

TECHNICAL MANUAL

BREEAM[®] NOR

BREEAM-NOR ver. 1.1 (2012)

New Construction

Norsk IPR: Norwegian Green Building Council

Internasjonal IPR: BRE Global



BREEAM[®] NOR

SD 5066A: ISSUE 1.1

BREEAM-NOR ver. 1.1

The BREEAM-NOR Assessor Manual is a technical guidance document which has been created to aid licensed BREEAM Assessors, licensed by BRE to carry out BREEAM-NOR Buildings Assessments.

This NGBC Environmental & Sustainability Standard is the property of the Norwegian Green Building Council, based upon a license from BRE Global Ltd. Pursuant to the Framework Agreement entered into, and is made publicly available for information purposes only. Its use for testing, assessment, certification or approval must be in accordance with NGBC's procedures, approved by BRE Global Ltd., and requires interpretation by NGBC and by NGBC's experts. Any party wishing to use this NGBC Environmental & Sustainability Standard to offer testing, assessment, certification or approval must have undergone examination-related training by NGBC and possess a license; a fee will normally be charged. BRE Global will not unreasonably refuse such applications. NGBC accepts no responsibility for any unauthorised use or distribution by others of this NGBC Environmental & Sustainability Standard and may take legal action to prevent such unauthorised use or distribution.



Contents

<i>Norwegian Green Building Council</i>	6
<i>Terms and conditions for accessing BREEAM Europe scheme manuals</i>	6
1.0 Introduction	8
1.1 <i>What is BREEAM?</i>	8
1.2 <i>Governance and Quality Standards</i>	9
1.3 <i>BREEAM Credibility</i>	10
1.4 <i>The BREEAM Manuals</i>	11
2.0 Scope	16
2.1 <i>Stages of assessment</i>	17
2.2 <i>Type of projects that can be assessed using BREEAM-NOR</i>	18
2.3 <i>Type of buildings that can be assessed using this BREEAM scheme</i>	26
3.0 Scoring and Rating	36
3.1 <i>Rating benchmarks</i>	37
3.2 <i>Environmental section weightings</i>	37
3.3 <i>Minimum standards</i>	38
3.4 <i>BREEAM credits for innovation</i>	40
3.5 <i>How to calculate a building's rating</i>	41
3.6 <i>BREEAM Outstanding Rating</i>	43
4.0 Management	44
5.0 Health and Wellbeing	84
6.0 Energy	134
7.0 Transport	178
8.0 Water	208
9.0 Materials	228
10.0 Waste	254

11.0 Land Use and Ecology	275
12.0 Pollution	297
13.0 Innovation	334
14.0 Technical Checklists	336
14.1 <i>Technical Checklist A2: Man 2 Constructors' Environmental and Social Code of Conduct</i>	336
14.2 <i>Technical Checklist A3: Man 3 Construction Site Impacts</i>	342
14.3 <i>Technical Checklist A4: LE3 Land of Low Ecological Value</i>	350
14.5 <i>Technical Checklist A5: Mat 5 Responsible Sourcing of Materials</i>	351
14.6 <i>Technical Checklist A6: Guidance for relating ecologist's report to BREEAM</i>	358
14.7 <i>Technical Checklist A9: NOx emissions grid electricity</i>	373
14.9 <i>Technical Checklist A15: Site Waste Management Plan</i>	374
14.10 <i>Technical Checklist A16: Contaminated land</i>	377
14.12 <i>Technical Checklist A20: Miljøgiftslisten</i>	381
15.0 References	384

List of Tables

Table 1.1 Summary of BREEAM categories and main issues	12
Table 3.1 BREEAM 2009 rating benchmarks	37
Table 3.2 BREEAM NOR environmental weightings	38
Table 3.3 Minimum BREEAM standards	38
Table 3.4 BREEAM issues with exemplary level criteria	40
Table 3.5 Example BREEAM score and rating calculation	42
Table 5.1 Average daylight factor measured at a height of 0.8 metres according to latitude at the building location	84
Table 5.2 Point daylight factor in office areas according to latitude at the building location	85
Table 5.3 Point daylight factor in common and sales areas according to latitude at the building location	85
Table 5.4 Reflectance for maximum room depths and window head heights	89
Table 5.5 VOC criteria by product type	109
Table 5.6 Seven-point thermal sensation scale	118
Table 6.1 Percentage improvement over the requirements of local Building Regulations	134
Table 6.2 Size of plant for which separate metering would be required	142
Table 7.1 Frequency and distance to public transport requirements for retail developments	179
Table 7.3 Default hours of operation for a typical day	182
Table 8.1 Guideline values for bacteriological monitoring	226
Table 8.2 Guideline values for general system monitoring	226
Table 9.1 Applicable elements to assessment stage	229
Table 9.2 Relevant product groups distributed by building elements in the assessment phase	230
Table 9.3 Responsible Sourcing Tier Levels and Criteria	247
Table 9.4 EMS Criteria	248
Table 11.1 Credits awarded depending on the change in ecological value of site	285
Table 12.1 Refrigerant GWP	300
Table 12.2 Dry NOx emissions level depending on nominal heat input – offices & retail	307
Table 12.3 Dry NOx emissions level depending on nominal heat input - industrial	307
Table 12.4 Recommendations for the uniformity of illuminance	326
Table 12.5 Recommendations for Maximum Luminance (CD/m ²)	326
Table 12.6 Environmental lighting zone	329
Table 13.1 BREEAM issues with exemplary level criteria	334
Table 14.1 Standard road transport fuel conversion factors	348
Table 14.2 Standard road transport fuel conversion factors	348
Table 14.3 Standard Road Transport Fuel Conversion Factors	349
Table 14.4 Freight road mileage conversion factors	349

BREEAM[®] NOR

BREEAM is a registered trademark of BRE (the Building Research Establishment Ltd. Community Trade Mark E5778551). The BREEAM marks, logos and symbols are the Copyright of BRE and are reproduced by permission.

Permission is given to Norwegian Green Building Council accordance authorization as National Scheme Operator of BREEAM-NOR in Norway

BREEAM Norway
Norwegian Green Building Council
Kongensgt 9
N-0153 Oslo
Norway

www.ngbc.no

www.breeam.org

www.breglobal.com

www.bre.co.uk

www.greenbooklive.com

Email: breeaminternational@bre.co.uk

© BRE Global Ltd 2009

The BREEAM name and logo are registered trademarks of the BRE.

Norwegian Green Building Council

NGBC is an independent association for industry leaders in Norwegian construction and real estate. NGBC intends to be a motivator and driving force for the changes that construction and real estate will be making to reduce adverse effects to the environment and human health by disseminating knowledge and tools, and preparing its members and others with respect to future requirements and possibilities. NGBC's purpose is to increase the environmental standard of Norwegian construction by developing BREEAM-NOR in a manner that causes environmentally friendly buildings to be demanded and highly sought after.

NGBC is, with its 120 members (spring 2011), nation-wide and representative for the entire value chain in construction and real estate, including tenants and local societies/towns. A membership list can be found at www.ngbc.no.

BREEAM-NOR ver. 1.0 was developed with input from more than 100 volunteering employees from NGBC's member companies. Five technical working groups have received strategic guidance and advice from the Strategic Advising Group (SAG), which is composed of representatives from the authorities, the research community and the member companies. The working groups have purchased expert consulting as needed. SAG has given the Board of NGBC its recommendation for BREEAM-NOR. BRE Global Ltd's approval of BREEAM-NOR is based upon its adoption by the Board of NGBC.

Terms and conditions for accessing BREEAM Europe scheme manuals

By accessing or using this website www.ngbc.no you agree to these terms and conditions of use.

Personal data protection

NGBC respects the privacy of users entering this site and we recognise the importance of the responsible use of information collected on this site. We will do our best to maintain the accuracy of the personal information you supply to us. You have the right to access and correct your personal information at any time and if you wish to do so please contact us at post@ngbc.no. We will not sell or rent your personally identifiable information to anyone..

Disclaimer

Mention of third party products, services, companies and websites on any BRE website is for informational purposes only and constitutes neither an endorsement nor a recommendation.

Copyright

This manual, and the associated material at NGBC's Web site, may be downloaded and used freely. The information and images contained on our websites are the property of NGBC or BRE Global Ltd, unless explicitly stated to the contrary. They are protected by copyright laws. Material may be downloaded free of charge or printed without requiring specific permission but remains the intellectual property, technical know how and copyrighted material of NGBC. Such material is not to be used in a derogatory manner, in a misleading context or for commercial purposes. If the material is being issued to others, the source including the web address and copyright status must be acknowledged. We may require you to register your details before downloading certain information or documents.

Trade Marks

BREEAM is a registered trademark of BRE (the Building Research Establishment Ltd. Community Trade Mark E5778551). The BREEAM marks, logos and symbols are Copyright of BRE and are reproduced by permission.

1.0 Introduction

1.1 What is BREEAM?

BREEAM is an integrated assessment system for construction and real estate, which documents differences in effects on the environment and human health, and which makes it easier to make the correct choices. BREEAM-NOR is a Norwegian adaptation and is connected with relevant standards and rules in the environmental and energy areas.

BREEAM (Building Research Establishment's Environmental Assessment Method) is the world's leading and most widely used environmental assessment method for buildings, with over 115,000 buildings certified and nearly 700,000 registered. It sets the standard for best practice in sustainable design and has become the de facto measure used to describe a building's environmental performance. Credits are awarded in ten categories according to performance. These credits are then added together to produce a single overall score on a scale of Pass, Good, Very Good, Excellent and Outstanding. The operation of BREEAM is overseen by an independent Sustainability Board, representing a wide cross-section of construction industry stakeholders.

BREEAM-NOR was developed by the Norwegian Green Building Council (NGBC). NGBC operates BREEAM-NOR under a license from BRE Global Ltd, which allows NGBC to issue certificates on behalf of their certified assessors in the classes of Pass, Good, Very Good, Excellent and Outstanding.

Aims of BREEAM:

- To mitigate the impacts of buildings on the environment
- To enable buildings to be recognised according to their environmental benefits
- To provide a credible, environmental label for buildings
- To stimulate demand for sustainable buildings

Objectives of BREEAM:

- To provide market recognition to low environmental impact buildings
- To ensure best environmental practice is incorporated in buildings
- To set criteria and standards surpassing those required by regulations and challenge the market to provide innovative solutions that minimise the environmental impact of buildings

- To raise the awareness of owners, occupants, designers and operators of the benefits of buildings with a reduced impact on the environment
- To allow organisations to demonstrate progress towards corporate environmental objectives

1.2 Governance and Quality Standards

BRE Global Ltd has authorized NGBC as National Scheme Operator of BREEAM-NOR.

Board of NGBC decides and supervises the use of BREEAM-NOR and associated manuals, publications, standards and certification, within mandate given in Framework Agreement, by BRE Global Ltd. The Board is elected by NGBCs annual meeting.

The Board has given the mandate to Strategic Advisory Group and Education Group to ensure and advice relevant and targeted development and use of BREEAM-NOR. NGBC has made use of its members' professional experience and expertise, supplemented by best knowledge and expertise, in the development of BREEAM-NOR. NGBC has paid special attention to balance the BREEAM-NOR in relation to the diversity and different interests in Norwegian Real Estate and Construction sector, and work closely with the Norwegian authorities, NGOs and emphasizes within the purpose.

The board and SRG represents a broad cross section of stakeholders from the construction industry, designers, developers, end users, research and government.

NGBC educate and authorizes Accredited Professional (AP) as an internal project support to make solutions and changes to improve design to achieve cost-effective solutions in line with BREEAM-NOR. BREEAM-NOR AP is assumed to have experience of competence, and will have a special understanding and knowledge of interdisciplinary collaboration, and optimized timeline for project development. BREEAM-NOR AP in Norway has been developed in accordance to similar BREEAM-schemes in UK. The use of AP can provide up to 3 credits.

Certification by BREEAM-NOR will be done by a qualified auditor (Assessor), - trained, certified and licensed by NGBC. The user of BREEAM-NOR has to engage BREEAM-NOR Assessor to get 3.de part approval. The Assessor may be consulted, but cannot have any tasks in the project / property. This implies that the Assessor cannot be employed by the building owner.

The assessor report and classification done by Assessor will be quality assured (QA) by BRE, on behalf of NGBC. BRE are issuing rating certificates upon successful completion of QA

1.3 BREEAM Credibility

Technical Credibility

BREEAM has been tried and tested since 1990, both in terms of its robust technical standards and its commercial delivery, and expert advice (based on scientific evidence) continues to inform almost every issue in BREEAM.

In the UK there are over 115,000 buildings certified and over 700,000 homes and buildings currently registered for assessment. BREEAM can be used to assess any building type anywhere in the world.

Robust Technical Standards

BREEAM has always used objective criteria to recognise good environmental performance:

- Issues for assessment are agreed to be significant, and offer worthwhile reductions in environmental impact
- Issues must be assessable at the relevant stage in the building's life
- Performance levels are based on scientific evidence wherever possible
- Performance levels must exceed demands of law and regulations and encourage innovation
- Improvements encouraged by BREEAM are achievable and cost effective

Where specific targets cannot be set using hard science or research, sensible practical measures are recommended to minimise environmental impact or enhance the environment of the building and its users.

Commercial Credibility

Assessments are undertaken by organisations and individuals trained and licensed by NGBC pursuant to a license from BRE Global Ltd.. This ensures:

- Competition in the market for assessment services
- Engagement with the whole of the industry
- Design and auditing will be done accordance to the same quality standards throughout the hole value chain. Certification will be issued by NGBC, under license from BRE Global Ltd

BRE Global has gained UKAS (United Kingdom Accreditation Service) accreditation for all its BREEAM schemes. This means that its management of BREEAM is monitored and overseen by UKAS.

1.4 The BREEAM Manuals

BREEAM-NOR

The BREEAM-NOR assessment tool is based upon a so-called “Credit List” (point list). NGBC has developed such a list based upon BREEAM Europe Commercial 2009 and BREEAM Education 2008. NGBC’s list is based upon Norwegian rules and standards, and Norwegian practices. The list is specified in “Handbook for Environmentally Correct Construction”.

The points that can be attained will vary with the type of building (retailing, office, industry and education). Users must establish the project type and building category in the correct manner for all parts of the construction.

Version 1.0 has been developed by 5 technical working groups, approved by the Strategic Advising Group, adopted by the Board of NGBC and authorised by BRE Global.

What is in the BREEAM Manuals?

A definition of the scope of each BREEAM scheme

Full information on the technical standards and criteria of each BREEAM scheme (summarised below)

Rating & scoring information

Technical checklists

Country appendix sheets with further information and guidance specific to each country are provided in a separate document.

Understanding the BREEAM Manuals

A BREEAM standard covers ten categories of sustainability including:

- Management
- Health & Wellbeing
- Energy
- Transport
- Water
- Materials
- Waste
- Land Use and Ecology
- Pollution
- Innovation

Each category is detailed in this technical manual and consists of a number of issues (summarised below) with specified purposes. Each issue seeks to mitigate the impact of a new or refurbished building on the environment by defining a performance target and assessment criteria that must be met to confirm the target has been achieved. The criteria specify the performance target(s) that the solutions must satisfy, relevant to the purpose. Where a performance target has been achieved the number of available BREEAM credits can be awarded.

Table 1.1 Summary of BREEAM categories and main issues

Management <ul style="list-style-type: none"> • Commissioning • Construction site impacts • Building User Guide 	Waste <ul style="list-style-type: none"> • Construction waste • Recycled aggregates • Recycling facilities
Health and Wellbeing <ul style="list-style-type: none"> • Daylight • Occupant thermal comfort • Acoustics • Indoor air and water quality • Lighting 	Pollution <ul style="list-style-type: none"> • Refrigerant use and leakage • Flood risk • NO_x emissions • Watercourse pollution • External light and noise pollution
Energy <ul style="list-style-type: none"> • CO₂ emissions • Low or zero carbon technologies • Energy sub metering • Energy efficient building systems 	Land Use and Ecology <ul style="list-style-type: none"> • Site selection • Protection of ecological features • Mitigation/enhancement of ecological value
Transport <ul style="list-style-type: none"> • Public transport network connectivity • Pedestrian and Cyclist facilities • Access to amenities • Travel plans and information 	Materials <ul style="list-style-type: none"> • Embodied life cycle impact of materials • Materials re-use • Responsible sourcing • Robustness
Water <ul style="list-style-type: none"> • Water consumption • Leak detection • Water re-use and recycling 	Innovation <ul style="list-style-type: none"> • Exemplary performance levels • Use of BREEAM Accredited Professionals

The performance targets go beyond and support the minimum standard needed to satisfy Building Regulation or other legislation. The targets represent good or best practice in the field of sustainable design and procurement.

The BREEAM issues are tradable, meaning that a tenant, user, developer or design team/client can pick and choose which to require and/or comply with in order to build their BREEAM performance score. Several BREEAM issues do have minimum standards meaning that, to achieve a particular BREEAM rating, a defined number of credits for that issue must be achieved or specified performance requirements met (BREEAM's minimum standards are outlined in section 3.0).

Each BREEAM issue is structured as follows:

- **Issue Information:** Issue ID, issue title, number of credits available for meeting the performance target and whether the issue forms part of BREEAM's minimum standards.
- **Aim:** Broadly outlines the objective of the issue i.e. the impact it intends to mitigate
- **Assessment Criteria:** outlines the building performance target/benchmark and its criteria. Some issues have *Exemplary Level Criteria*. Where a building demonstrates that it meets *Exemplary Level Criteria* an Innovation Credit can be awarded (refer to section 13 *Innovation* for more detail)
- **Schedule of Evidence Required:** outlines typical examples of the type of information that must be collected from the design team/client by the BREEAM assessor so they can assess if the building complies with the issue criteria.
- **Additional Information:** details relevant definitions of BREEAM terminology and contains information to support the assessment and compliance of the building.

The following pages contain an example BREEAM issue.

Example of a BREEAM Issue

Please note: this BREEAM issue has been edited for the purpose of demonstration.

This box indicates the total number of BREEAM credits available for each scheme. These credits can be awarded if the assessed building complies with the assessment

Information box appears at the top of each BREEAM issue. Each issue has a unique ID and title.

This box states whether or not minimum standards apply to the BREEAM issue. Section 3.3 of the guidance details the specific minimum standards for each relevant BREEAM issue. For example one of the two available credits for the Man 2 issue must be achieved to obtain an Excellent BREEAM rating.

No. of credits available			Issue Title	Minimum Standards				
Ret	Off	Ind		P	G	VG	E	O
3	3	2	Pol 4 - NO _x emissions from heating source	-	-	-	-	-

The Aim describes the objective of the issue and the impact that the Assessment Criteria seeks to mitigate.

Aim

To encourage the supply of heat from a system that minimises NO_x emissions, and therefore reduces pollution of the local environment.

Assessment Criteria

The following demonstrates compliance:

- Where manufacturer's details demonstrate that the plant installed to meet the building's space heating demand has dry NO_x emission levels at 0% excess O₂ as follows:

Credits	Nominal heat input < 70kW		Nominal heat input > 70kW	
	Dry NO _x level (mg/kWh)	Boiler class (EN 297:1994)	Dry NO _x level (mg/kWh)	Boiler class (EN 676:2003)
1	100	4	120	2
2	70	5	80	3
3	40	-	50	-

The emissions should be estimated under normal operating conditions (not standby).

Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue.

An exemplary credit can be awarded where manufacturer's details demonstrate that the plant installed to meet the building's space heating demand has zero dry NO_x emission levels at 0% excess O₂.

