>
<th>% improvement*</th>
<th>Credits awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toilet</td>
<td>6 litre flush</td>
<td>12.5</td>
<td>1</td>
</tr>
<tr>
<td>Wash hand basin taps</td>
<td>12 litres per minute</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>Showers</td>
<td>14 litres per minute</td>
<td>40</td>
<td>3</td>
</tr>
<tr>
<td>Urinals</td>
<td>7.5 litres per hour</td>
<td>50</td>
<td>4</td>
</tr>
<tr>
<td>Kitchen tap</td>
<td>12 litres per minute</td>
<td>55</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>65</td>
<td>Innovation</td>
</tr>
</tbody>
</table>

*Rainwater harvesting can be used to offset the consumption.
Wat 02 – Water Monitoring

This credit is mandatory (1 credit)

The specification of a **pulsed output water meter** on the mains water supply to each building to ensure water consumption can be monitored and managed and therefore encourage reductions in water consumption.
5_Water

Wat 03 - Water leak detection and prevention

1 credit where 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.

1 credit where a flow control device is fitted to each WC area/facility to ensure water is supplied only when needed (and therefore prevent minor water leaks)

Wat 04 - Water efficient equipment

1 credit where an irrigation method specified for internal or external planting and/or landscaping does not rely on potable water
Not always applicable.
6_Materials

Mat 01 - Life cycle impacts
6 credits where construction materials with a low environmental impact have been specified for the major building elements from the Green Guide to Specification or Other Life Cycle Assessment Tool:
http://www.bre.co.uk/greenguide

Mat 03 - Responsible sourcing of materials
3 credits where responsibly sourced materials for key building elements have been specified.

Mat 04 – Insulation
1 credit where thermal insulation which has a low embodied environmental impact has been specified and where the insulation has been responsibly sourced
Mat 03 – Responsible Sourcing of Materials

3 credits available, 1 credit is mandatory

The following elements must be ‘responsibly sourced’:

- Structural Frame
- Ground floor
- Upper floors (including separating floors)
- Roof
- External walls
- Internal walls
- Foundation/substructure
- Fittings
- Hard landscaping

Responsibly Sourced can include:
- ISO 14001 certification
- FSC certification (timber)
- BES 6001
- Equivalent EMS

<table>
<thead>
<tr>
<th>Material</th>
<th>% of element</th>
<th>Supplier</th>
<th>Responsibly Sourced?</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Walls</td>
<td>Brick</td>
<td>Dave's Bricks</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Steel</td>
<td>Steve's Steel</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Timber</td>
<td>Tam's Timber</td>
<td>Y</td>
</tr>
<tr>
<td>Plasterboard</td>
<td>5%</td>
<td>-</td>
<td>N</td>
</tr>
</tbody>
</table>
6_Materials

Mat 05 - Designing for robustness
1 credit where vulnerable areas of the building have been identified (both internal and external) where vehicular, trolley and pedestrian movement occur AND
the design incorporates suitable durability and protection measures or design features/solutions to prevent damage to the vulnerable areas.
7_Waste

Wst 01 - Construction waste management
3 credits where a Site Waste Management Plan is developed and specifies a series of targets for waste generation and diversion from landfill.

Wst 02 - Recycled aggregates
1 credit where the total amount of recycled and/or secondary aggregate specified is greater than 25% of the total high-grade aggregate specified for the development.

Wst 03 - Operational waste
1 credit where there is dedicated space to cater for the segregation and storage of operational recyclable waste volumes generated by the assessed building/unit, its occupant(s) and activities.

Wst 04 - Speculative floor and ceiling finishes (Offices Only)
1 credit where either:

a. For tenanted areas (where the future occupant is not known), prior to full fit-out works, carpets, other floor finishes and ceiling finishes have been installed in a show area only.

b. In a building developed for a specific occupant, that occupant has selected (or agreed to) the specified floor and ceiling finishes.
8_Land Use and Ecology

LE 01 – Site Investigation
1 credit where at least 75% of the proposed footprint is on land which has previously been developed on in the last 50 years
2 credits where at least 90% of the proposed footprint is on land which has previously been developed in the last 50 years
1 credit where the site is deemed to be significantly contaminated

LE 02 - Ecological value of site and protection of ecological features
1 credit where land within the construction zone is defined as ‘land of low ecological value’
1 credit where all existing features of ecological value surrounding the construction zone and site boundary area (i.e. those likely to be affected by the works) are adequately protected from damage
8_Land Use and Ecology

**LE 04 - Enhancing site ecology**

1 credit where a suitably qualified ecologist (SQE) has been appointed (at the design brief stage) to report on enhancing and protecting the ecology of the site.

2 credits where at least 50% of the recommendations within the ecology report for enhancement of site ecology have been, or will be, implemented.

3 credits where at least 95% of the recommendations within the ecology report for enhancement of site ecology have been, or will be, implemented.

**LE 05 - Long term impact on biodiversity**

1 credit where a landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion.

2 credits where the principal contractor carries out a number of biodiversity enhancing actions including, nominating a ‘Biodiversity Champion and recording actions taken to protect biodiversity and monitor their effectiveness.**
9_Pollution

Pol 01 – Impact of Refrigerants
4 credits where the building does not require the use of refrigerants within its installed plant/systems OR where refrigerants meet required ODP and GWP levels AND where an appropriate enclosure and leak detection system is installed.

Pol 02 – NOx emissions
3 credits based on the level of NOx emissions from building as follows:
1 credit 100 mg/kWh (space heating & cooling)
2 credits 70 mg/kWh (space heating & cooling)
3 credits ≤40 mg/kWh (space heating & cooling)

Pol 03 – Surface water run off
2 credits where the building is situated in a location consider to be a ‘low risk’ from flooding.
1 credit where the peak rate of run-off from the site to the watercourses is no greater for the developed site than it was for the pre-development site.
1 credit Any additional predicted volume of run-off for the 100 year 6 hour event must be prevented from leaving the site by using infiltration or (SuDS) techniques.
1 credit for the specification of Sustainable Drainage Systems (SUDs) or source control systems such as permeable surfaces or infiltration trenches
9_Pollution

Pol 04 – Reduction of night time pollution

1 credit for ensuring that the external lighting strategy has been designed in compliance with Table 1 of the ILE Guidance notes for the reduction of obtrusive light, 2005

Pol 05 – Noise attenuation

1 credit where the noise level from the proposed site/building is no greater than +5dB during the day (0700hrs to 2300hrs) and +3dB at night (2300hrs to 0700hrs) compared to the back-ground noise level
Innovation Credits

Additional recognition for ‘innovation in the field of sustainable performance’, above and beyond what is currently recognised and rewarded in BREEAM.

**Two ways** of obtaining Innovation Credits:

1. By meeting **exemplary level performance requirements** for an existing BREEAM issue - 10% Bonus Credits Available

   - Man01 Sustainable Procurement
   - Man02 Responsible Construction Practices
   - Hea02 Indoor Air Quality
   - Ene01 Reduction of CO2 Emissions
   - Tra03 Alternative modes of transport
   - Wat01 Water Consumption
   - Mat01 Life Cycle Impacts
   - Mat03 Responsible Sourcing of Materials
   - Wst01 Construction Waste Management
   - Wst02 Recycled Aggregates

   OR

2. Where an **application** is made to BRE Global to have a particular building feature or process recognised as ‘innovative’
BREEAM International
New Construction 2013 Manual

• All schemes are now contained within one manual

• Building type
  – Offices
  – Retail
  – Industrial
  – Dwellings
  – Bespoke

• Geographical region
  – Europe
  – “Outside Europe”

• New construction only

Available to download at www.breeam.org
BREEAM has been developed to meet the following underlying principles:

- Ensure **environmental quality** through an accessible, holistic and balanced measure of environmental impacts
- Use **quantified measures** for determining environmental quality
- Adopt a **flexible approach**, avoiding prescriptive specification and design solutions
- Use **best available science** and **best practice** as the basis for quantifying and calibrating a cost effective performance standard for defining environmental quality
- Reflect the **social and economic benefits** of meeting the environmental objectives covered
- Provide a **common framework** of assessment that is tailored to meet the ‘local’ context including regulation, climate and sector
BREEAM has been developed to meet the following underlying principles:

• **Integrate construction professionals** in the development and operational processes to ensure wide understanding and accessibility

• Adopts **third party certification** to ensure independence, credibility and consistency of the label

• Adopts **existing industry** tools, practices and other standards wherever possible to support developments in policy and technology, build on existing skills and understanding and minimise costs