Some BREEAM issues have *Exemplary Level Criteria*. If the assessed building complies with the *Exemplary Level Criteria* an additional BREEAM credit can be awarded for innovation. See section 13 *Innovation*

Compliance Notes

New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	If the heating demand for the refurbished building is being met by an existing system, then the NO _x emission level for the existing system must be assessed against the criteria of this issue.
Extensions to existing buildings	The rule above for refurbishment projects also applies to new build extensions to existing buildings.

The *Assessment Criteria* details the requirements that the assessed building must demonstrate compliance with for the available BREEAM credits to be awarded.

Occasionally international or national publications and standards will be referred to within the *Assessment Criteria* followed by a reference number or a link to a compliance note. Further references to the international publications are provided in section 16 of this document and references to the national standards are provided in the relevant country appendix sheet.

Each BREEAM issue contains a *Compliance Notes* table. This table provides additional guidance on the application and interpretation of the *Assessment Criteria*.

The *Schedule of Evidence Required* table describes the types of information that must be provided to the BREEAM assessor as evidence of the assessed building's compliance with the *Assessment Criteria*.

The *Schedule of Evidence* table is split in to two sections. The first details the type(s) of evidence required at the interim design stage of assessment. The second describes the type(s) of evidence required at the final post construction stage of assessment. The numbers in the table correspond to the numbered assessment criteria in the above sections.

Schedule of Evidence Required		
Req.	Design Stage	Post Construction Stage
1	<p>A copy of the specification clause confirming:</p> <ul style="list-style-type: none"> Type of heating system(s) installed. <p>For each system specified, a letter, email or literature from the manufacturer(s) confirming:</p> <ul style="list-style-type: none"> Dry NO_x emissions rate in mg/kWh. <p>If more than one system is providing heat, design team calculations confirming:</p> <ul style="list-style-type: none"> The average NO_x emission rate. 	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> Heating system(s) installed. <p>OR</p> <p>A letter from the design team or main contractor confirming:</p> <ul style="list-style-type: none"> No changes to the specification.

Additional Information

Relevant definitions

Appropriate energy modelling software: Refer to BREEAM issue Ene 1 for a definition

NO_x emissions: are pollutant gases produced by the combustion of fossil fuels and sunlight to produce ozone that can cause serious respiratory problems. NO_x emissions also produce acid rain which has a detrimental effect on ecosystems.

Dry NO_x Levels: the NO_x emissions (mg/kWh) resulting from the combustion of fossil fuels at 0% excess oxygen levels.

Calculating NO_x emission levels from fossil energy fired boilers:
 For fossil fuel boilers, the NO_x-emission rate for heat production can either be directly obtained from manufacturers data or calculated from measurements. It is only possible to measure NO_x-emissions in mg/m³ combustion air. Please find conversion rates below.

Calculating NO_x emission levels from Combined Heat & Power (CHP) systems
 Where CHP systems are present or specified, only the heat-related emissions are considered for the assessment of this issue. For a combined heat and power production unit, it is not possible to clearly charge NO_x emissions to either heat or electricity, as both are produced at the same time with a certain NO_x emission. Therefore it is necessary to use a reference NO_x-emission for the produced electricity in the country of assessment, subtract it from the total NO_x-emission produced by the plant and then allocate the remaining NO_x emissions to the heat output. The following formula should be used to determine this:

$$m_{Heat} = \frac{M - W_{el} \times m_{el.ref.}}{W_{Heat}}$$

Where:

- m_{Heat} = NO_x emissions per unit of heat generated in mg/kWh_{Heat}
- M = total NO_x emissions generated by plant in mg
- W_{el} = total quantity of electricity produced in kWh_{el}
- $m_{el.ref.}$ = country-specific electricity reference NO_x-emissions in mg/kWh_{el} – please refer to Checklist A9 to find the relevant information
- W_{Heat} = total quantity of electricity produced in kWh_{Heat}

The *Additional Information* section contains definitions of terms used in the *Assessment Criteria* and *Compliance Notes* section. This section will also contain further information relevant to the issue e.g. assessment guidance and relevant websites

2.0 Scope

This section of the guidance outlines the scope of this international BREEAM scheme and the type of buildings that it can be applied to.

BREEAM-NOR can be used to assess the environmental effects for commercial and educational buildings that are subject to Norwegian rules and practices.

Buildings and projects that are not covered by the scope of the BREEAM-NOR Scheme may be assessed by utilising the BREEAM International Bespoke Scheme. Until NGBC has developed a national scheme for adapted assessment, BREEAM International Bespoke will be offered by BRE Global Ltd. Further information may be obtained at www.breeam.org, or via BREEAM International's customer support breeaminternational@bre.co.uk.

2.1 Stages of assessment

BREEAM-NOR can be used to assess the environmental impacts arising as a result of an individual building development (including external site areas). Assessment may be done at the end of the following 2 phases:

1. The design stage (DS) – assessment leading to an interim certificate
2. Post-Construction Stage (PCS) – assessment leading to a final certificate

Design Stage

The project review in this phase must have progressed to an extent that relevant information is available to the BREEAM assessor, and that the building's performance, in its rough characteristics may be assessed on the basis of available reports and documentation against the specifications in the BREEAM-NOR Scheme manual.

Assessment after the design stage assesses the building's performance, as a rule before the start of construction. If preparatory work and/or demolition work is being undertaken that will be included in line with the relevant compliance notes, it is important to look after time-specific requirements for documentation, specified under each individual item.

Assessment at this stage does not represent the building as-built, and thus is unable to serve as qualifications for a final certificate. It is highly recommended that advance assessment and any possible interim certificate be undertaken as support for achieving the desired qualities with respect to BREEAM-NOR.

To complete an assessment at this stage the design must be advanced to the point where the relevant information is available to enable the BREEAM assessor to demonstrate, in a robust manner, the building's performance against the reporting and evidential criteria of the technical guidance. The interim DS assessment will therefore be completed and certified at the scheme design or detailed design stages.

Post-Construction Stage

A final assessment will be carried out after its construction and certification pursuant to the practical as-built work has been completed.

There is no requirement that there be advance assessment or an interim certificate in order to have a building audited in the post/construction stage as a basis for certification of the building.

A 2-stage use of BREEAM-NOR, by doing an advance assessment, gives greater predictability, more cost-efficient documentation and reporting, and reduces the risk for losing timeline-dependent points. In a 2-stage review, the phase after the design phase will be organised so as to confirm the advance assessment and that that completed building accords with the underlying project planning basis, reports and documents.

The PCS assessment and subsequent BREEAM Certification represents the final 'as built' performance and BREEAM Rating. A final PCS assessment is completed and certified after practical completion of the building works.

There are two approaches to assessment at the post-construction stage:

1. A post-construction review of an interim design-stage assessment
2. A post-construction assessment

A post-construction review serves to confirm the interim BREEAM rating achieved at the design stage in accordance with the reporting and evidential criteria of the technical guidance. Where a formal interim DS assessment has not been carried out and a BREEAM assessment and rating is required, a full PCS assessment can be conducted.

2.2 Type of projects that can be assessed using BREEAM-NOR

A BREEAM-NOR assessment may only be carried out in the stages described above, and only for the following types of projects:

- Whole new buildings
 - Major refurbishments of existing buildings
 - New build extensions to existing buildings
 - A combination of new-build and existing building refurbishment
1. New build and/or refurbishments which are part of a larger mixed use building
- Existing building fit-out

Major refurbishments and renovation to existing buildings

For the purposes of a BREEAM assessment, a major refurbishment project is a project that results in the provision, extension or alteration of thermal elements and/or building services and fittings. These types of projects include:

- Thermal elements include walls, roofs and floors.
- Fittings include windows (incl. rooflights), entrance doors

- Building services include lighting, heating and mechanical ventilation/cooling and management systems

Minor refurbishments

This BREEAM scheme is not designed to assess a cosmetic and minor refurbishment of an existing building, i.e. works that do not result in the provision, extension or alteration of thermal elements and/or building services and fittings; or a change of use.

New build extensions to existing buildings

BREEAM can be used to assess new build extensions to existing buildings and, where the existing building is undergoing major refurbishment, the new build extension and existing building.

When assessing only a new-build extension to an existing building, in some BREEAM issues it is necessary to consider services/facilities within the existing building, where such services/facilities will be integral to the new extension or used by the occupants of the new extension. Assessment guidance on what should be evaluated is provided in the *Compliance Notes* table within the specific BREEAM issue for such instances, where relevant.

Building Fit-out

BREEAM can be used to assess a fit out of an existing building. An assessment can be carried out on the first fit-out of the shell of a new building/unit or subsequent re-fit of an existing building/unit. A building fit-out can be certified at the interim stage, based on the fit-out design and specification and/or post fit-out based on an assessment of the actual finished, fitted-out unit/building.

The methodology for a fit-out assessment includes issues core to the BREEAM assessment and rating of a building. This includes the assessment of building-related impacts that may not be affected by the scope of the fit-out works. This approach serves to highlight the intrinsic environmental performance of the existing building/unit and recognise the opportunity that a fit-out presents to improve the environmental performance of an existing building.

In the technical guidance the assessment criteria for a building fit-out, for the most part, is the same as that for a new build/major refurbishment assessment. In some BREEAM issues there is building '*fit out only assessment*' criteria, including; *Construction Site Impacts*, *Materials Specification* and *Responsible Sourcing*; and some issues contain *fit out only* compliance notes and guidance. Furthermore, some BREEAM issues are not applicable to *fit-out only* assessments, including; *Land Use and Ecology*, *re-use of facades and structure*, *recycled aggregates* and *Flood Risk*.

The assessor should note that if the building is undergoing a first fit-out and the shell and core of the building has previously been BREEAM assessed using the same version of BREEAM, it is permissible

to use the existing shell and core building assessment performance and couple this with an assessment of the fit out specification to produce a BREEAM rating for the fully fitted building.

Shell and Core / Speculative Assessments

Non fitted-out buildings of a speculative nature, more commonly referred to as **Shell and Core** buildings, can be assessed using this BREEAM scheme. For the majority of issues the assessment of a Shell and Core building against BREEAM criteria will be straightforward. However, several of the BREEAM issues and their criteria are tailored to assess a building that is being fitted out. These **Fit Out related BREEAM issues** will not be scoped out for the BREEAM assessment of a speculative building, as ultimately the building will be used in a fitted out state, therefore the BREEAM rating must account for this.

Non fitted-out buildings will typically cover fundamental building elements such as structural, climatic buffer and the fitting out of common areas. An HVAC-system can be delivered for the core with the possibility for tenants to connect to it.

It is recognised that it may not be possible to assess compliance with some of the fit out related BREEAM issues, as fit out decisions relating to certain aspects of the building will be made by the future tenant, who at the time of the formal assessment of the Shell and Core building may not be known. Subsequently BREG recognise that there is a need for a degree of flexibility in applying BREEAM to Shell and Core buildings, to recognise the scope of limitations and opportunities open to the developer to influence the final fitted-out performance of the building.

There are four options available to clients who wish to use BREEAM to assess a shell and core building. Each option provides a different level of robustness to assessing BREEAM fit out issues and therefore value in terms of a contribution towards the BREEAM percentage score and rating.

Option 1 – Use of a tenancy lease agreement between the developer and tenant/s

BREEAM aims to encourage a mutually beneficial relationship between the Shell and Core developer/owner of a building and its future tenant/s so that the fully fitted operational building can demonstrate performance against the highest possible environmental standards. In order to achieve this, BREEAM encourages and rewards the use of formal legally binding **Green Lease Agreements** between a developer/owner and their tenant/s, although we recognise that these agreements are currently not widely used within the market place. As such, Green Lease Agreements can be used as evidence demonstrating compliance with the relevant BREEAM issues criteria at the interim and post construction stages of assessment.

BREEAM will only be assessing the fit out specifications of the first tenants to occupy the building after construction, and whether they comply with the tenancy lease agreement. However, green lease

agreements should be considered within a long-term strategy wherever possible and future tenants should also be covered by the agreement. Where the developer chooses to use BREEAM In Use to assess the operation of the building after construction, green leases will also be recognised as an acceptable way to demonstrate compliance.

Where a legally binding tenancy agreement, that commits the tenant's fit out to meet the BREEAM criteria, is provided as evidence, the **full value** of the available BREEAM credits covered by the criteria can be awarded.

The assessor will, when reviewing the lease contract, determine the specific criteria that will be deemed to have been fulfilled with respect to the contract submitted.

Option 2 – A Green Building Guide for tenant fit outs

As an alternative to a Green Lease, developers may demonstrate part compliance with BREEAM credits where they produce a building specific **Green Building Guide** that is distributed to all future tenant/s of the assessed building. This formal, but non legally binding document must provide development specific guidance to the tenant on carrying out their fit out in a manner that upholds the BREEAM criteria of the credits sought, and encourages tenants to play their role in maintaining and improving the overall buildings environmental performance.

A Green Building Guide does not provide conclusive evidence that the tenant will implement the suggestions when compared to a Green Lease Agreement and this needs to be reflected in the relative score achieved by the building. Subsequently, where relying on a Green Building Guide to demonstrate compliance with a BREEAM fit out issue or requirement, **half of the value** of the available credits can be achieved and contribute towards the overall BREEAM score and rating.

'Green Guide' is a formal document providing detailed advice to the future tenant(s) of the building concerning how the building's effects on the environment can be minimised. The guide places a special emphasis on the environmental effects that the tenant(s) can influence through their fitting out of the building. The assessor will, when reviewing the relevant 'Green Guide' determine precisely which criteria will be deemed to have been fulfilled, if the tenant follows the recommendations in the guide.

Option 3 – Developer/Tenant collaboration

Where the future tenant(s) of a building is/are known a collaborative assessment may be carried out. The performance of the building and compliance with the BREEAM criteria can be assessed using the design and procurement evidence for the shell and core elements of the building and evidence provided by the future tenant(s) e.g. their fit-out design and specification. Where compliance is sought via this

route, the **full value** of the available credits can be achieved and contribute towards the overall BREEAM score and rating.

Option 4 – No evidence provided for tenant/s fit out specification

Where a Shell and Core developer cannot confirm compliance with a particular issue or chooses not to produce a Green Lease Agreement or a Green Building Guide to cover the content of a particular issue (or where one or more of the above documents are produced but a particular BREEAM issue is excluded from the content), the BREEAM credits available for the particular issue must be withheld.

Shell and core assessments of developments with multiple tenants

It is accepted that in developments with multiple tenants, provided at least 75% of the net lettable floor area within a multiple tenanted building/development is covered by the tenants lease agreement, this will be acceptable for the purposes of awarding full BREEAM credits. Where some of the tenants are covered by the tenants lease agreement, but these do not account to 75% of the net lettable floor area, the total score for each issue might be area-weighted provided that all other tenants are covered by Option 2

Shell and core building assessments and minimum BREEAM standards

Please note that all minimum BREEAM standards remain applicable for Shell and Core buildings. For issues with minimum standards, compliance can be demonstrated for the areas of the Shell and Core building that are directly under the influence of the Shell and Core developer. For issues reliant upon compliance of tenant areas/fit out items, the minimum standards will still be applied to those areas and compliance can be demonstrated via the lease agreement, green building guide or tenants fit out specification (as demonstrated using example below).

Example - Wat 2 Water Meter

The aim of Wat 2 is to ensure that water consumption can be monitored and managed therefore encouraging reductions in water consumption. Using the BREEAM Europe Retail scheme as an example, the criteria of this issue state that buildings with multiple tenants are required to provide separate pulsed meters on the water supply to each letting area, common area and service areas where they exist. The installation of a water meter for each of the areas listed above is not carried out by the developer, perhaps because the tenants are responsible for the water consumption in their own unit and pay rates accordingly. However, BREEAM still sets a requirement for these areas to be separately sub-metered and compliance can be demonstrated for each option as follows:

Option 1 - In order to demonstrate compliance with the criteria of this issue and receive the full value of the available BREEAM credits a green lease agreement can be provided as evidence to the BREEAM assessor. The agreement will need to include a clause which requires the tenants to install a water

meter for each of the relevant areas they are responsible for. The clause in the tenancy agreement must demonstrate to the BREEAM assessor that the BREEAM criteria will be met. At the post construction stage of assessment it is recognised that if the tenant is unknown then the Green Lease cannot and does not have to be signed by the tenant to demonstrate compliance. The developer/landlord must however confirm that all prospective tenants will be required to sign the Green Lease Agreement to secure compliance with, and the full value of the relevant BREEAM issues. This evidence will allow the development to achieve one credit for this issue.

In developments with multiple tenants, where only some tenants have signed the Green Lease Agreement, and a Green Building Guide has been developed as an informative document for all other tenants as explained below, the score can be area-weighted and the minimum standards will be reduced to half the value. This will be referred to option 1a in the scoring tool.

Option 2 –

As an alternative to a Green Lease, developers may demonstrate part compliance with BREEAM credits where they produce a building specific Green Building Guide that is distributed to all future tenant/s of the assessed building. This formal, but non legally binding document must provide development specific guidance to the tenant on carrying out their fit out in a manner that upholds the BREEAM-NOR criteria of the credits sought, and encourages tenants to play their role in maintaining and improving the overall buildings environmental performance.

A Green Building Guide does not provide conclusive evidence that the tenant will implement the suggestions when compared to a Green Lease Agreement and this needs to be reflected in the relative score achieved by the building. Subsequently, where relying on a Green Building Guide to demonstrate compliance with a BREEAM fit out issue or requirement, half of the value of the available credits can be achieved and contribute towards the overall BREEAM score and rating.

Option 3 - If the developer and tenants choose to undertake a collaborative assessment then the shell and core specification and the fit out design specification can be used as evidence to demonstrate compliance. If this evidence demonstrates compliance with the BREEAM criteria, it will allow the development to achieve one credit for this issue.

Option 4 - The developer may choose to take no action and subsequently, unless they meet the criteria of this issue through the shell and core specification, no recognition can be given as the assessment criteria will not be met. Subsequently the development will achieve zero credits for this issue.

Shell and Core assessments and BREEAM issue Ene 1: Energy Efficiency

When calculating the Energy Performance Rating for a shell and core building, where HVAC/ lighting variables for the tenanted areas are not known, a developer is required to assume for the shell only spaces the most energy intensive fit-out specification permissible under local building regulations i.e. the maximum design fit-out specification.

For the purposes of the BREEAM assessment it is permissible, when conducting the energy modelling and calculating the Building Energy Performance Index, to substitute specifications confirmed within a Green Lease Agreement, and therefore legally committed to by the tenant(s), in place of the maximum design fit-out specification. This rule applies only to those areas of the building that the scope of the Lease Agreement covers. Tenanted areas not covered by the scope of the Green Lease must assume the maximum design fit-out specification as defined under local building regulations.

The use of a Green Building Guide for tenants fit out (described above) cannot be used to substitute the maximum design fit out specification, for the purpose of assessing BREEAM issue Ene 1 Energy Efficiency, as such a Guide is not legally enforceable.

Definitions

Shell and Core – Typically a Shell and Core building covers base building elements such as structure, envelope and fit out of common areas. A core HVAC system may be provided to allow for tenant connections.

Fit Out related BREEAM issues – In BREEAM the following are the typical BREEAM issues which are either specific to, or contain criteria that rely on or are influenced by the tenants fit out of a building. Please refer to each issue's specific compliance note for further guidance on how to assess the issue for a shell only development.

Man 1 – Commissioning	Hea 13 – Acoustic Performance
Man 4 – Building User Guide	Hea 14 – Office Space (Industrial & Retail schemes)
Hea 1 - Daylighting	Ene 2 – Sub-metering of substantial energy uses
Hea 2 – View Out	Ene 3 – Sub-metering of high energy load and tenancy areas
Hea 3 – Glare Control	Ene 4 – External Lighting
Hea 4 – High Frequency Lighting	Tra 8 – Deliveries and Manoeuvring
Hea 5 – Internal and External Lighting Levels	Wat 1 – Water Consumption
Hea 6 – Lighting Zones & Controls	Wat 2 – Water meter
Hea 9 – Volatile Organic Compounds	Wat 4 – Sanitary Supply Shut Off
Hea 10 – Thermal Comfort	
Hea 11 – Thermal Zoning	
Hea 12 – Microbial Contamination	

Wst 4 – Compactor Baler

Pol 4 – NOx emissions from heating source

Pol 1 – Refrigerant GWP – Building Services

Pol 7 – Reduction of night time light pollution

Pol 2 – Preventing Refrigerant Leaks

Pol 8 – Noise attenuation

Pol 3 – Refrigerant GWP – Cold Storage

Similar buildings (or units) on the same site

It is possible to assess a number of separate but similar buildings, or individual units within a larger building development, within one BREEAM assessor's report. This is subject to the following conditions:

1. The buildings/units must all be on the same site
2. The buildings/units must be of the same building type e.g. an office, with the same building functions/spaces and fitted out to a similar specification and therefore assessed using the same BREEAM issues
3. Each BREEAM issue must be assessed, and its credits awarded, based on the worst performing building/unit
4. The assessor's conclusion that all the buildings/units can be assessed pursuant to BREEAM-NOR

For the above scenario, a single BREEAM certificate will be issued listing all the buildings/units covered by the single BREEAM assessor's report.

Where required, a duplicate of the certificate can be produced for the purposes of display in each individual building/unit. Duplicates of certificates are not chargeable provided they are requested by the BREEAM assessor along with the initial certification request to BRE Global.

Alternatively, a certificate can be produced specific to each individual building/unit. In such cases an additional charge will be made for each individual certificate requested.

In either case the certification criteria must be confirmed by the assessor on the Certificate Request Form submitted with their formal assessment report to BRE Global.

If one or more building/unit performs markedly better than another on the same site and the client wishes to recognise this, a separate BREEAM assessment and therefore certificate is required.

2.3 Type of buildings that can be assessed using this BREEAM scheme

2.3.1 Offices

BREEAM Europe Offices can be used to assess buildings that consist of office areas and associated functions/areas.

The building functions/spaces listed below are covered by the scope of BREEAM Offices where they form a part of an office development:

Office areas

- Cellular or open plan offices
- Meeting rooms
- Training/presentation rooms

Other associated functions/areas

- Reception and waiting areas
- Staff restaurant and/or kitchen facilities
- Restrooms, WCs and changing facilities
- Storage and waste management areas
- I.T suites, server rooms
- Staff gym or crèche
- Ancillary areas e.g. plant room, circulation space

The office areas must make up >50 % of the gross internal floor area of the building.

The above list is not exhaustive, but serves to indicate the type of areas covered by the scope of this BREEAM scheme. Where a proposed building contains a small additional function/area that is not listed above, the building can still be assessed using this scheme. If the assessor has reason to believe that this scheme is not appropriate given the small additional function/area type, BRE Global should be contacted for advice.

Mixed use developments

Office space within a mixed use development/building can be assessed using BREEAM Offices, provided the office space is separable from the other mixed use elements of the building.

Floors within a larger office development

Single or multiple floors of office space 'sandwiched' between other floors that do not form a part of the assessment can be assessed using this scheme. An example of this situation may be in the case of a tenanted building where part of the building is undergoing refurbishment or a re-fit and the remaining parts are not undergoing such change, or they are undergoing refurbishment/fit out but do not require a BREEAM assessment.

Data centres

The BREEAM-NOR Scheme cannot be used to assess data centres (buildings whose primary function will be to act as data centres i.e. the floor area of such buildings consists predominantly of data hall) alternatively, the BREEAM International Bespoke Scheme should be used..

Building does not fit the scope of BREEAM Offices

Building types not covered by the scope of BREEAM-NOR, category Offices could be assessed using another category in BREEAM-NOR scheme, or other BREEAM schemes. BREEAM-NOR can be downloaded from www.ngbc.no, and all BREEAM scheme manuals can be downloaded from www.breeam.org, each manual details the scope of that scheme. Alternatively, if the building does not fall within the scope of an existing BREEAM Scheme it can be assessed using the BREEAM International Bespoke Scheme.

Building does not fit the scope of BREEAM Offices

Building types not covered by the scope of BREEAM-NOR, category Offices could be assessed using another category in BREEAM-NOR scheme, or other BREEAM schemes. BREEAM-NOR can be downloaded from www.ngbc.no, and all international BREEAM scheme manuals can be downloaded from www.breeam.org, each manual details the scope of that scheme. Alternatively, if the building does not fall within the scope of an existing BREEAM standard it can be assessed using the BREEAM Bespoke scheme.

2.3.2 Industrial

BREEAM-NOR, category Industrial can be used to assess one or a combination of the following types of Industrial building:

1. **Storage and distribution warehouses:** (including cold food storage)
2. **Light industrial/factory units** e.g. manufacturing, assembly, packaging etc. and small 'starter' or 'nursery' units.
3. **Workshops:** e.g. manual workshops and vehicle workshops.

The building functions/areas listed below are covered by the scope of BREEAM NOR, category Industrial where they form a part of one of the above industrial building types:

Operational areas

- Storage/warehousing
- Light industrial/factory uses
- Workshops and cold storage
- Delivery yard
- Waste management areas

Office areas (see also figure 1 and guidance below)

- Cellular or open plan offices
- Meeting rooms
- Training/presentation rooms

Other associated functions/areas

- Reception, counter/customer services and waiting area
- Staff restaurant and/or kitchen facilities
- Restrooms, WCs and changing facilities
- I.T. suites, server rooms
- Staff gym
- Staff crèche/nursery
- Ancillary areas e.g. plant room, circulation space

The operational areas must make up >50% of the total gross internal floor area of the building.

The above list is not exhaustive, but serves to indicate the type of areas covered by the scope of this BREEAM-NOR category Industrial scheme. Where a proposed building contains a small additional function/area that is not listed above, the building can still be assessed using this scheme. If the assessor has reason to believe that this scheme is not appropriate given the small additional function/area type, BRE Global Ltd. should be contacted for advice.

Unless otherwise stated, BREEAM-NOR category Industrial cannot be used to assess any of the above functions/spaces as standalone developments, i.e. the BREEAM-NOR category Industrial cannot be used to assess and certify an office or gym that does not form a part of one of the above industrial building types. Such buildings can be assessed using one of the other standard BREEAM schemes or, where appropriate, the BREEAM International Bespoke scheme.

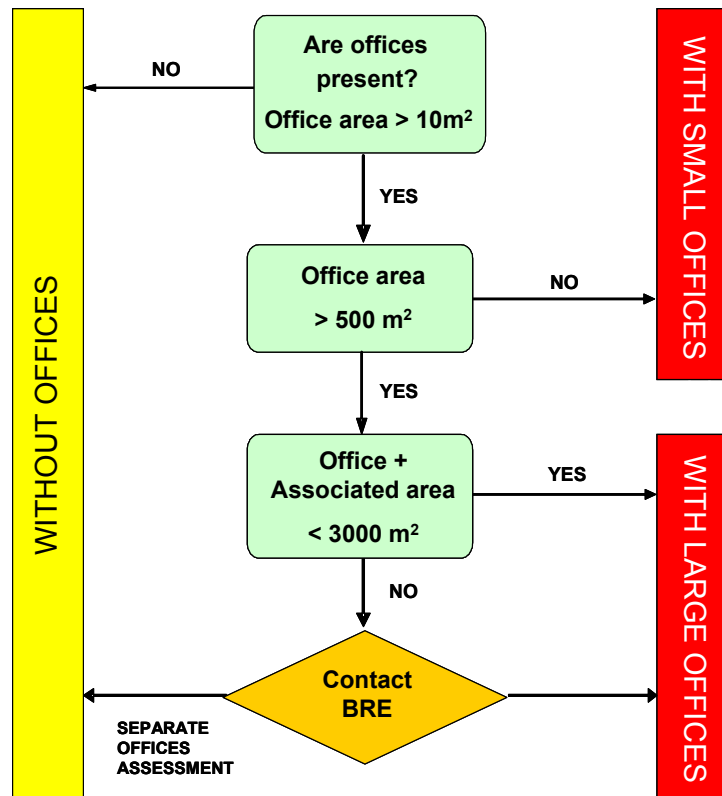


Figure 1: Determining the type of BREEAM *Industrial* assessment

The approach to the assessment of office areas within an industrial building differ depending on the size of office space provided. The BREEAM Assessor's spreadsheet tool selects the appropriate BREEAM issues for assessment based on the scope of the building requiring assessment, as defined by the BREEAM assessor.

Trade Warehouse

A building used for trade only with a counter and customer service area can be assessed using the BREEAM Industrial scheme. A building with goods display areas must be assessed using the BREEAM -NOR, category Retail.

Automotive servicing and repair workshops

Buildings with a vehicle workshop service and repair area, counter and customer waiting area and staff office/room should be assessed using the BREEAM -NOR, category Industry.

Automotive showrooms

Automotive showrooms that meet the following must be assessed using the BREEAM -NOR, category Retail:

- The majority of the gross internal floor area (excluding 'office areas' and 'other associated function areas') consists of vehicle sales and display areas.
- The remaining gross internal floor area consists of vehicle workshops and offices areas.

Where the vehicle sales and display area is less than 50% of the gross internal floor area, NGBC should be contacted for advice on which BREEAM scheme to use.

Building does not fit the scope of BREEAM -NOR, category Industry

Building types not covered by the scope of BREEAM-NOR, category Industry could be assessed using another BREEAM-NOR category. BREEAM-NOR can be downloaded from www.ngbc.no, and all International BREEAM scheme manuals can be downloaded from www.breeam.org, each manual details the scope of that scheme. Alternatively, if the building does not fall within the scope of an existing BREEAM standard it can be assessed using the BREEAM Bespoke scheme.

2.3.3 Retail

BREEAM -NOR, category Retail can be used to assess one or a combination of the following types of retail building:

1. **General display and sale of goods:** covers general shops and retail units selling non-food goods
2. **Food retail:** covers supermarkets/superstores and other convenience stores i.e. building types which display food or food and non-food goods
3. **Food preparation and service:** covers restaurants, cafes, public houses, bakeries, takeaways i.e. building types where food is prepared on site and served for consumption either on or off site
4. **Service provider:** covers banks, post office, bookmakers, dry cleaners, travel agencies.

The Retail scheme can assess the above types of retail where they combine to form part of a larger retail development e.g. shopping centre/district, department store or retail park.

The building functions/areas listed below are covered by the scope of BREEAM -NOR, category Retail where they form a part of one of the above retail building types:

Retail areas

- Retail sales and display areas
- Counter and customer service areas
- Customer dining and seating areas
- Petrol station & vehicle wash
- Commercial kitchen/food preparation and servery
- Commercial laundry/dry cleaner
- Delivery yard
- Waste management areas

Operational support areas

- Goods storage/warehousing
- Workshops
- Cold storage

Office areas (see also figure 1 and guidance below)

- Cellular or open plan offices
- Meeting rooms
- Training/presentation rooms

Associated functions/areas

- Cinema

- Health and fitness suite
- Staff restaurant and/or kitchen facilities
- Restrooms, WCs and changing facilities
- Reception and waiting areas
- I.T. suite, server room
- Crèche/Nursery
- Ancillary areas e.g. plant room, circulation space

The retail and operational support areas must make up >50 % of the gross internal floor area of the building.

The above list is not exhaustive, but serves to indicate the type of spaces covered by the scope of this BREEAM NOR scheme. Where a proposed building contains a small additional function/area that is not listed above, the building can still be assessed using this scheme. If the assessor has reason to believe that this scheme is not appropriate given the small additional function/area type, NGBC should be contacted for advice.

Unless otherwise stated BREEAM NOR Retail cannot be used to assess any of the above functions/spaces as standalone developments, i.e. the Retail scheme cannot be used to assess and certify an office or gym that does not form a part of one of the above retail building types. Such buildings can be assessed using one of the other standard BREEAM NOR schemes or, where appropriate, the BREEAM International Bespoke scheme.

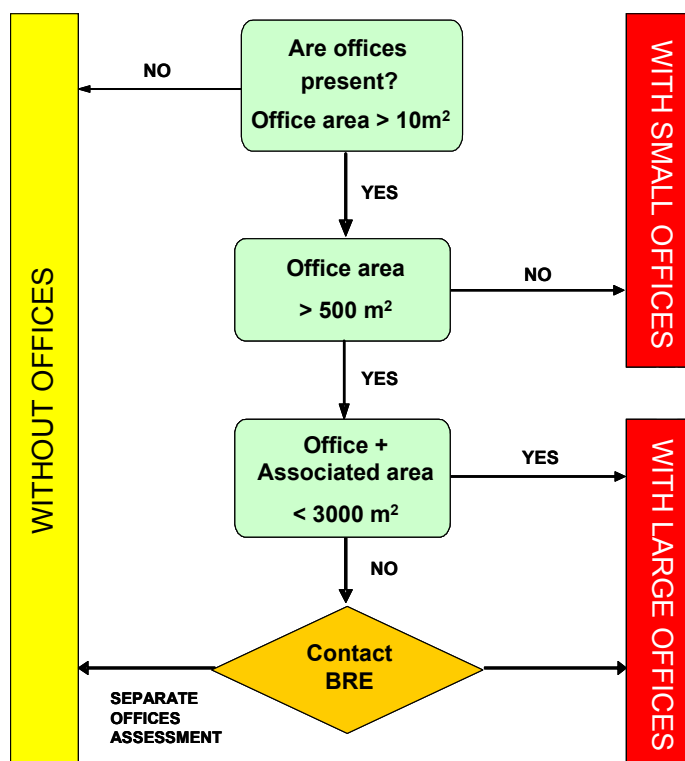


Figure 1: Determining the type of BREEAM Retail assessment

The approach to the assessment of office areas within a retail building differ depending on the size of office space provided. The BREEAM Assessor's spreadsheet tool selects the appropriate BREEAM issues for assessment based on the scope of the building requiring assessment, as defined by the BREEAM assessor.

Trade Warehouse

A building used for trade only with a counter and customer service area can be assessed using the BREEAM -NOR, category Industry. A building with goods display areas must be assessed using the BREEAM -NOR, category Retail.

Automotive servicing and repair workshops

Buildings with a vehicle workshop service and repair area, counter and customer waiting area and staff office/room should be assessed using the BREEAM -NOR, category Industry.

Automotive showrooms

Automotive showrooms that meet the following must be assessed using the BREEAM -NOR, category Retail:

- The majority of the gross internal floor area (excluding 'office areas' and 'other associated function areas') consists of vehicle sales and display areas.
- The remaining gross internal floor area consists of vehicle workshops and offices areas.

Where the vehicle sales and display area is less than 50% of the gross internal floor area, BRE should be contacted for advice on which BREEAM scheme to use.

Mixed use developments

Retail space within a mixed use development/building can be assessed using BREEAM -NOR, category Retail, provided the retail space is separable from the other mixed use elements of the building.

Floors within a larger retail development

Single or multiple floors or units of retail space 'sandwiched' between other floors that do not form a part of the assessment, can be assessed using this scheme. An example of this situation may be in the case of a tenanted building where part of the building is under-going refurbishment or a re-fit and the remaining parts are not undergoing such change, or they are undergoing refurbishment/fit out but do not require a BREEAM assessment.

Building does not fit the scope of BREEAM Retail

Building types not covered by the scope of BREEAM -NOR, category Retail could be assessed using another BREEAM-NOR category or another BREEAM scheme. BREEAM-NOR can be downloaded from www.ngbc.no, All other International BREEAM scheme manuals can be downloaded from www.breeam.org, each manual details the scope of that scheme. Alternatively, if the building does not fall within the scope of an existing BREEAM standard it can be assessed using the BREEAM Bespoke scheme.

2.3.4 Education

1. **Pre-School**, including;
 - Nursery schools¹
2. **Schools**, including;
 - Primary schools
 - Secondary schools
 - All age-range schools (including education/teaching buildings at boarding schools)
 - Academies
 - Non-acute Special Educational Needs (SEN) schools
3. **Further and Higher Education/Vocational Colleges and Institutions**, including;
 - Teaching facility

¹ Nursery school/education means full-time or part-time education suitable for children who have not attained compulsory school age (whether provided at schools or elsewhere), i.e. facilities/buildings for the teaching of children who are between the ages of one to five years old. If the building's sole purpose is to provide full/part day care facilities for children 2yrs old or younger i.e. a crèche, its assessment using the BREEAM *Education* scheme is unlikely to be appropriate.

- Learning Resource Centre
- Laboratory / Workshop
- Student Union
- Or a mixture of the above types.

The building functions/areas listed below are covered by the scope of BREEAM Education where they form a part of one of the above building types:

General educational specific areas

- | | |
|--------------------------------|------------------------------------|
| - Classrooms and seminar rooms | - Home economics/teaching kitchens |
| - Open plan teaching areas | - Workshops |
| - Lecture theatres | - Drama studios |
| - Libraries | - Music rooms |
| - Teaching laboratories | - Audio visual |
| - Private study areas/rooms | - Assembly Halls |
| - I.T. suites | - Student break out areas |
| - Play rooms | |

Further and Higher Education specific areas

- General teaching and research laboratories (part of a H.E or F.E institution), including;
 - o Wet and dry labs
 - o Microbiological / clinical labs
 - o Cleanrooms
- Desk-based visual arts studios
- Large-scale visual arts studios, e.g. sculpture/photography/film/drama
- Multi-media recording studios and editing studios
- Trade-based workshops, e.g. salons, bricklaying, carpentry etc.
- Engineering/design based teaching and research workshops/studios
- 'Independent living' workshops/classrooms, e.g. childcare provision, support for physical disabilities, support for learning difficulties
- Recreational
- Retail unit, e.g. bookshop, convenience store

Office/staff areas

- Cellular or open plan offices
- Meeting rooms
- Staff rooms

Other associated functions/areas

- | | |
|---|---|
| - Sports Facilities, e.g. gymnasium, swimming pool etc. | - Interview/counselling/medical rooms |
| - Conference rooms | - Crèche areas Restrooms, WCs and changing facilities |
| - Reception and waiting areas | - Storage and waste management areas |
| - Food preparation and servery | - I.T. server room / data centre |
| - Dining areas and common rooms | - Ancillary areas e.g. plant room, circulation space |

The above list is not exhaustive, but serves to indicate the type of spaces covered by the scope of BREEAM-NOR. Where a proposed building contains a small additional function/area that is not listed above, the building can still be assessed using this scheme. If the assessor has reason to believe that this scheme is not appropriate given the small additional function/area type, NGBC can be contacted for advice.

Unless otherwise indicated, BREEAM-NOR Education cannot be used to assess any of the above *functions/areas* as standalone developments which are not part of an educational establishment. Such buildings can be assessed using one of the other standard BREEAM schemes or, where appropriate, the BREEAM Bespoke scheme.

All age range schools and academies

All age range schools and academies should normally be assessed using the guidance/criteria applicable to secondary schools. In some cases, for these types of education establishments, it may be more appropriate to use the assessment criteria for further education colleges or primary schools. For example, where an all age range school or academy will contain functional/operational areas more akin to those outlined above for further and higher education buildings or where the needs of the accommodation and occupiers are similar to those of primary or early years pupils. Based on the information received about the proposed building, the Assessor should determine the most appropriate BREEAM Education guidance/criteria to assess the building against. Where in doubt the Assessor should contact NGBC for guidance

Schools provided for users with severe disabilities/ learning difficulties

Schools for children with severe disabilities/learning difficulties that prevent them from interpreting their surroundings without feeling anxious or distressed needs special designed buildings.