• **Stakeholder consultation** to inform ongoing development in accordance with the underlying principles and the pace of change in performance standards (accounting for policy, regulation and market capability)
BREEAM ratings can be influenced by:

- Starting early
- Appoint Assessor / Engage a BREEAM AP
- Team effort, including client and contractors
- Plan carefully, assign responsibilities
- Know BREEAM (as much as possible)
- Capitalise on project opportunities
  - Mandatory credits
  - Cost effective credits
  - Consider weighting
  - Innovation / exemplary levels
- Takes time
Assessment Certification Process

Client specifies BREEAM Assessment in project brief

BREEAM Assessor/BREEAM AP appointed by client or design team

Assessor/AP provides design advice and Assessor undertakes design stage stage assessment.

Post Construction BREEAM Assessment carried out by Assessor.

BREEAM Office QA

Interim Certification

Final Certification
Cost of BREEAM

• **Certification Fees**
  – Registration (£700-£1350)
  – Interim QA (£1500-£2300)
  – Final QA (£700-£1350)

• **BREEAM Assessor Fees**
  – Size and Complexity of Project
  – Experience of Design Team
  – Level of Support Required

• **Increased Capital Costs**
  – See reports on Costing Sustainability
Putting a price on sustainability

‘Putting a price on sustainability’ BRE Trust (BRE & Cyril Sweett)

• Covers:
  – Housing
  – Naturally ventilated office
  – Air conditioned office
  – PFI health centre

• Capital cost implications of achieving the different BREEAM / EcoHomes ratings

• Available from BRE bookshop
Putting a price on sustainability – key findings

• Naturally ventilated Office
  – Increase in capital cost for achieving BREEAM Excellent
    • 3.4% increase for ‘typical locations’ i.e. locations where public transport links could be better, the provision of amenities could be improved, there is ecological value on the proposed site
    • 2.5% increase for ‘good locations’ i.e. locations where there are well served public transport nodes, there is a good provision of amenities, there is no ecological value on the proposed site
  – Predicted in-use cost savings for a BREEAM Excellent building
    • Energy 17%
    • Water 71%

Due to the increase in energy prices experts now believe that these estimated savings will have significantly increased
Putting a price on sustainable schools

- **Study undertaken by Faithful and Gould and BRE**
  - Secondary school case study
    - Increase in capital cost for achieving BREEAM Excellent
      - 4.4% increase for ‘poor locations’
      - 3.9% increase for ‘good locations’
    - Although initial capital costs may be higher, purchasing or procuring an energy-efficient building can result in significant cost savings from energy bills. If the mains water consumption is metered, implementing low water use facilities will also have a positive effect on reducing operational expenditure.

  - A number of options for carbon reduction were also investigated, such as increasing insulation levels, reducing infiltration rates, and controlling the lighting to maximise the use of daylight. Carbon emissions were reduced using low-cost fabric and efficiency measures before applying renewable energy technology. Renewable/low-emission energy systems were then applied as a means to reduce further the carbon emissions.
Training - Routes to Qualification

• **BREEAM Assessor**
  
  BREEAM International, Various Locations Worldwide
  
  [http://www.breeam.org/events](http://www.breeam.org/events)
  
  Cost: approx £1900 (BREEAM International Assessor)
  
  Duration: 3 days
  
  Must complete an assessment and exam to be qualified

• **BREEAM AP**
  
  Training Courses mainly run in BRE Watford
  
  Duration: 1 day and approx. 4 days online learning prior
  
  Cost: approx £500

• **BREEAM In Use**
  
  – Client Accreditation
  
  – Auditor Accreditation
Other BREEAM Schemes

• BREEAM Bespoke
• BREEAM Communities
• BREEAM In Use
• BREEAM for Retrofit
• Code for Sustainable Homes or Ecohomes
BREEAM International National Scheme Operators

The following countries have adapted BREEAM for use in their own country. These schemes are operated by National Scheme Operators in each of the following countries:

- Germany
- Netherlands
- Norway
- Spain
- Sweden
- Austria
Case Study - Diageo Project Phoenix - BREEAM Outstanding

- 1st BREEAM Outstanding Building in Ireland
- Final Score - 90.96%
- EPC - Zero Carbon Building (16 credits in Ene 01)
- Innovation credits for Water, Transport, Management, VOCs, CHP
- Highly efficient brewery in operation
- LEED Platinum
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