Assessors carrying out assessments on schools for pupils with such needs will need to carefully consider all the BREEAM issues that might be affected by the need to provide special facilities for such building users, e.g. View Out, Cyclist Facilities, etc. and decide whether the BREEAM Bespoke scheme would be more appropriate for such assessments.

Boarding Schools

Residential accommodation cannot be assessed using BREEAM-NOR *Education*.

Building does not fit the scope of BREEAM *Education*

Building types not covered by the scope of BREEAM *Education*, can be assessed using the BREEAM *Bespoke* scheme.

3.0 Scoring and Rating

This section of the BREEAM manual explains how an assessed building's certified BREEAM rating is calculated.

There are a number of elements that determine the BREEAM rating; these are as follows:

- BREEAM rating benchmarks
- BREEAM environmental weightings
- Minimum BREEAM standards
- BREEAM credits for Innovation
- Special requirements for Outstanding

In order to obtain points, performance with respect to the criteria must be fulfilled and documented. As a point of departure, no points will be awarded unless it has been proved that the criteria have been fulfilled in a satisfactory manner. This normally means that all performance targets that are included must at a minimum be legally mandated or executed. If doubts or disagreements arise concerning the validity of the documentation, NGBC will determine whether the claimed performance will be accepted as having been attained.

Each of these elements is described in the sections on the following pages; this is followed by guidance and an example describing how a BREEAM rating is calculated.

In addition, there is a section describing the conditions that must be met in order to award an assessed building a 'BREEAM Outstanding' rating, the highest achievable BREEAM rating.

3.1 Rating benchmarks

The rating benchmarks for BREEAM NOR are outlined in table 1.1 below for new buildings, major refurbishments and fit-out projects:

Table 3.1 BREEAM 2009 rating benchmarks

BREEAM Rating	% score
UNCLASSIFIED	<30
PASS	≥30
GOOD	≥45
VERY GOOD	≥55
EXCELLENT	≥70
OUTSTANDING*	≥85

* Please note: there are additional criteria for achieving a BREEAM Outstanding rating. Please refer to the guidance below.

3.2 Environmental section weightings

The areas are weighted with respect to each other.

The weighting table below is based upon the weightings in BREEAM Europe Commercial 2009. The Strategic Advising Group and the Board of NGBC have made small adjustments to this in order to strengthen BREEAM-NOR's significance for the changes BREEAM-NOR wishes to contribute to in Norway. The areas of Transport and Materials have been strengthened to some extent, in order to reflect the transport challenges in a country with scattered developed areas, and in order to support robust solutions in light of traditions for lacking maintenance/technical outdatedness. The areas of Water and Pollution have been correspondingly reduced in significance, due to Norway having good access to clean water and with the significance of BREEAM-NOR being limited in comparison with the significance of the authorities to reducing pollution.

The sum of the points obtained in each area are converted to the percentage obtained of the total possible within each area, with the share then being weighted with respect to table 3.2 below.

Table 3.2 BREEAM NOR environmental weightings

BREEAM Section	Weighting (%)	
	New builds, extensions & major refurbishments	Building fit-out only
Management	12.0	13.0
Health & Wellbeing	15.0	17.0
Energy	19.0	21.0
Transport	10.0	11.0
Water	5.0	6.0
Materials	13.5	15.0
Waste	7.5	8.0
Land Use & Ecology	10.0	N/A
Pollution	8.0	9.0
Innovation	10.0	10.0

3.3 Minimum standards

Even if the building qualifies for the class and certificate attained with respect to table 3.1 above, the minimum requirements in table 3.3 (below) must be satisfied in order to obtain the class and certificate.

Table 3.3 Minimum BREEAM standards

BREEAM issue					
	PASS	GOOD	VERY GOOD	EXCELLENT	OUTSTANDING
Man 1 - Commissioning	1	1	1	1	2
Man 3 - Construction site impacts	-	-	-	1	1
Man 4 - Building user guide	-	1	1	1	1
Hea 4 - High frequency lighting	1	1	1	1	1
Ene 1 - Energy Efficiency (min credit out of 13 credits as total)	-	-	-	7	9
Ene 2 - Sub-metering of substantial energy uses	-	-	1	1	1
Ene 5 - Low or zero carbon technologies	-	-	-	1	1

Wst 3 - Storage of recyclable waste	-	-	-	1	1
Mat 1 - LCA-based material selection	√	√	√	√	√
Hea 8 – Ventilation solution in order to ensure indoor air quality			1	1	2
Hea 9 – Volatile organic compounds			1	2	2
Hea 20 - Moisture protection			1	1	1
Ene 23 - Energy performance of building structure				1	2

The criteria for Hea4 High-frequency lighting is normally satisfied in Norwegian measures and projects. Hence it is a condition that the criteria in Hea 4 should be met in order to obtain the class and certificate.

In Mat1 LCA-based material selection, there is a specific requirement that the authorities' list (under preparation) for avoiding use of building materials with environmental toxins must be complied with. It is however possible to deviate with respect to given criteria. It is a condition that this criteria be satisfied in order to obtain the class and certificate. Because the requirement does not go beyond the minimum requirements of the code of regulations, no points are given for satisfying the criteria.

Please refer to the relevant part of the scope section of this manual (section 2.2) for guidance on how BREEAM's minimum standards are applied and assessed for speculative (shell and core) building assessments.

3.4 BREEAM credits for innovation

Innovation credits provide additional recognition for a building that innovates in the field of sustainable performance, above and beyond the level that is currently recognised and rewarded within standard BREEAM issues. Innovation credits therefore enable clients and design teams to boost their building's BREEAM performance and in addition, help support the market for new innovative technologies and practices.

An additional 1% score can be added to a building's final BREEAM score for each Innovation credit achieved. The maximum number of Innovation credits that can be awarded for any one building assessed is 10; therefore the maximum available score achieved for 'innovation' is 10%. Innovation credits can be awarded regardless of the final BREEAM rating i.e. they are awardable at any BREEAM rating level.

A building can achieve an Innovation credit by meeting criteria given for exemplary performance for an existing BREEAM issue (3.4 outlines the BREEAM issues with exemplary performance criteria). Further detail is available in section 13 *Innovation*.

Table 3.4 BREEAM issues with exemplary level criteria.

Man 3 – Construction Site Impacts
Hea 1 – Daylighting
Hea 9 – Volatile Organic Compounds
Hea 14 - Office Space (BREEAM Retail & Industrial Schemes only)
Ene 5 - Low or Zero Carbon Technologies
Tra 3 – Alternative modes of transport
Wat 2 - Water Meter
Mat 5 - Responsible Sourcing of Materials
Wst 1 - Construction Site Waste Management
Pol 4 – NOx emissions of heating source

3.5 How to calculate a building's rating

The BREEAM assessment is made by an assessor, authorised to perform assessments with respect to BREEAM-NOR. A BREEAM assessor must determine the BREEAM rating using the BREEAM Assessor's Spreadsheet Tool and associated calculators. An indication of performance against the BREEAM standard can also be determined using a BREEAM Pre-Assessment Estimator. The Pre-Assessment Estimators are available from the BREEAM website for each scheme.

The process of determining a BREEAM rating is outlined below and in 3.5:

1. For each BREEAM section the number of credits awarded must be determined by a BREEAM assessor in accordance with BREEAM's assessment criteria (detailed in the technical sections of the scheme manual).
2. The percentage of the credits achieved is calculated for each BREEAM section.
3. The percentage of credits achieved is then multiplied by the corresponding BREEAM section weighting (see note below). This gives the section score.
4. The section scores are then added together to give the overall BREEAM score. The BREEAM score is compared to the benchmarks in table 2 and, provided all minimum standards have been met, the relevant BREEAM rating is achieved.
5. An additional 1% can be added to the final BREEAM score for each Innovation credit achieved (up to a maximum of 10%).

Table 3.5 Example BREEAM score and rating calculation

BREEAM Section	Credits Achieved	Credits Available	% of Credits Achieved	Section Weighting	Section score
Management	12	17	70%	0.12	8.47%
Health & Wellbeing	15	19	79%	0.15	11.84%
Energy	12	24	48%	0.19	9.5%
Transport	5	9	55%	0.10	5.55%
Water	5	9	67%	0.05	2.77%
Materials	6	12	50%	0.135	7.00%
Waste	3	7	43%	0.075	3.21%
Land Use & Ecology	4	10	40%	0.10	4.00%
Pollution	5	12	42%	0.08	3.36%
Innovation	1	10	10%	0.10	1%
Final BREEAM score				56.7%	
BREEAM Rating				VERY GOOD	
Minimum Standards for BREEAM 'Very Good' rating				Achieved?	
Man 4 – Building User Guide				✓	
Hea 4 - High frequency lighting				✓	
Ene 2 Sub-metering of substantial energy uses				✓	
Mat 1 - LCA-based material selection				✓	
Hea 8 – Ventilation solution in order to ensure indoor air quality				✓	
Hea 9 – Volatile organic compounds				✓	

3.6 BREEAM Outstanding Rating

The following conditions must be met in order to certify a building at the Outstanding BREEAM rating level:

1. The building must achieve a final BREEAM Score $\geq 85\%$
2. The minimum performance standards (table 3.3) for the Outstanding rating level must have been met
3. Provision of material for the production and publication of a case study (refer to guidance below) on the Outstanding rated building.

Production of case study

One of the most important aspects of the Outstanding BREEAM rating will be that projects receiving this rating will act as exemplars for the industry. It is therefore a very important aspect of the new rating that a good-quality case study is produced that design teams can refer to.

The design team and client will be asked via the certificate request form to agree to provide relevant building/project information to allow BRE Global to produce a case study. Case studies should be prepared in line with NGBC's standard template. NGBC reserves the right to produce such a project presentation if it becomes necessary. This information will be required with the formal post construction stage BREEAM assessor's report for the assessed building.

Subject to approval from the design team/client, BRE Global will publish the case study on either the BREEAM website, Green Book live website and other BRE/BREEAM-related publications (as appropriate).

Where information is not provided for the production of a case study, the building will be certified to a BREEAM Excellent rating level.

4.0 Management

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	2	2	2	Man 1 - Commissioning	1	1	1	1	2

Aim

To recognise and encourage an appropriate level of building services commissioning that is carried out in a co-ordinated and comprehensive manner, adhering to national best practise guidelines, thus ensuring optimum performance under actual occupancy conditions.

Assessment Criteria

The following demonstrates compliance:

First credit

- An appropriate project team member(s) is appointed as *commissioning agent* to monitor and programme pre-commissioning, commissioning and, where necessary, re-commissioning of the following key services (where they are present in the building) on behalf of the client:
 - Heating systems
 - Water Distribution systems
 - Lighting systems
 - Ventilation systems
 - Refrigeration systems
 - Automatic and manual controls
 - Cold storage
- The main contractor accounts for the commissioning programme, responsibilities and criteria within the main programme of works. In particular, an *adequate period of time* has been allowed for commissioning in the project programme.
- A *specialist commissioning manager* is appointed (by either client or contractor) at design stage for *complex systems* (where they exist – please refer to compliance notes for a definition of complex systems). The scope of their responsibility includes:
 - Design input: commission ability design reviews and solutions supporting robust and rational operation
 - Commissioning management input to construction programming
 - Commissioning management input during installation stages
 - Management of commissioning, performance testing and handover/post-handover stages.

Second credit

- The first credit has been achieved.

2. Where a Building Management System (BMS) is specified, the following commissioning procedures must be carried out:
 - a. Commissioning of air and water systems is carried out when all control devices are installed, wired and functional
 - b. In addition to air and water flow results, commissioning results include physical measurements of room temperatures, off coil temperatures and other key parameters as appropriate
 - c. The BMS/controls installation should be running in auto with satisfactory internal conditions prior to handover
 - d. All BMS schematics and graphics (if BMS is present) are fully installed and functional to user interface before handover
 - e. The occupier and operator will be fully trained in the operation of the system.
3. The above appointment(s) include the following seasonal commissioning responsibilities over a minimum 12 month period, once the building becomes occupied:

Complex Systems –Specialist commissioning manager

- a. Testing of all building services under full load conditions, i.e. heating equipment in mid-winter, cooling/ventilation equipment in mid-summer, and under part load conditions (spring/autumn)
- b. Where applicable, testing should also be carried out during periods of extreme (high or low) occupancy
- c. Interviews with building occupants (where they are affected by the complex services) to identify problems or concerns regarding the effectiveness of the systems
- d. Re-commissioning of systems (following any work needed to serve revised loads), and incorporating any revisions in operating procedures into the O&M manuals.

Where specialist building services systems such as fume cupboards, microbiological safety cabinets and a cold storage system are present then the assessor must ensure that these systems are included in the specialist commissioning agent's responsibilities.

Simple Systems (naturally ventilated) – External Consultant/Facilities Manager

- a. Review thermal comfort, ventilation, and lighting, at three, six, nine and twelve month intervals after initial occupation, either by measurement or occupant feedback.
- b. Take all reasonable steps to re-commission systems following the review and incorporate any relevant revisions in operating procedures into the O&M manuals.

Compliance notes	
New Build	There are no additional or different requirements to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different requirements to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	<p>An assumption has to be made that the shell only spaces of the building will contain heating, ventilation and air conditioning systems (HVAC), domestic hot water systems (DHWS) and/or Lighting and therefore both credits must be assessed.</p> <p>Compliance with this BREEAM issue can be demonstrated via one of the following means in shell only buildings/areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits)

	<p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out only	<p>The criteria at this stage of assessment are the same as those identified at the design stage, subject to the following;</p> <ol style="list-style-type: none"> 1. The criteria apply to the existing services, to encourage re-commissioning of those services following additional installation works, and to any new systems specified or integrated into the services strategy as part of the fit-out works. 2. Where the existing services have been commissioned or re-commissioned within the three years prior to the assessment, and therefore further commissioning or re-commissioning would be of little benefit, then this credit can be awarded by default. This is provided that the scope of the current fit-out works does not result in any of the following: <ol style="list-style-type: none"> a. Changing of layout which could enhance or reduce daylight, ventilation and zone controls such as partitioning, relocation of HVAC units etc; b. Changing perimeter services; c. Changes to zoned areas for HVAC equipment; <p>Specification of additional or replacement plant/controls that affect HVAC or DHW systems.</p>
Adequate period of time	<p>The time allocated for commissioning, performance testing and handover may vary depending on the scope of building services within the building. However, at least two weeks should be allocated for commissioning where a building contains complex servicing systems.</p>
Commissioning agent	<p>The role of the commissioning agent is to monitor and programme commissioning of the building services as part of the global programme of works to ensure that the commissioning carried out is adequate to the systems installed in the building, as well as to carry out commissioning of the simple systems. The commissioning agent can be:</p> <ul style="list-style-type: none"> • A person from within the contractor or sub-contractor organisation, • A member of the design team • The project manager or design manager <p>provided they are not involved in the general installation works. Please contact NGBC/BRE for clarification on the suitability of other individuals.</p>
Specialist commissioning manager	<p>This individual must be appropriately qualified to carry out commissioning of complex systems, <u>but also</u> manage the commissioning requirements of those systems from early design stage to post-handover of the building, in particular the specialist commissioning manager must work with the design team, the commissioning agent and the contractor to ensure commissioning requirements are appropriately taken into account at each stage of the project and that the systems will operate as per design. Examples of these individuals include:</p> <ul style="list-style-type: none"> • Building services engineer • M&E engineer • Specialist contractor • Specialist commissioning agency <p>They may be part of the design team or a specialist design contractor but cannot be directly involved in the installation works. Please contact BRE for clarification on the suitability of other individuals.</p>
Complex systems	<p>Complex systems are systems that typically involve interaction between a number of components to ensure proper operation. They will usually require</p>

	<p>specific knowledge and expertise to be designed and installed. They may depend on other systems such as control systems to work effectively Typical complex systems are:</p> <ul style="list-style-type: none"> • Air conditioning • Mechanical ventilation, displacement ventilation, complex passive ventilation • Building management systems (BMS) • Renewable energy sources • Microbiological safety cabinets and fume cupboards • Cold storage enclosures and refrigeration plant <p>Simple systems which may be commissioned by the commissioning agent include gas condensing boilers or water pipes.</p>
Naturally ventilated buildings	<p>Where the building is largely naturally ventilated, using simple cross-flow ventilation relying solely on openable windows and/or trickle vents (except in areas where mechanical ventilation is legally required), the appointment of a specialist commissioning agent is not required to award this credit. If a BMS system is employed, however, to control the natural ventilation and/or if renewable energy sources are utilised in the development, the requirement for a specialist commissioning agent remains.</p>
Process related equipment	<p>Any process- or manufacture-related equipment specified as part of the building fit-out may be excluded from this requirement except where they form an integral part of the building HVAC services, such as some heat recovery systems.</p>

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First Credit		
1&3	<p>A copy of a letter or commissioning responsibilities schedule confirming the appointment of [or commitment to appoint]:</p> <ul style="list-style-type: none"> • Commissioning agent and scope of their commissioning role. • Specialist commissioning manager and scope of their commissioning role. 	<p>Commissioning records/reports confirming:</p> <ul style="list-style-type: none"> • Monitoring actions carried out by the nominated design team member. • Specialist commissioning manager's actions/role.
2	<p>A copy of the specification clause confirming:</p> <ul style="list-style-type: none"> • The managing contractor's responsibilities with respect to this requirement. <p>OR</p> <p>A copy of a commissioning schedule highlighting:</p> <ul style="list-style-type: none"> • Managing contractor's commissioning responsibilities. • Sufficient time will be allocated for commissioning, performance testing and handover. 	<p>A copy of the main contract programme highlighting:</p> <ul style="list-style-type: none"> • Commissioning, performance testing and handover period.
Second Credit		

1	Evidence (as outlined above) confirming compliance with the first credit.	Evidence (as outlined above) confirming compliance with the first credit.
2	A copy of the specification clause stating: <ul style="list-style-type: none"> The standards and codes of practice to which commissioning procedures are to comply with. 	Commissioning records/reports confirming: <ul style="list-style-type: none"> Commissioning procedures executed in compliance with relevant standards.
3	A copy of the specification clause/commissioning schedule confirming: <ul style="list-style-type: none"> The stages of the BMS/Controls commissioning procedures. 	Commissioning records/reports confirming that; <ul style="list-style-type: none"> BMS/controls commissioning activities were carried out in compliance with the commissioning schedule/specification clause.
4	Refer to evidence requirements for 1, 2 & 3 of the first credit. This evidence must confirm the scope of seasonal commissioning responsibilities/tasks (as required).	A copy of the seasonal commissioning schedule/programme. OR A copy of the letter appointing the commissioning manager and scope of their responsibilities.

Additional Information

Relevant definitions

None.

Commissioning is a vital stage of most construction projects in ensuring that building services and fabric operate as intended by the design team, i.e. in a safe **but also** efficient and effective way. A poorly commissioned building can consume significantly more resources, and is likely to provide a significantly poorer indoor environment than one that is properly commissioned.

Many projects suffer from inadequate commissioning due to a lack of clear responsibilities. BREEAM seeks to ensure that such responsibilities are clearly assigned. Whilst rarely in a position to control commissioning work, design team professionals are in an ideal position to witness it and give feedback on its relevance, robustness, and effectiveness. On more complex projects, the appointment of a specialist agent can give significant benefits in ensuring that systems work together and avoid unnecessary conflicts through poor installation and setting.

Once a building is occupied, the actual internal environmental conditions may be different from those anticipated at the design stage, and seasonal commissioning of the building allows the building services to be fine tuned to provide optimum conditions under all actual weather/occupancy conditions..

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Inclust.	Educat.		P	G	VG	E	O
2	2	2	2	Man 2 - Constructors' Environmental & Social Code of Conduct					
					-	-	-	-	-

Aim

To recognise and encourage construction sites which are managed in an environmentally and socially considerate and accountable manner.

Assessment Criteria

The following demonstrates compliance:

1. The main contractor complies with Checklist A2, credits awarded as follows:
 - a. One credit where 6 items are achieved in each of the four sections.
 - b. Two credits where all items are achieved in each of the four sections.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell only assessments.
Fit Out Only	The criteria at this stage of assessment are the same as those identified at the design stage.
Contractor not yet appointed	At the interim design stage of assessment, where the contractor is not yet appointed, the client must either include within the specification, or commit to including, a requirement for the appointed contractor to comply with specific criteria of Checklist A2. A general commitment to satisfy Checklist A2 will not be acceptable. The assessor must then use this information to complete Checklist A2.
Site clearance	The scope of this issue applies to the main contractor and their scope of works. If the scope of the main contractor's works includes demolition and site clearance then this stage of work falls within the scope of the credit criteria.
Assessment of Checklist A2	The site must be assessed by the BREEAM—NOR assessor using Checklist A2 along with a nominated individual on site, e.g. site manager. This individual will confirm that the procedures outlined are in place and will therefore be responsible for demonstrating the veracity of the checklist.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	<p>A copy of completed checklist A2.</p> <p>AND</p> <p>A formal letter from the client/developer confirming:</p> <ul style="list-style-type: none"> • The main contract includes a clause requiring compliance with specific requirements of Checklist A2. • Individuals responsible for third party assessment of site compliance. • The scope of the main contractor's works. 	<p>A copy of the compliance report.</p>

Additional Information

None.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
4	4	4	4	Man 3 - Construction Site Impacts					
					-	-	-	1	1

Aim

To recognise and encourage construction sites managed in an environmentally sound manner in terms of resource use, energy consumption and pollution.

Assessment Criteria

The following demonstrates compliance:

New build and refurbishment projects

1. One credit where evidence provided demonstrates that 2 or more of items a-g (listed below) are achieved. **OR**
2. Two credits where evidence provided demonstrates that 4 or more of items a-g (listed below) are achieved. **OR**
3. Three credits where evidence provided demonstrates that 6 or more of items a-g (listed below) are achieved:
 - a. Monitor and report and set targets for CO₂ or energy arising from site activities
 - b. Monitor, report on CO₂ or energy arising from transport to and from site
 - c. Monitor, report and set targets for water consumption arising from site activities
 - d. Implement best practice policies in respect of air (dust) pollution arising from the site
 - e. Implement best practice policies in respect of water (ground and surface) pollution occurring on the site
 - f. Main contractor has an environmental materials policy, used for sourcing of construction materials to be utilised on site
 - g. Main contractor operates an Environmental Management System.

The Assessment Criteria for items a-g are detailed in the relevant section of Checklist A3.

4. One credit where evidence provided demonstrates that at least 80% of site timber is responsibly sourced and 100% is legally sourced.

Fit Out only assessments

1. One credit where evidence provided demonstrates that the fit-out contractor adopts best practice policies in respect of air (dust) pollution arising from the site.
2. One credit where evidence provided demonstrates that the fit-out contractor has an environmental materials policy, used for sourcing of construction materials to be utilised on site.

- One credit where evidence provided demonstrates that the fit-out contractor operates an Environmental Management System.

The Assessment Criteria for each of the above items are detailed in the relevant section of Checklist A3.

Exemplary level criteria – new build and refurbishment projects only

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue:

- Evidence provided demonstrates that all of the items a-g listed previously are achieved and at least 80% of site timber is responsibly sourced and 100% is legally sourced.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell only assessments.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit-out-only assessments.
Site timber	<p>The fourth credit (for responsibly sourced site timber) is not dependent on any of the first three credits being achieved.</p> <p>For the purpose assessing this issue, site timber is considered to be timber used to facilitate construction, including formwork, site hoardings and other temporary site timber used for the purpose of facilitating construction. It does not cover structural timber and timber used for fit-out items (this is addressed in BREEAM issue Mat 5).</p>
Site clearance	The scope of this issue applies to the main contractor and their scope of works. If the scope of the main contractor's works includes demolition and site clearance then this stage of work falls within the scope of the assessment criteria.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	<p>A copy of the relevant section from the main contract specification confirming:</p> <ul style="list-style-type: none"> Contractor's obligations in respect to each item on the checklist Site timber will be sourced from suppliers capable of providing certification to the level required for the particular tier claimed (see table 9.3 of BREEAM issue MAT 5) All timber will come from a 'legal source' and is not on the CITES list*. 	<p>Site records demonstrating monitoring and recording of the following (where relevant):</p> <ul style="list-style-type: none"> Site energy/CO₂ consumption Site deliveries Site water consumption <p>Copies of the documented procedures used on site for working to best practice pollution management guidelines.</p> <p>A letter from the main contractor confirming:</p>

<p>OR</p> <p>Where the main contract specification is not yet available, a formal letter from the client/developer including:</p> <ul style="list-style-type: none"> • Completed checklist A3 identifying which items will form part of the main contractor’s obligations. • The policy for sourcing site timber for the project. • Confirmation that the above will be implemented in compliance with BREEAM’s criteria. <p>* Or in the case of Appendix III of the CITES list, it has not been sourced from the country seeking to protect this species as listed in Appendix III.</p>	<ul style="list-style-type: none"> • Procedures for pollution management and mitigation were implemented • Name/job title of individual responsible for monitoring and managing construction site impacts throughout the project. <p>A copy of the certification document or Chain of Custody (CoC) certificate(s) for the site timber.</p> <p>Where any non-certified timber is used, written confirmation from the supplier(s) confirming that:</p> <ul style="list-style-type: none"> • All timber comes from a legal source. • All timber species and sources used in the development are not listed on any of the CITES appendices for endangered or threatened species (Appendix I, II, or III*).
--	---

Additional Information

Relevant definitions

CITES (Convention on International Trade in Endangered Species)¹ Appendices I and II of the CITES list illustrate species of timber that are protected outright. Appendix III of the CITES list illustrates species that are protected in at least one country. If a timber species used in the development is on Appendix III it can be included as part of the assessment as long as the timber is not obtained from the country(s) seeking to protect this species.

Chain of Custody: This is a process used to maintain and document the chronological history of the evidence/path for products from forests to consumers. Wood must be tracked from the certified forest to the finished product. All the steps, from transporting wood from the forest to a sawmill, until it reaches the customer, must maintain adequate inventory control systems that allow for separation and identification of the certified product. Chain-of-custody certification ensures that a facility has procedures in place to track wood from certified forests and avoid confusing it with non certified wood. Chain-of-custody is established and audited according to relevant forest certification systems rules.

Energy

Monitoring and reporting at site level are the key factors in raising awareness of the impacts of energy consumption. Whilst total energy is frequently monitored, this information is predominantly used to feedback into the tendering process and is seldom used to seek improvements on the site in question.

Targets

Targets are requested in the BREEAM criteria as an Exemplary Level Criteria to complete the process of setting, monitoring and achieving targets. BREEAM does not set targets, as these are very project specific. For some guidance on how to set targets, contractors may find it useful to refer to http://www.ccinw.com/sites/kpi_pages.html?site_id=5§ion_id=171. Procedural <http://www.bygggekostnader.no/article.php?articleID=487&categoryID=302> may also be useful.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	2	Man 4 - Building User Guide					
					-	1	1	1	1

Aim

To recognise and encourage the provision of guidance for the non technical building user so they can understand and operate the building efficiently.

Assessment Criteria

The following demonstrates compliance:

1. A Building User Guide that contains the information described under the '*User Guide Contents*' heading (see additional guidance) has been developed.
2. The *guide* is relevant to the non-technical building user and appropriate to the stakeholder(s) that will occupy the building.

Second credit (Higher educational laboratory building type or function only)

1. A Laboratory User Guide that contains the information described under the 'User Guide Contents' heading (see additional guidance) has been developed.
2. The guidance is relevant to the laboratory users that will occupy and use the facilities.

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	For speculative developments it may not be possible to include all information outlined below. The Guide must be developed, including all relevant sections and completed as far as is possible given the services and fabric installed, so that it can be handed over to the fit-out team who will then be able to complete the relevant sections based on the fit-out strategy before handing over to the tenant/building owner.

Fit Out Only	The criteria at this stage of assessment are the same as those identified at the design stage. Where there is an existing Building User Guide this must be updated in line with the scope of the fit-out work that will be undertaken and comply with the BREEAM criteria. The guide must be developed/updated by, or in collaboration with, the fit-out project team/contractor. Where there is not an existing Building User Guide this must be prepared to cover all aspects of the building, including aspects included in the shell construction/systems (if relevant).
Operation and Maintenance manual	The presence of a building O&M manual does not meet this requirement. The latter provides the detailed specialist information required by technical Facilities Managers (FMs) and maintenance staff/contractors. The guide can be contained in the Operation & Maintenance (O&M) manual, but must be an extractable or 'stand alone' section.
Multiple tenanted buildings	Where the building will be divided in to multiple tenancies, one central building user guide should be provided covering the scope of landlord controlled areas/responsibilities. A separate subsidiary guide should be provided for each tenant's space, appropriate to the status/responsibility of the tenant(s) and their building/unit.
Buildings without laboratories	If the building does not have laboratory space or is not a laboratory building then the second credit does not need to be assessed. The assessor's spreadsheet tool will filter this credit from the assessment.

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1&2	<p>A copy of the specification clause confirming:</p> <ol style="list-style-type: none"> Requirement to develop a Building User Guide Scope of the Guide's contents. <p>OR</p> <p>A formal letter from the client/developer confirming:</p> <ul style="list-style-type: none"> That the design team will be required to develop a Building User Guide. The contents of the Guide will be developed in compliance with the BREEAM criteria. 	<p>A copy of the Building User Guide.</p> <p>Written confirmation from the design team that the guide has been distributed to the building's owner, tenant(s) or fit out contractor (for completion), as appropriate.</p>

Additional Information

User Guide Contents

The list below indicates the type of information that should be included to meet the needs of the Facilities Management (FM) Team/Building Manager and the general users (staff).

1. Building Services Information

- General User - Information on heating, cooling and ventilation in the building and how these can be adjusted, e.g. thermostat location and use, implications of covering heating outlets with files, bags etc., and use of lifts and security systems.
- FM – As above, plus a non-technical summary of the operation and maintenance of the building systems (including BMS if installed) and an overview of controls.

2. Emergency Information

- a. General User - Include information on the location of fire exits, muster points, alarm systems and fire fighting systems.
- b. FM - As above, plus details of location and nature of emergency and firefighting systems, nearest emergency services, location of first aid equipment.

3. Energy & Environmental Strategy

This should give owners and occupiers information on energy-efficient features and strategies relating to the building, and also provide an overview of the reasons for their use, e.g. economic and environmental savings. Information could include:

- a. General User – Information on the operation of innovative features such as automatic blinds, lighting systems etc., and guidance on the impacts of strategies covering window opening and the use of blinds, lighting and heating controls.
- b. FM - As above, plus information on airtightness and solar gain (e.g. the impact of leaving windows/doors open in an air conditioned office, or use of blinds in winter with respect to solar gain); energy targets and benchmarks for the building type, information on monitoring such as the metering and sub-metering strategy, and how to read, record and present meter readings.

4. Water Use

- a. General User – details of water saving features and their use and benefits, e.g. aerating taps, low flush toilets, leak detection, metering etc.
- b. FM – As above, plus details of main components (including controls) and operation. Recommendations for system maintenance and its importance, e.g. risk of legionella.

5. Transport Facilities

- a. General User – details of car-parking and cycling provision; local public transport information, maps and timetables; information on alternative methods of transport to the workplace, e.g. car sharing schemes; local 'green' transport facilities.
- b. FM - As above, plus information on conditions of access, maintenance and appropriate use of car parking and cycling facilities, e.g. number of spaces provided.

Higher Education Institutes only

The above information in point 5 does not need to be included in the user's guide if there is a separate dedicated travel information space, accessible to the staff, and in compliance with BREEAM issue Tra 7. However, the guide must reference the travel information space, the information provided and its location.

Retail projects: the above information in point 5 does not need to be included in the user's guide if there is a separate dedicated travel information space, accessible to the staff, and in compliance with BREEAM Issue Tra7. However, the guide must reference the travel information space, the information provided and its location.

6. Materials & Waste Policy

- a. General User – Information on the location of recyclable materials storage areas and how to use them appropriately.
- b. FM – As above, plus information on recycling, including recyclable building/office/fit out components, waste storage and disposal criteria; examples of Waste Management Strategies and any cleaning/maintenance criteria for particular materials and finishes.

7. Re-fit/Re-arrangement Considerations

- a. General User – an explanation of the impact of re-positioning of furniture, i.e. may cover grilles/outlets, implications of layout change, e.g. installation of screens, higher density occupation etc.
- b. FM - As above, plus environmental recommendations for consideration in any refit. Relevant issues covered in BREEAM should be highlighted, e.g. the use of natural ventilation, use of materials rated green or white in EcoProduct or labelled with the Nordic Swan or EU flower,

reuse of other materials etc., the potential impact of increasing occupancy and any provision made in the original design to accommodate future changes.

8. Reporting Provision

- a. General User – Contact details of FM/manager, maintenance team, and/or help desk facility; and details of any building user group if relevant.
- b. FM – As above, plus contact details of suppliers/installers of equipment and services and their areas of responsibility for reporting any subsequent problems.

9. Training

Details of the proposed content and suggested suppliers of any training and/or demonstrations in the use of the building's services, features and facilities that will be needed. This could include:

- a. General User - Training in the use of any innovative/energy saving features.
- b. FM – As above, plus training in emergency procedures and setting up, adjusting, and fine tuning, the systems in the building.

10. Links & References

This should include links to other information including websites, publications and organisations. In particular, the Carbon Trust programme should be referenced and links provided to its website and good practice guidance.

11. General

Where further technical detail may be required by the FM Team or manager there should be references to the appropriate sections in the Operation and Maintenance Manual.

Laboratory specific building user guide contents (where applicable)

Energy and Health and Safety staff should be involved in the development of this guide to ensure relevant results.

1. Training:

Include details of proposed content of any training and/or demonstrations in the use of the laboratory facilities and equipment as needed.

- a. General user - this could include coBuilder about dangerous substances (where relevant), training in the use of any innovative/energy saving features and specialist equipment, emergency procedures;
- b. FM - as above plus training in setting up, adjusting, and fine tuning the systems in the laboratory areas.

2. Safety and Emergency procedures:

This should include:

- a. Safe handling of hazardous materials and substances;
- b. Security procedures for the laboratory operation;
- c. Any procedure for evacuation, disinfection, decontamination as appropriate in case of emergency;
- d. Emergency telephone numbers.

3. Energy and environmental strategy:

This section should give users information on energy-efficient features and strategies related to the laboratory, and also provide an overview of the reasons for their use, e.g. economic and environmental savings. Information could include:

- a. Information on the energy efficient operation of fume cupboards and microbiological safety cabinets (where present), including considerations on the impact of overloading fume cupboards and leaving fume cupboards' sashes open when not needed.
- b. Good housekeeping and management planning to ensure that any equipment operation is minimised, that time clock functions are utilised and that equipment is not left on unnecessarily.
- c. Checking that the equipment has been tested and/or inspected via equipment log.
- d. Minimisation of use of artificial lighting and temperature controls, and switching off of equipment, lights, PCs etc.

- e. Minimisation of use of water.

4. Materials and Waste

This should include:

- a. List of potential hazardous materials and waste and risks associated (coBuilder).
- b. Safe waste segregation and disposal instructions;
- c. Potential for reuse/recycling any non-hazardous waste.

5. Checklist of safety and best practice daily procedures to be completed prior to leaving the laboratory area

6. Links, references and useful contact numbers

BREEAM requires a 'Building User Guide' that contains the necessary details about the everyday operation of the development in a form that is easy for the intended users to understand.

Without the provision of adequate information and guidance it is likely that the building will be used inappropriately leading to the dissatisfaction of occupants and wasted resources. For example: Some ventilation and/or lighting systems can be impaired by inappropriate positioning of partitions, office furniture etc. so causing inefficiencies, a lack of comfort and poor performance.

The aim of the issue is to ensure that design features are used efficiently and that changes to office space are managed in the most appropriate manner. For example, the design team of a speculative, open plan office, are likely to have considered the need for meeting or cellular space, and may have provided additional riser or duct space to assist future use. The design of the building may require additional or expanded systems to be installed if occupant levels rise above those designed for. This information should be passed on to the personnel making management decisions, so that they are aware of the implications of such decisions on the management of the building.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	2	2	2	Man 12 - Life Cycle Cost Analysis	P	G	VG	E	O
					-	-	-	-	-

Aim

To recognise and encourage the development of a Life Cycle Cost (LCC) analysis model for the project to improve design, specification and through-life maintenance and operation.

Assessment Criteria

The following demonstrates compliance:

1. 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), or equivalent.
2. The Life Cycle Costs analysis based on the concept design/design development proposals covers the following stages:
 - a. Construction
 - b. Operation - includes, as a minimum, utilities
 - c. Maintenance - includes, as a minimum, planned maintenance, replacements and repairs, cleaning, management costs
 - d. End of life.
3. The LCC analysis uses a study period of 25 or 30 (as applicable) **AND** 60 years, shown in real and discounted cash flow terms.
4. The analysis demonstrates that at least two of the following issues have been analysed at a strategic and system level (as per figure 6, Different levels of analysis at different stages of the life cycle, ISO 15686-5), comparing alternative options:
 - a. Structure
 - b. Envelope
 - c. Services
 - d. Finishes

The chosen solution is the one that best meets the performance requirements for the built asset.

5. The option(s) with the lowest discounted LCC over the period is preferred, assuming that their selection results in at least one of the following:
 - a. The lowest building energy consumption over the operational life span of the building (compared to other options/alternatives analysed)
 - b. A reduction in maintenance requirement/frequency
 - c. Prolonged replacement intervals of services infrastructure/systems or building fabric
 - d. Dismantling and recycling or reuse of building components.
6. The model was updated during Stages RIBA Work Stages D/E (design development/technical design) or equivalent.

Second credit

1. The first credit is achieved.
2. The results of the feasibility study have been implemented in the specification, design and final construction of the assessed building.

New Build	There are no additional or different requirements to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different requirements to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different requirements to those outlined above specific to refurbishment projects.
Fit Out Only	Issue not applicable for fit-out-only assessments

Schedule of Evidence Required

	Design Stage	Post Construction Stage
First Credit		
1-4	A copy of the feasibility stage LCC analysis. The details of the cost consultant who has completed the analysis.	No additional evidence required to that outlined for the design stage of assessment.
5	A formal letter from the design team or cost consultant confirming: <ul style="list-style-type: none"> • The preferred option. 	No additional evidence required to that outlined for the design stage of assessment.
6	An updated copy of the LCC analysis for the detailed and final design. OR A formal letter from the design team confirming: <ul style="list-style-type: none"> • The LCC analysis will be updated to reflect the detailed and final design proposals. • Any proposed change(s) made to the specification will be on the basis that they will minimise life cycle costs and impacts. 	An updated copy of the LCC analysis for the final design.
Second Credit		

2	A formal letter from the design team confirming: <ul style="list-style-type: none"> The option(s) with the lowest discounted life cycle costs have been, or will be, implemented in the design and specification. 	Assessor's building/site inspection confirming: <ul style="list-style-type: none"> The completed building reflects the preferred option identified in the LCC analysis.
---	--	--

Additional Information

Relevant definitions:

Life Cycle Cost analysis: A procurement evaluation technique which determines the total cost of acquisition, operation, maintenance and disposal of the building.

The assessor should note that BREEAM places fixed requirements on the time at which the Life Cycle Cost feasibility study should be carried out in order that maximum benefit from undertaking this is achieved.

The *strategic level* analysis (looking at issues such as location and external environment, maintainability and internal environment, etc.) and *system level* analysis (looking at issues such as foundations, solid or framed wall and floors, types of energy, ventilation, water capacity, communications etc.) should be carried out early in the design process to influence the fundamental decisions taken regarding the building without having an adverse affect on either cost or design programme. It is however important that this is revisited as the design develops to ensure that an optimal solution is retained throughout the procurement process.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
3	3	3	3	Man 13 – Combined (Man 5 – Man 11)	-	-	-	-	-

Aim

To reduce environmental impact through effective management,

- by recognize and promote several of topics in management, which together represent direct and / or indirect reductions in environmental impacts from a variety of topics. Man 13 will motivate and recognize the developer to include this diversity of individual topics.

Assessment Criteria

Up to 3 points can be gained if **at least 2** of the 6 optional credits are complied with:

- | | |
|--------|--|
| Credit | Issue |
| 1 | Man 5 – Site Investigation |
| 1, 2 | Man 6 – Consultation |
| 1, 2 | Man 7 – Shared facilities |
| 1 | Man 8 – Security |
| 1 | Man 9 – Publication of building-related information |
| 1 | Man 10 – The building and its grounds as an educational resource |
| 1 | Man 11 – Ease of maintenance |

New Build	There are no additional or different requirements to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different requirements to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different requirements to those outlined above specific to refurbishment projects.
Fit Out Only	Issue not applicable for fit-out-only assessments

Individual requirements are listed in the specific credit text.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Man 13.5 – Site Investigation	P	G	VG	E	O
					-	-	-	-	-

Aims:

To recognize and encourage detailed site investigation to ensure the building accounts for site conditions and any remedial action required is taken beyond the requirements that apply to planning and building regulations.

Assessment Criteria

The following demonstrates compliance:

1. The site has been investigated to determine local conditions that will affect the design and specification of the proposed development.
2. The following areas are covered in the investigation:
 - a. Ground and ground water conditions assessed in accordance to governmental instructions
 - b. Establishing the engineering properties of the soil and aggressiveness of the ground water
 - c. If the site investigation indicates the site may be contaminated, further investigations are carried out
3. The *relevant bodies* (see Compliance Notes) have been consulted and confirm the absence of the following:
 - a. Buildings of local architectural or historical interest referred to in a local authority development plan
 - b. Buildings within areas of outstanding natural beauty and national parks
 - c. Scheduled ancient monuments buildings in historic parks and gardens
 - d. Buildings within the curtilage of scheduled ancient monuments
 - e. Buildings or sites with distinguishing local architectural characteristics
 - f. Sites of archaeological interest
4. Where the building/site is identified as one of the above types appropriate measures have been taken to protect any areas/features of value and all relevant bodies have been consulted and have agreed the design adopted.
5. The site investigation has been carried out at, or prior to, RIBA Stage C *concept design*, or equivalent.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	For refurbishment projects that do not include ground works or additional structural load, the ground investigation detailed in requirement 2 is not required. All other credit criteria remain applicable. For refurbishment projects that do include ground works or additional structural load, advice should be sought from BRE on whether requirement 2 is applicable.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Relevant Bodies	Developer is responsible for relating to the relevant local authorities such as the municipal government, county council, The Cultural Heritage Management Office (Byantikvaren) or The Directorate for Cultural Heritage (Riksantikvaren),

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1,2&5	A Copy of the site investigation report	The evidence required at this stage of assessment is the same as that identified at the design stage. AND Formal written confirmation from the design team that measures identified at the design stage to protect features/buildings were implemented.
3	A copy of correspondence with/from the Relevant Body beyond the subject of consultation in connection with the building application	
4	A made-up site plan identifying: Proposed development Sensitive buildings/sites in proximity Location and scope of protection measures	

Additional Information

Relevant definitions

None.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	2	2	2	Man 13.6 – Consultation	P	G	VG	E	O
					-	-	-	-	-

Aim

To involve the relevant stakeholders (including building users, business, residents and local government) in the design process in order to provide buildings fit for purpose and to increase local “ownership”.

Assessment Criteria

The following demonstrates compliance:

First credit

1. During the preparation of the brief (equivalent to stage B) the following was undertaken:
 - a. Members of the local community and *appropriate stakeholders* have been identified, with whom the design team will consult
 - b. Knowledge and experience collated from the existing buildings of the same type (if relevant) to identify existing partnerships and networks. If the building is a new development in an existing community or for a community still under construction, a representative consultation group should be identified from similar buildings of the same type in the same authority/area
 - c. A consultation plan was prepared and included a timescale and methods of consultation, clearly identifying at which points consultees can usefully contribute and how they will be kept informed about progress on the project.
2. The consultation included at least the following issues:
 - a. Functionality, building quality and local impact (including aesthetics)
 - b. Building user satisfaction/productivity
 - c. Management and operational implications
 - d. Maintenance resources/burdens
 - e. Good and bad examples of buildings of the same type.
 - f. Local traffic/transport impact.
 - g. Opportunities for shared use of facilities and infrastructure with the community/*appropriate stakeholders*
3. Feedback has been given to the consultation group regarding suggestions made, and this feedback covered:
 - a. What was proposed during the consultation exercise
 - b. How each of these proposals were considered
 - c. The outcome, e.g. implementation of suggestions or description of why options have not been deemed feasible.

Where **higher educational laboratory building** type or function is present:

4. A stakeholder engagement workshop has been undertaken at RIBA stage B or equivalent with the scope of determining the client's broad requirements with concern to laboratory facilities. The workshop must have been attended by the following (as a minimum):
 - a. Internal staff (including senior representatives from estates, academic users, and laboratory managers/technicians)
 - b. Design team, including the mechanical engineer
 - c. Project manager.
5. A design team meeting has been undertaken at RIBA stage C or equivalent with a focus on appropriate sizing, optimisation and integration of laboratory equipment and systems. As a result, the design has been developed by using a risk assessment approach and, where possible, it was supported by the use of 3D modelling for pipework and duct planning. The workshop must have been attended by the following (as a minimum):
 - a. Internal staff (including a representative from the maintenance function)
 - b. Design team, including representatives from the architects and all significant building services contractors
 - c. Project manager.
6. The results of the above activities have been summarised in a design intent document, which has been approved by all parties involved and formed the basis of subsequent quality control.

Second credit

7. The first credit is achieved.
8. The consultation process used an independent method carried out by a third party.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Fit Out Only	Issue not applicable to fit-out-only assessments.
Relevant Bodies	Developer is responsible for relating to the relevant local authorities such as the municipal government, county council, The Cultural Heritage Management Office (Byantikvaren) or The Directorate of Cultural Heritage (Riksantikvaren)
Appropriate stakeholders – Pre-school, Schools & sixth form colleges	Includes the following (as appropriate to the school building type): <ul style="list-style-type: none"> • Local residents and volunteer group(s) • Ex pupils/students group(s) • Teachers/lecturers (representative groups) • Local businesses • Design team members and main contractor • Community groups (for example based on religion, leisure or culture) • Local Authority and/or local education service providers.

Appropriate stakeholders – Further and Higher Education buildings	<p>Where the assessment concerns a new building or a refurbishment within an existing campus i.e. an infill development, it is sufficient to consult with relevant stakeholders, including the following (as appropriate):</p> <ul style="list-style-type: none"> • Students and staff groups and unions • Alumni associations • Director of estate • Researchers • Teachers/lecturers (representative groups) • Departmental and institutional senior management • Design team members and main contractor • Local Authority and/or local education service providers • Health and Safety representative <p>Where the assessment concerns a whole campus, members of the local community must also be identified and consulted with. These would typically include:</p> <ul style="list-style-type: none"> • Local residents and volunteer groups • Local businesses • Community groups (for example based on religion, leisure or culture)
--	--

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First Credit		
1	A list of the stakeholders consulted.	Evidence as outlined at the design stage of assessment.
2	A consultation plan setting out the process and the scope of the consultation. Copies of agendas and minutes of meetings with the stakeholders demonstrating: <ul style="list-style-type: none"> • The consultation plan in action • The stage in plan of works that consultation occurred. 	
3, 4 & 5	Copies of documentation demonstrating consultation feedback, including (where relevant): <ul style="list-style-type: none"> • Newsletters, posters, circulars etc. • Agenda and minutes from meetings. 	
6	A copy of the design intent document.	
Second Credit		
7	Evidence (as outlined above) confirming compliance with the first credit.	Evidence as outlined at the design stage of assessment.
8	Name of the third party facilitator. Copies of the assessment results for each stage of the project where the consultation method is used.	

Additional Information

Relevant definitions

Functionality: The way in which the building is designed to be useful and is split into use, access and space.

Build quality: The engineering and construction performance of a building.

Impact: The building's ability to create a sense of place, and have a positive effect on the local community and environment. This includes character and innovation, form and materials, internal environment and urban and social integration.

Consultation guidance and methodologies

There is a great deal of guidance available on community consultation, and many specialist organisations offer such services. Much of it is focussed on community planning, but is adaptable.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	2	2	2	Man 13.7 – Shared facilities	P	G	VG	E	O
					-	-	-	-	-

Aim

To recognize and encourage the acceptance of flexible building design that facilitates and increases the opportunity for shared and / or changes of use, at no cost.

Assessment Criteria

The following demonstrates compliance:

Primary and secondary schools, sixth form and further education colleges and higher education

First credit

1. At least one credit has been achieved under Man 6 Consultation.
2. The design team confirms that:
 - a. Potential users of the shared facilities (such as operators of clubs and community groups) have been consulted and their criteria have informed the brief.
 - b. They met formally to consider feedback according to the consultation plan
 - c. A document was produced describing the facilities to be shared and how access to them will be arranged. The document must include a reflection of this can be done likely without any extra cost.
 - d. This document has been communicated to all consultees.

Second credit

1. The first credit is achieved.
2. Shared facilities are provided in a separate and secured zone that can be accessed by members of the public/community without gaining uncontrolled access to other parts of the building.
3. Instructions and guidance on access and use of shared facilities has been developed and handed over to the building occupants (this can be included in the building user guide where such a guide is provided).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Fit Out	This issue is not applicable to a fit out only assessment.

Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Existing shared facilities	Where existing shared facilities are present on site that comply with the above Assessment Criteria (including the involvement of users and community in the consultation stage), the credits can be awarded. These facilities could be within an existing building, that does not form part of the assessment, provided the building is accessible to all relevant stakeholders.
Type of shared facilities	No criteria have been set in this respect as the types of space will vary according to the building size, type, and use and consultation feedback. Typical facilities may however include: <ul style="list-style-type: none"> • Sports facilities • Meeting and conference rooms • Drama and theatre space
Pre-schools	This issue does not apply to the assessment of pre-school developments i.e. nursery school and children centres.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First Credit		
1	As outlined under issue Man 6 Consultation.	As outlined under issue Man 6 Consultation.
2	Agenda & minutes from design team meeting. A copy of the document, and its distribution list, outlining the strategy for shared facilities.	There is no additional evidence required at the post construction stage of assessment.
Second Credit		
2	A marked-up design plan highlighting: <ul style="list-style-type: none"> • The facilities that will be shared • Access and security zones for and around the shared facilities. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • Existence of shared facilities. • Access and security arrangements for the facilities.
3	A copy of the document containing the instructions and guidance on access and use of shared facilities. OR A formal letter from the design team confirming that such a document will be written and handed over to the building occupants.	A copy of the document containing the instructions and guidance on access and use of shared facilities.

Additional Information

Relevant Definitions:

None.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Man 13.8 – Security	P	G	VG	E	O
					-	-	-	-	-

Aim: To recognize and encourage effective measures to improve safety and prevent crime through the design of the building.

Assessment Criteria

1. Design team has consulted specialist in security, such as police, security consultant and / or municipal SLT coordinator (coordination of local substance abuse and crime protective measures), and recommendations are taken into account.
2. The consultation took place before or in conjunction with relevant planning.
3. The recommendations are incorporated in the design of the finished building.

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Fit Out Only	This issue is not assessed for a fit-out only assessment.

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1&2	<p>Correspondence from or a copy of the report/feedback from the security advisor confirming:</p> <ul style="list-style-type: none"> • Scope of their advice/involvement • The stage of design in which their advice was sought • Summary of their recommendations 	<p>No additional evidence required to that outlined for the design stage of assessment.</p>
3	<p>A marked-up copy of the site/design plan(s) highlighting examples of:</p> <ul style="list-style-type: none"> • The development conforming to security advisor recommendations <p>OR</p> <p>If the timing of assessment does not permit the above, a copy of the specification clause confirming: The development will conform to security advisor recommendations.</p>	<p>Assessor's building/site inspection and photographic evidence providing examples of:</p> <ul style="list-style-type: none"> • The site/development conforming to key security advisor recommendations recommendations. <p>OR</p> <p>Correspondence from the security advisor confirming:</p> <ul style="list-style-type: none"> • The as-built development or design complies with their recommendations.

Additional Information

Relevant definitions:

Security Advisor:

Police and local coordination unit of the local drug and crime prevention (SLT) has approved to have safety skills. Other advisors / consultants must be able to demonstrate competency in line with the work police and SLT are doing.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Man 13.9 – Publication of building information	-	-	-	-	-

Aim

To recognise and encourage the publication of information related to the aspects of the design and procurement process' which reduce the overall environmental impact of the building.

Assessment Criteria

The following demonstrates compliance:

1. The information listed below is publicised as a case study through one of the following means:
 - a. Developer's own website, publicly available literature or press release
 - b. Industry/sector or Government/Local Authority sponsored website or information portals.
 - c. Relevant public sector, organisation or institutional website or literature.

2. The following project related information is publicised in the case study:
 - a. A basic description of the project and building
 - b. BREEAM Rating and score
 - c. The key innovative and low-impact design features of the building
 - d. Gross floor area - m²
 - e. Total area of site – dekar (1/10 hektar)
 - f. Area of storage (m²)
 - g. % area of grounds to be used by community (where relevant)
 - h. % area of buildings to be used by community (where relevant)
 - i. Predicted electricity consumption kWh/m²
 - j. Predicted fossil fuel consumption kWh/m²
 - k. Predicted renewable energy generation - kWh/m²
 - l. Predicted water use - m³/person/year
 - m. The steps taken during the construction process to reduce environmental impacts, i.e. innovative construction management techniques
 - n. A list of any social or economically sustainable measures achieved/piloted

In addition to the above project information, NGBC wants to collect the total project cost (kr/m²), construction cost (kr/m²), and estimated operating costs (kr/m²). NGBC will, in collaboration with others, analyze cost data, and use the analysis in its guidance and information. The projects are encouraged to send such data to post@ngbc.no

3. At least two of the following must be met:
 - The first credit of Man 6 *Consultation* has been achieved
 - Site visits have been arranged for future building users

- Building users and/or other stakeholders have been given the opportunity to attend design team meetings
- Building users and/or other stakeholders are given regular presentations on progress of design/construction
- Online and updated information on the progress of the design and construction of the project.

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Buildings for which this credit is not applicable	Higher Educational buildings of a sensitive or secure nature or where confidential and sensitive information are handled or for which confidentiality agreements have been signed may be exempt from the assessment of this issue. In this case, the assessor must provide a statement in their report justifying why this assessment issue is exempt.
Shell Only	There are no additional or different criteria to those outlined above specific to the assessment of shell-only buildings.
Fit Out Only	Issue not applicable to Fit-out only assessments.

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1&2	<p>A formal letter from the developer or design team confirming:</p> <ul style="list-style-type: none"> • A case study for the development will be prepared. • The information to be included in the case study. • The medium for case study publication. 	A copy of the published case study.
3	<p>As appropriate:</p> <ul style="list-style-type: none"> • Evidence as required for issue M6. • A marked-up programme showing dates of site visits. • A marked-up programme showing dates of design team meetings attended by building users/stakeholders. • The programme for presentations that have been or will be given. • A brief description of the subject of each presentation or copy of the presentation. • The web address for publicly accessing information on the design and construction process. 	<p>As appropriate:</p> <ul style="list-style-type: none"> • Evidence as required for issue M6. • A formal letter from the design team or main contractor confirming date(s) of site visits and design team meetings attended by building users/stakeholders. • A copy of the presentation. • Assessor check of website to ensure project information is valid and up to date.

Additional Information

Relevant definitions

None

Referemces

<http://www.futurebuilt.no/?nid=206284&projectid=218952>

<http://www.arkitektur.no/default.aspx?nid=84523>

<http://naring.enova.no/sitepageview.aspx?sitePageID=1151>

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Man 13.10 – Development as a learning resource	P	G	VG	E	O
					-	-	-	-	-

Aim

To recognise and encourage the use of the building and site as a learning resource for demonstrating environmental awareness.

Assessment Criteria

The following demonstrates compliance:

1. At least one credit has been achieved under Man 13.6 Consultation.
2. The building is designed to, or includes features or installations that demonstrate to future building users a local and/or global environmental impact of building development or operation, and how the building and/or landscape mitigates such impacts.
3. Due to the subjective nature of the issue and circumstances of the individual project strict Assessment Criteria have not been set. The items outlined below are suggestions that can be used to determine whether the building and/or landscape meet the BREEAM criteria. For buildings other than educational buildings (e.g pre-school, schools, colleges or university buildings), special effort should be demonstrated to develop the building for learning purposes. This could be done by web pages, publications or other forms of public exposure.

Building

1. Use of demonstration projects such as:
 - a. A working renewable energy source such as PV's or wind turbines with a description of the technology and live data on energy generated and subsequent CO₂ emissions prevented.
 - b. Alternative heating sources such as wood fuel, solar thermal, geothermal with a description of the technology, live data on energy generated and subsequent CO₂ emissions prevented.
 - c. Rainwater collection systems with live readings, a basic description of how the technology works and its environmental benefit.
2. Utilisation of the building fabric or structure; for example a cutaway wall section that shows building insulation use within the fabric, with internal and external temperature readings to demonstrate its function. Alternatively, innovative use of a low-impact building material(s) or technology, such as building products made from recycled materials, e.g. roof tiles made from recycled tyres.
3. A permanent display section with:
 - a. Information on the building's design, construction and strategies to reduce its environmental impact

- b. General information on the environmental impact of the building as whole
 - c. Low-impact building solutions and materials that can be specified in modern design and construction to mitigate such impacts.
4. Where energy or water meters with a pulsed output have been provided, the data can be displayed with a description of the system being monitored.
 5. The demonstration/information for the building is presented in a part of the building that has regular user access: for example assembly halls, group or resource spaces.

Landscaping

6. The landscaping/site demonstrates either of the following:
 - a. Space within or adjacent to the site boundary or in the local area/region has been set aside, to allow creation and management of a natural habitat or wetland
OR
 - b. Space within or adjacent to the site boundary or in the local area/region has been set aside to allow creation and management of an area for organic planting and/or animal husbandry.
 - c. The landscaping/site space(s) are clearly marked and designated on a site plan and provide an adequately sized area for achievement of the aim.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to the assessment of shell-only buildings.
Fit Out Only	Issue not applicable for Fit-out-only assessments.
Buildings for which this credit is not applicable	<p>Higher educational buildings of a sensitive or secure nature or where confidential and sensitive information are handled or for which confidentiality agreements have been signed may be exempt from the assessment of this issue. In this case, the assessor must provide a statement in their report justifying why this assessment issue is exempt.</p> <p>Higher educational buildings where no visitors or students are admitted (e.g. research only buildings) may be exempt from the assessment of this issue. In this case, the assessor must provide a statement in their report justifying why this assessment issue is exempt.</p>
Site selection for schools	Building Bulletin 71 ² (section 4) outlines information on site selection and appraisal issues to consider when designating such a space.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	Evidence as outlined under issue Man 6 Consultation.	As outlined under issue Man 6 Consultation.
2	Marked-up design plan demonstrating: <ul style="list-style-type: none"> • The proposed/specified demonstration feature/installation. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • Installation and existence of the demonstration feature

Additional Information

Relevant definitions

None.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Man 13.11 – Ease of maintenance					
					-	-	-	-	-

Aim

To recognise and encourage the specification of a building and building services that can be easily maintained during their lifecycle.

Assessment Criteria

The following demonstrates compliance:

1. A critical appraisal has been completed at the feasibility stage of building procurement, covering the maintenance implications for different design options. This appraisal must comply with service life planning in accordance with ISO 15686 Service Life Prediction Procedures.
2. A maintenance strategy has been developed from the critical appraisal and formulated at the design stage. The maintenance strategy must cover the extent to which maintenance can be designed out and how support systems can be built into the specification to facilitate efficient and cost-effective operation and maintenance. The strategy must include an indication on how all major plant and equipment is to be removed and replaced within the design life of the building, including the access openings, lifting arrangement and route to and from the plant room at a delivery point.
3. Where there is a management plan for the landscaping (for example, as defined in BREEAM issue LUE 6 Long term impact on biodiversity), this has been included in the maintenance strategy.
4. Storage for appropriate equipment for cleaning and general maintenance, should be adapted. This must be evenly distributed over the entire area / building. As a minimum there should be broom cupboard or similar on each floor.

In connection with the larger purchase is recommended to use the checklist on account of ownership, operation and maintenance. CIBSE 'Guide to the ownership, operation and maintenance of building services' <http://www.cibse.org/index.cfm?go=publications.view&item=389>, can be utilized, until Norway have developed accordingly

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Fit Out only	This issue is not assessed in a fit-out only assessment.

Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
---	---

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	<p>A formal letter from the design team with:</p> <ul style="list-style-type: none"> Confirmation of use and compliance with relevant standards. <p>A copy of outcome from critical appraisal, in line with the CIBSE checklist at the relevant stages, such as design, tender, construction and commissioning stages.</p>	<ul style="list-style-type: none"> Same as for design stage
2&3	<p>A copy of the maintenance strategy (including the landscaping plan if appropriate).</p> <p>OR</p> <p>A formal letter from the design team confirming that:</p> <ul style="list-style-type: none"> A compliant maintenance strategy will be developed. This will include the landscape maintenance plan, if relevant. 	<p>A copy of the maintenance strategy (including the landscaping plan if appropriate).</p>
4	<p>Marked-up drawings showing locations and sizes of the storage space.</p>	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> The location and sizes of the cleaners' storage space.

Additional Information

None

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
3	3	3	3	Man 14 – BREEAM-NOR Accredited Professional	-	-	-	-	-

Aim

Promote the design and development of buildings with high environmental standards in an efficient and cost effective manner.

Assessment Criteria

In recognition of the significant contribution a BREEAM-NOR AP can make to the design process, up to three BREEAM-NOR credits are available if a BREEAM-NOR AP is engaged from an appropriate point in a project

The following demonstrates compliance:

First credit

1. BREEAM performance objectives are agreed, no later than the end of the design brief stage.
5. The appointed BREEAM-NOR Accredited Professional is given the opportunity to attend key design team meetings held from the start of design brief, up to and including stage Technical Design

If the overall responsibility is changed during the design stages, the role as BREEAM-NOR AP can be transmitted from one person to another.

Second credit

1. The first credit has been achieved.
2. The project is reviewed against BREEAM-NOR performance objectives by the appointed BREEAM-NOR Accredited Professional no later than the end of the Pre-Construction stage.
3. The appointed BREEAM-NOR Accredited Professional is given the opportunity to attend key design team meetings held from the start of production up to and including Construction to Practical Completion or equivalent, and is to be included on the circulation list of minutes from all meetings

Third credit

1. The first and second credit is achieved
2. The project/building has achieved a classification according to the performance objective, which was stated in connection to the first credit or higher, verified by third party assessment.

BREEAM-NOR Accredited Professional

The BREEAM-NOR AP will facilitate the team's efforts to successfully schedule activities, set priorities and negotiate the trade-offs required to achieve a target BREEAM rating when the design is formally assessed.

Compliance notes	
New Build	There are no additional or different requirements to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different requirements to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different requirements to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different requirements to those outlined above specific to new-build projects.
Fit Out only	There are no additional or different requirements to those outlined above specific to new-build projects.
BREEAM-NOR Accredited Professional Experience	<p>BREEAM-NOR Accredited Professional is licensed by NGBC, and has undertaken BREEAM-NOR AP training.</p> <p>BREEAM-NOR Accredited Professionals will provide the design team with expert advice on built environment sustainability, environmental design and environmental assessment.</p> <p>BREEAM-NOR AP has to have the following background to be licensed by NGBC:</p> <ul style="list-style-type: none"> • At least 3-three years post graduate (or equivalent) professional experience working in a role covering the sustainability of the built environment - candidates will ideally have design team involvement on a number of projects where sustainability was part of the project brief e.g. a target to achieve at least BREEAM Excellent for the completed design • Knowledge of environmental design / integrated design with an appreciation of life cycle assessment and cost analysis

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First Credit		
1	A copy of pre estimator analyses showing the possible scoring and performance objectives	A copy of pre estimator analyses showing the possible scoring and performance objectives
2	A copy of confirmation letter	A copy of confirmation letter
Second Credit		

1	Copy of the review(s) made during Design stage and/or Copy of the plan for review(s) to be done before Pre-Construction stage.	Copy of the review(s) made before Pre-Construction stage
2	A copy of confirmation letter	A copy of confirmation letter
Third Credit		
2	a copy of the assessment calculations confirming that the project qualifies for the proposed classification level or higher	a copy of the assessment calculations confirming that the project qualifies for the proposed classification level or higher

Additional Information

Relevant definitions

Other

The license as BREEAM-NOR AP does NOT document professional education and experience or specific expertise in the design of buildings.

BREEAM-NOR AP is expected to promote BREEAM in a positive manner, and make use of BREEAM-NOR in a way which is recognised as high quality.

5.0 Health and Wellbeing

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat		P	G	VG	E	O
1	1	1	1	Hea 1 - Daylighting	P	G	VG	E	O
					-	-	-	-	-

Aim

To give building users sufficient access to daylight.

Assessment Criteria

The following demonstrates compliance:

1. The provision of daylight has been designed in compliance with national best practice daylighting guides.
2. For all developments, 80% of the office floor area is adequately daylit as specified in point a-d.
3. For pre-schools, schools and further education colleges, at least 80% of floor area in occupied spaces are daylit as specified in point a-d. For higher education buildings, at least 60% of floor area in occupied spaces is adequately lit as specified in point a-d.
 - a. An average daylight factor in accordance with table 5.1 below:

Table 5.1 Average daylight factor measured at a height of 0.8 metres according to latitude at the building location

Latitude (°)	Average Daylight Factor		
	First credit - all buildings	Exemplary level	
		Single-storey buildings	Multi-storey buildings
55-60	2.1	4.2	3.15
≥60	2.2	4.4	3.3

PLUS either (b) OR (c AND d) below

- b. A uniformity ratio of at least 0.4 (spaces with glazed roofs, such as atria, must achieve a uniformity ratio of at least 0.7) or a minimum point daylight factor in accordance with table 5.2 below:

Table 5.2 Point daylight factor in office areas according to latitude at the building location

Latitude (°)	Minimum point daylight factors					
	First credit		Exemplary level – single storey buildings		Exemplary level – multi storey buildings	
	All other spaces	Spaces with glazed roofs	All other spaces	Spaces with glazed roofs	All other spaces	Spaces with glazed roofs
55-60	0.84	1.47	1.68	2.94	1.26	2.205
≥60	0.88	1.54	1.76	3.08	1.32	2.31

OR

- c. A view of sky from desk height (0.7m) is achieved.

AND

- d. The room depth criterion $d/w + d/HW < 2/(1-RB)$ is satisfied.

Where: d = room depth

w = room width

HW = window head height from floor level

RB = average reflectance of surfaces in the rear half of the room.

Note: Table 5.4 (see additional information) gives maximum room depths in metres for different room widths and window head heights of side lit rooms

3. For industrial developments, at least 80% of the operational area and all other *occupied spaces* are adequately daylit as follows;
 - a. Average daylight factor in accordance with table 5.1 above.
 - b. **PLUS** either (b) **OR** (d) above.
4. For retail developments, at least 35% of the common areas (where applicable) have point daylight factors in accordance with table 5.3 below:

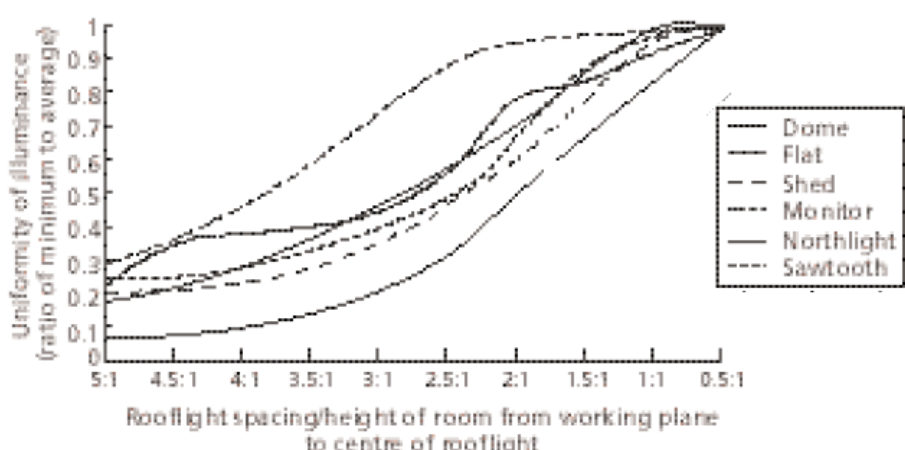
Table 5.3 Point daylight factor in common and sales areas according to latitude at the building location

Latitude (°)	Minimum point daylight factors
55-60	2.1
≥60	2.2

Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue.

1. At least 80% of floor area (for the building spaces/room identified above in the standard criteria) has an average daylight factor in accordance with table 5.1 above or an average daylight illuminance of 300 lux for 2650 hours per year in multi-storey buildings and 400 lux in single-storey buildings.
2. The criteria outlined above concerning uniformity ratio, view of sky or room depth criterion are met. Where demonstrating compliance via uniformity ratio or point daylight factor the following minimum criteria apply:
 - a. A uniformity ratio of at least 0.4 (spaces with glazed roofs, such as atria, must achieve a uniformity ratio of at least 0.7) or a minimum point daylight factor as in table 5.2 above.
3. For retail developments, at least 50% by floor area of the common spaces and 35% by floor area of the sales spaces have point daylight factors in accordance with table 5.3 above or point daylight illuminance of 200lux for 2650 hours per year.

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	The criteria of this issue apply only to the scope of the assessed building. If this scope includes the existing building as well as the new building then the relevant areas within the existing building must be assessed against the criteria of this BREEAM issue. If the assessment covers only the new building, then the areas in the existing building do not need to be assessed.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only projects.
Fit Out only	There are no additional or different criteria to those outlined above specific to fit out-only projects.
National daylighting best practice guides	Lyskultur, publication No. 21, 1998 "Daylight in buildings – Project planning guidelines" "Regulations relating to technical requirements for buildings (Building code regulations)" with guidelines. SINTEF Byggforsk Building Detail 421.610 "Requirements for lights and lighting"
Percentage of assessed area	Where the compliance requirement specifies that 80% of <i>office</i> or other <i>occupied space</i> floor area must be adequately daylighted, it refers to 80% of the total floor area of all the rooms that must be assessed i.e. the compliant area. If for example a development has 6 rooms that must be assessed, each 150m ² (total area 900m ²) then 720m ² must comply with the criteria; this is equal to 4.8 rooms. The number of rooms that must comply must always be rounded up; therefore in this example, five rooms must have an average daylight factor of 2,1% or more (plus meet the other criteria) to achieve the credit.
View of sky requirement	To comply with the <i>view of sky</i> criteria at least 80% of the room that complies with the average daylight factor requirement must meet the view out requirement; i.e. it is permissible for up to 20% of the room not to meet the view of sky requirement and still achieve a compliant room.
Uniformity with rooflights	The room depth criteria cannot be used where the lighting strategy relies on rooflights. In such areas either appropriate software should be used to calculate the uniformity ratio or, in the case of a regular array of rooflights across the whole of the space, the following figure can be used to determine the uniformity ratio. 

	<u>Uniformity of illuminance decreases as the spacing between rooflights</u> (extracted from the CIBSE Guiding Light LG10)
Excluded areas	Media, arts production, SEN sensory spaces, x-ray rooms and other areas requiring strictly controlled acoustic or lighting conditions can be omitted from the assessment criteria. Sports hall exercise spaces should be included within the daylight calculations. In general, the assessor should use their professional judgement to establish which areas need to be exempted from the assessment of this issue. Any exclusion will need to be fully justified in the certification report.
Laboratories	Laboratory areas must be included within the definition of <i>occupied areas</i> unless the type of research that will be carried out requires strictly controlled environmental conditions, such as the exclusion of natural light at all times.
Two-side lit rooms	For rooms lit by windows on two opposite sides, the maximum room depth that can be satisfactorily daylighted is twice the limiting room depth (d) (measured from window wall to window wall; CIBSE Lighting Guide LG10. The reflectance of the imaginary internal wall should be taken as 1.
Borrowed light	For areas where borrowed light is used, calculations or results from appropriate lighting design software must be provided to demonstrate that such areas meet the BREEAM requirements (if contributing to the percentage of compliant area). Examples of borrowed light include: light shelves, clerestory glazing, sun pipes or internal translucent/transparent partitions (such as those using frosted glass).
Daylight factor for a point	The daylight factor for a point must be computed for a point 1.0 metres from a side wall, at a height of 0.8 metres above the floor and halfway in from the window facade.

Schedule of Evidence Required

	Design Stage	Post Construction Stage
Option 1		
All	<p>Design plans for each floor in the building with each room/area appropriately labelled for use.</p> <p>AND</p> <p>Daylight calculations confirming:</p> <ul style="list-style-type: none"> • Building areas assessed • Latitude of the site • The daylighting variables/criterion measured • Average daylight factor for each area • A copy of the results of the modelling demonstrating that the appropriate level of illuminance has been achieved for all relevant areas • Compliance with room depth criterion, uniformity ratio, view of sky (if required) • The daylight provision is in compliance with the relevant standards. <p>Retail only</p> <ul style="list-style-type: none"> • The percentage of area where point daylight factors are at least 2.1/2.2 % • The position of the 2.1/2.2 % daylight factors isolux contours in each of the rooms assessed 	<p>Daylight calculations for the building 'as built' confirming compliance with all criteria.</p> <p>OR</p> <p>Assessor's site inspection report or 'as-built' drawings confirming:</p> <ul style="list-style-type: none"> • The window sizes, light transmittance and dirt factor, wall thickness and room layout and dimensions are as per design-stage daylighting compliant room • A letter from the design team or main contractor confirming that window specification, size and/or room layout have not changed since the design stage assessment. <p>Where there have been changes, revised calculations/modelling are required to demonstrate compliance for the relevant areas/rooms.</p> <p>OR</p> <p>Results from on-site measurements* that have been carried out.</p> <p>*These must be in accordance to the methodology described in Lyskultur, publication No. 21, 1998 "Daylight in buildings – Project planning guidelines"</p>

Additional Information

Relevant definitions

Occupied space: A room or space within the assessed building that is likely to be occupied for 30 minutes or more by a building user.

Point daylight factor: A point daylight factor is the ratio between the illuminance (from daylight) at a specific point on the working plane within a room, expressed as a percentage of the illuminance received on an outdoor unobstructed horizontal plane. This is based on an assumed overcast sky, approximated by the 'CIE (Commission Internationale de l'Eclairage) overcast sky'. Computer simulations are the most appropriate tools to allow for point daylight factors to be displayed. Alternatively, the DF can be measured and computed in a scale model under an artificial sky with the use of lux meters. 2% daylight factors isolux contours (i.e. lines connecting all the points that have the same point daylight factor value) will need to be mapped on the room plan to check the area where point daylight factors are 2% or higher. Mapping should be done based on a minimum calculation grid of 50x50cm and 50cm from the wall.

Average daylight factor: The average daylight factor is the average indoor illuminance (from daylight) on the working plane within a room, expressed as a percentage of the simultaneous outdoor illuminance on a horizontal plane under an unobstructed CIE Standard Overcast Sky.

Illuminance: The amount of light falling on a surface per unit area, measured in lux.

Uniformity: The uniformity is the ratio between the minimum illuminance (from daylight) on the working plane within a room (or minimum daylight factor) and the average illuminance (from daylight) on the same working plan (or average daylight factor).

View of sky / no-sky line: Areas of the working plane have a view of sky when they receive direct light from the sky, i.e. when the sky can be seen from working plane height. The no-sky line divides those areas of the working plane, which can receive direct skylight, from those that cannot.

Working plane: the horizontal, vertical or inclined plane in which a visual task lies. The working plane is normally taken as 0.7-0.8 m above the floor .

Computer simulation: Software tools that can be used to model more complex room geometries for daylighting.

The table below gives maximum room depths in metres for different room widths and window head heights of sidelit rooms:

Table 5.4 Reflectance for maximum room depths and window head heights

Reflectance (R_B)	0.4		0.5		0.6	
Room Width (m)	3.0	10.0	3.0	10.0	3.0	10.0
Window Head Height (m)						
2.5	4.5	6.7	5.4	8.0	6.8	10.0
3.0	5.0	7.7	6.0	9.2	7.5	11.5
3.5	5.4	8.6	6.5	10.4	8.1	13.0

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat		P	G	VG	E	O
1	1	1	1	Hea 2 – View Out	P	G	VG	E	O
					-	-	-	-	-

Aim

To allow occupants to refocus their eyes from close work and enjoy being able to see an external view and follow the changes in weather conditions and daylight throughout the day, thus reducing the risk of eyestrain and breaking the monotony of the indoor environment.

Assessment Criteria

The following demonstrates compliance:

1. The *relevant building areas* are within 7m distance of a wall with a window or permanent opening providing an *adequate view out*, where the window/opening is $\geq 20\%$ of the total inside wall area (refer to Compliance Notes for a definition of *relevant building areas* and *adequate view out*).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	Where the actual workstations/desk layout is unknown at the time of assessment, a notional workstations/desk layout may be used to demonstrate compliance. Where it is not possible to confirm which areas of the building will contain workstations/benches or desks, due to the speculative nature of the building, then all areas of the building must comply (excluding ancillary areas).
Fit Out	The criteria at this stage of assessment are the same as those identified at the design stage.
Buildings with office space <500m² (Retail & Industrial only)	If the building being assessed contains office space that totals <500m ² then this BREEAM issue does not need to be assessed as a standalone issue. The criteria for this issue form a part of BREEAM credit Hea 14 'Office Space'. The aim of Hea 14 is to recognise relevant Health & Wellbeing issues in buildings with a small amount of office space, ensuring the issues are weighted relative to the overall proportion of the building and users who utilise this type of space.

Adequate view out	The view out should ideally be through an external window providing a view of a landscape or buildings (rather than just the sky) at seated eye level (1.2 – 1.3m) in the <i>relevant building areas</i> . A view in to an internal courtyard or atrium will comply provided the distance from the opening to the back wall of the courtyard/atrium is at least 10m (therefore allowing enough distance for the eyes to refocus). The view cannot be an internal view across the room, as this is likely to become obstructed by partitions, filing cabinets etc. The bottom edge of the window must be maximum 0,9 m above underling floor.
High level windows	Roof lights and high level windows that do not provide an <i>adequate view out</i> do not meet the criteria for this BREEAM issue.
Relevant building areas	Where the term ' <i>relevant building areas</i> ' is referenced in this BREEAM issue it refers to any areas of the building where there are, or will be, workstations/benches or desks for building users.
Excluded areas:	Areas where activities requiring the exclusion or limitation of natural light is a functional requirement of the space, such as e.g sports halls, conference rooms/lecture theatres, laboratories where research activities require permanent exclusion of daylight etc., can be excluded from the assessment

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	<p>Design plan and elevation showing:</p> <ul style="list-style-type: none"> All <i>relevant building areas</i> and room depths Actual or notional workstations/desk layout Window/open areas <p>Site plan showing:</p> <ul style="list-style-type: none"> Building location and proximity to external obstructions. 	<p>Assessor's site inspection report and photographic evidence confirming:</p> <ul style="list-style-type: none"> All <i>relevant building areas</i> comply. <p>OR</p> <p>As built drawings or a formal letter form the design team confirming:</p> <ul style="list-style-type: none"> No changes have occurred since design stage, therefore design stage evidence demonstrates compliance post construction.

Additional Information

Relevant definitions

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat		P	G	VG	E	O
1	1	1	1	Hea 3 – Glare Control	-	-	-	-	-

Aim

To reduce problems associated with glare in occupied areas through the provision of adequate glare control systems.

Assessment Criteria

The following demonstrates compliance:

1. An occupant-controlled shading system on all windows, glazed doors and rooflights in all *relevant building areas*..

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where the existing building falls within the scope of the assessment, then the criteria extend to the <i>relevant building areas</i> and <i>occupied spaces</i> of the existing building. If only the new extension is being assessed then the criteria apply to the relevant areas of the new building.
Shell only	<p>Compliance with this BREEAM issue can be demonstrated via one of the following means in shell only buildings/areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.

Buildings with office space <500m² (Retail & Industrial only)	If the building being assessed contains office space that totals <500m ² then this BREEAM issue does not need to be assessed as a standalone issue. The criteria for this issue form a part of BREEAM issue Hea 14 'Office Space'. The aim of Hea 14 is to recognise relevant Health & Wellbeing issues in buildings with a small amount of office space, ensuring the issues are weighted relative to the overall proportion of the building and users who utilise this type of space.
Relevant building areas	Where the term ' <i>relevant building areas</i> ' is referenced in this BREEAM issue it refers to any areas of the building where there are, or will be, workstations/benches, desks and/or close work will be undertaken or visual aids used.
Workshops	For workshops, to avoid unduly high maintenance due to dust/dirt, compliance can be also be demonstrated in such areas by designing out glare through measures such as brise-soleil, low eaves, bioclimatic design or blinds integral to the window.

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1	<p>Marked-up copy of the design plan(s) confirming:</p> <ol style="list-style-type: none"> 1. A description of the function of each of the building spaces. <p>A copy of the relevant specification clause(s), window schedule or design plan confirming:</p> <ul style="list-style-type: none"> • Type of shading system(s) and control to be installed. 	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ol style="list-style-type: none"> 2. Installation of compliant glare control system.

Additional Information

Relevant definitions

Occupied space: A room or space within the assessed building that is likely to be occupied for 30 minutes or more by a building user and, with respect to this issue, where it would be desirable to limit the potential for glare or provided a system of glare control.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat		P	G	VG	E	O
1	1	1	1	Hea 4 - High frequency lighting					
					-	-	-	-	-

Aim

To reduce the risk of health problems related to the flicker from light sources.

Assessment Criteria

The following demonstrates compliance:

1. All discharge lamps, fluorescent tubes and compact fluorescent lamps are fitted with high frequency ballasts/transformers/drivers. If PWM (Pulse Width Modulation) of light sources, for example LEDs, takes place, then such must be high frequency.

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where the existing building falls within the scope of the assessment, then the criteria extend to the existing building. If only the new extension is being assessed then the criteria apply to the new building only.
Shell Only	<p>Compliance with this BREEAM issue can be demonstrated via one of the following means in shell only buildings/areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1	A copy of the specification clause or room data sheets confirming: <ul style="list-style-type: none"> A compliant lighting strategy. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> Installation of high frequency ballasts/transformers/drivers. <p>OR</p> As-built drawings/specification confirming: <ul style="list-style-type: none"> No changes have occurred since design stage assessment. Where changes have occurred, a compliant lighting strategy is installed.

Additional Information

Relevant definitions

High frequency ballast: High frequency ballasts increase the frequency of the power coming from the grid (50Hz) to a frequency optimising the performance of fluorescent lamps, typically around 30kHz.

There are several advantages to running fluorescent lamps at higher frequencies. At 30kHz, the frequency of re-ignition of a fluorescent lamp is too quick to be detected by the human eye, therefore reducing visible flicker that some fluorescent lamps running on mains frequency fail to do. Additionally, 30kHz being above the audible range of the human ear, the buzzing noise coming out of low quality main frequency ballasts is avoided. Finally, the luminous efficacy of fluorescent lamps increases with frequency; it can be optimised by up to 10% when they are running at 30kHz compared to those operating at 50Hz.

LED modules that are 230V will be able to flicker, see also "normal" LED fittings during dimming. When dimming LEDs, the most common method is PWM (Pulse Width Modulation), which causes the light to be rapidly switched on and off, i.e. the time the light is actually on is being regulated. If it is not checked that the frequency at which this is occurring is sufficiently high, it will be possible that flickering may be introduced.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Hea 5 - Internal and external lighting levels	-	-	-	-	-

Aim

To ensure lighting has been designed in line with best practice for visual performance and comfort.

Assessment Criteria

The following demonstrates compliance:

1. Internal and external lighting luminance (lux) levels are specified in accordance with national best practice lighting guides. The lighting strategy for the building design must correspond to the levels in the national best practice guidelines (see compliance notes for task areas, surrounding areas and background areas).
2. For areas where computer screens are regularly used, confirmation is required that the lighting has been designed to limit the potential for glare in accordance with national best practice lighting guides, in particular the UGR limits are met.
3. The uniformity of illuminance over any task area is specified in accordance with national guidelines for best practices for lighting.

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where the existing building falls within the scope of the assessment, then the criteria extend to the existing building. If only the new extension is being assessed then the criteria apply to the areas of the new building only.

Shell Only	<p>The assessment criteria apply to shell only areas of the building. For the purposes of the BREEAM assessment it is permissible for the design team to substitute the default design fit-out performance specification (as defined in local building regulations) for the performance specifications confirmed within a <i>Green Lease Agreement (a template for this is under preparation by Norwegian Real Estate/Green Building Alliance)</i>. This rule applies only to those areas of the building that the scope of the Green Lease covers. Tenanted areas not covered by the scope of the Green Lease must assume the default design fit-out performance specification as defined under local building regulations.</p> <p>The use of a <i>Green Building Guide</i> for tenants fit out (as defined in the Scope section 2.2) cannot be used to substitute the maximum design fit out specification, for the purpose of assessing BREEAM issue Hea 5 Internal and external lighting levels.</p> <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
Surrounding area	The illuminance of the immediate surrounding areas must be related to the illuminance of the task area, and should provide a well-balanced luminance distribution in the field of view. Large spatial variations in illuminance around the task area may lead to visual stress and discomfort. The immediate surrounding area is taken to be a band with a width of at least 0.5 m indoors and 2.0 m outdoors.
No external areas	Where no external light fittings are specified, the criteria relating to external lighting do not apply and the credit can be awarded on the basis of compliance with the internal lighting criteria.
National best practice lighting guides	<ul style="list-style-type: none"> • Lyskultur's "1B lux table and planning criteria for indoor lighting systems" is a guide to "NS-EN 12464-1 Light and lighting - Lighting of workspaces - Part 1: Indoor work places." • Lyskultur's "1C lux table and planning criteria for lighting of outdoor work places" is a guide to "NS-EN 12464-2 Light and lighting - Lighting of workspaces – Part 2: Outdoor work places."

Schedule of Evidence Required

	Design Stage	Post Construction Stage
--	--------------	-------------------------

All	<p>A copy of the specification or relevant room schedules confirming:</p> <ul style="list-style-type: none"> • The internal/external illuminance levels are equal to or more stringent than those established in NS-EN 12464. • UGR limits • The uniformity of illuminance over task areas and surrounding area. • Where applicable, confirmation that illuminance levels are equal to or more onerous than those set in NS- EN 12464. • That the task area, surrounding area and any possible background area are defined with respect to national guidelines. <p>OR</p> <p>A formal written declaration of conformity from the relevant member of the design team confirming:</p> <ul style="list-style-type: none"> • The maintained illuminance levels, UGR limits and uniformity for internal/external space are in compliance with the relevant Standard. 	<p>A formal written declaration from the design team or main contractor confirming:</p> <ul style="list-style-type: none"> • Light fittings have been installed in compliance with the lighting specification. • No changes have occurred in the lighting specification used to demonstrate design stage compliance. <p>Where changes have occurred, a further declaration is required confirming that the revised lighting specification is in compliance with the BREEAM criteria.</p>
-----	--	--

Additional Information

Relevant definitions

Construction zone: For the purpose of this BREEAM issue the construction zone is defined as the site which is being developed for the BREEAM-assessed building, and the external site areas that fall within the scope of the new works.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Hea 6 - Lighting zones and controls	P	G	VG	E	O
					-	-	-	-	-

Aim

To ensure occupants have easy and accessible control over lighting within each *relevant building area*.

Assessment Criteria

The following demonstrates compliance:

1. Lighting is zoned to allow *separate occupant control* of the following areas (where applicable):
 - a. Office and circulation spaces
 - b. In office areas, zones of no more than four workplaces
 - c. Workstations adjacent to windows/atria and other building areas separately zoned and controlled.
 - d. Seminar and lecture rooms: zoned for presentation and audience areas
 - e. Library spaces: separate zoning of stacks, reading and counter areas.

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to new building extensions to existing buildings.
Shell Only	In the case of speculative buildings, the control system must have the capacity to be zoned, as required, once the final tenant is known and occupancy patterns/layout are agreed.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only projects.
Buildings with office space <500m² (Retail & Industrial only)	If the building being assessed contains office space that totals <500m ² then this BREEAM issue does not need to be assessed as a standalone issue. The criteria for this issue form a part of BREEAM issue Hea 14 'Office Space'. The aim of Hea 14 is to recognise relevant Health & Wellbeing issues in buildings with a small amount of office space, ensuring the issues are weighted relative to the overall proportion of the building and users who utilise this type of space.
Occupancy / workstation layout unknown	Where occupancy/workstation layout is not known, lighting control can be zoned on the basis of 40m ² grids i.e. an assumption of 1 person/workspace per 10m ² .
Small spaces	Where the building consists entirely of small rooms/spaces (less than 40m ²) which do not require any subdivision of lighting zones/control or meet the criteria by default, then this credit may be awarded.

Schedule of Evidence Required

	Design Stage	Post Construction Stage
All	Design plans for each floor of the building highlighting: <ul style="list-style-type: none"> • Space arrangement and room type AND Specification or design plans confirming: <ul style="list-style-type: none"> • Lighting zones • Location and scope of user-controls. 	Assessor's site inspection report, or as-built drawings/specification confirming: <ul style="list-style-type: none"> • No changes have occurred since design stage; therefore, design stage evidence can be used to demonstrate compliance at post construction stage. • Where changes have occurred since design stage, the amended features still comply with the design stage criteria.

Additional Information

Relevant definitions

Separate Occupant Control: Light switches/controls for a particular area/zone of the building that can be accessed and operated by the individual(s) occupying that area/zone. Such controls will be located within, or within the vicinity of, the zone/area they control.

Publication No. 24, "Lighting controls", from Lyskultur may be used for advice and guidance.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Hea 7 - Potential for Natural Ventilation	-	-	-	-	-

Aim

To recognise and encourage adequate cross flow of air in naturally ventilated buildings and use of natural ventilation in air-conditioned/mechanically ventilated buildings when outdoor climate makes it possible

Assessment Criteria

The following demonstrates compliance:

1. Office areas of the building are designed to be capable of providing fresh air entirely via a natural ventilation strategy, demonstrated via **EITHER** of the following:
 - a. The *openable window area* in each office space is equivalent to 5% of the gross internal floor area of that room/floor plate. For room/floor plates between 7m-15m depth, the *openable window area* is on opposite sides and evenly distributed across the area to promote adequate cross-ventilation. **OR**
 - b. The design demonstrates (by calculation, using ventilation design tool) that the natural ventilation strategy provides adequate cross flow of air to maintain required thermal comfort conditions and ventilation rates.

For a strategy which does not rely on *openable windows*, or which has office spaces with a plan depth greater than 15m, the design must demonstrate (by calculation in accordance with requirement 1b above) that the ventilation strategy can provide adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates.

2. The strategy is capable of providing at least two levels of user-control on the supply of fresh air to the office space with higher rates of ventilation achievable to remove short-term odours and/or prevent summertime overheating.

This would typically be demonstrated by providing a large enough area of manually opening windows or powered window actuators. Any opening mechanisms must be easily accessible and provide adequate user-control over air flow rates to avoid draughts.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where the existing building falls within the scope of the assessment, then the criteria extend to the existing building. If only the new extension is being assessed then the criteria apply to the areas of the new building only.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only projects.

Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only projects.
Buildings with office space <500m² (Retail & Industrial only)	If the building being assessed contains office space that totals <500m ² then this BREEAM issue does not need to be assessed as a standalone issue. The criteria for this issue forms a part of BREEAM issue Hea 14 'Office Space'. The aim of Hea 14 is to recognise relevant Health & Wellbeing issues in buildings with a small amount of office space, ensuring the issues are weighted relative to the overall proportion of the building and users who utilise this type of space.
Mechanically ventilated/cooled buildings	The aim of this BREEAM issue is to ensure that a building is capable of providing fresh air using a natural ventilation strategy. As a result, buildings that employ a mechanically ventilated/cooled strategy may still be able to achieve the credit, provided they can demonstrate compliance with the above criteria (for future adaptability).
Openable window area	The <i>openable window area</i> is defined as the geometric free ventilation area created when a ventilation opening, e.g. window, is open to its normal operational fully designed extent (i.e. this excludes open areas created when reversible windows are opened for cleaning etc). It is not the glazed area of a façade or the glazed area of the part of the window that is openable (unless it opens fully).

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-2	<p>Design plans and elevations, specification or calculations confirming:</p> <ul style="list-style-type: none"> Ventilation strategy in each <i>occupied space</i> The depth of the room Gross internal floor area of each <i>occupied space</i> The type of window/ventilator and total <i>openable area</i> * The location of openings The type and degree of user-control. <p>AND (where relevant)</p> <p>A copy of the results from the appropriate software modelling tool demonstrating compliance.</p> <p>*Manufacturers'/suppliers' literature may also be used as evidence.</p>	<p>Assessor's site inspection report and photographic evidence confirming:</p> <ul style="list-style-type: none"> The ventilation openings and controls are installed in accordance with compliant design stage evidence. * <p>A formal letter from the design team or main contractor confirming:</p> <ul style="list-style-type: none"> No changes have occurred since design stage. <p>Where changes have occurred since design stage, 'as-built' drawings, specification and calculations (as outlined under design stage evidence) that re-confirms compliance.</p> <p>* A random spot check of a selection of <i>occupied spaces</i> is sufficient. The assessor is not required to check each opening in all spaces/rooms.</p>

Additional Information

Relevant definitions

Ventilation design tools: any of the following design tools can be used to demonstrate compliance, different tools being more suited to different stages in the development of the design:

- Envelope flow models
- Computational fluid dynamics (CFD)

- Combined thermal and ventilation models
- Physical scale models.

Envelope flow models are the simplest tool and are recommended for the initial sizing of openings at the chosen design conditions. The other tools provide more detailed information and are usually more suited to later stages in the design.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	2	2	2	Hea 8 - Indoor Air Quality	-	-	1	1	2

Aim

To reduce the risk to health associated with poor indoor air quality due to unsatisfactory ventilation solutions.

Assessment Criteria

The following demonstrates compliance:

First credit

- Documentation being available that the building was designed to give quantities of fresh air with respect to the Norwegian Technical Regulations.
- Documentation being available of the implementations and final checks of the air quantities and qualities (commissioning records).
- Areas of the building subject to large and unpredictable or variable occupancy patterns such as shops and leisure buildings have CO₂ or air quality sensors specified and:
 - In mechanically ventilated spaces, the sensor(s) are linked to the mechanical ventilation system and provide demand-controlled ventilation to the space.
 - In naturally ventilated spaces, the sensors either have the ability to alert the building owner/manager when CO₂ levels exceed the recommended set point, or are linked to controls with the ability to adjust the quantity of fresh air, i.e. automatic opening windows/roof vents.
- Air-conditioned and mix-mode buildings: Where the building's air intakes are over 10 m apart to minimise recirculation AND intakes are over 20 m from sources of external pollution. Naturally ventilated buildings: Where openable windows/ventilators are over 10m from source of external pollution.

AND

Documentation being available that the placement and design of air intakes and exhaust outlets are according to recommendations given in Building Details 552.360 and NS 13779:2007 in order to reduce the risk of moisture permeation and other pollution.

- An operating and maintenance plan has been prepared for the ventilation system in Norwegian.

Two credits

- Points 1 – 5 above have been fulfilled
- The ventilation system gives the user the possibility to override night set back of ventilation in a simple manner

8. Documentation being available showing that course material has been developed for future training of operating personnel encompassing:
- Detailed description of the ventilation system, including operation procedures
 - Detailed description of operating and maintenance procedures ensuring optimum operation of the ventilation system

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only projects.
Fit Out only	There are no additional or different criteria to those outlined above specific to fit out-only projects.
Scope of the assessment criteria – industrial buildings	For industrial buildings the criteria apply only to the staff office areas and not the operational area. If the building does not contain any office areas, the BREEAM assessor's spreadsheet tool will filter this issue from the list of applicable credits.
Buildings with office space <500m² (industrial only)	If the building being assessed contains office space that totals <500m ² then this BREEAM issue does not need to be assessed as a standalone issue. The criteria for this issue form a part of BREEAM issue Hea 14 'Office Space'. The aim of Hea 14 is to recognise relevant Health & Wellbeing issues in buildings with a small amount of office space, ensuring the issues are weighted relative to the overall proportion of the building and users who utilise this type of space.
Local or national best practice ventilation standards	Technical Regulations, Building Detail 552.360 "Placement of fresh air intake and exhaust to minimize pollution" and NS-EN 13779; Ventilation for non-residential buildings. Performance requirements for ventilation and room-conditioning systems.
Measuring the distance	The distance requirement does not necessarily mean the plan distance, but the three dimensional distance around and over objects; e.g. on plan the air intakes may be less than 20m from a source of external pollution, but the intake may be on the roof of a 10 storey building and therefore over 20m from the source of pollution.
Sources of external pollution	This includes the following: <ul style="list-style-type: none"> Highways and the main access roads on the assessed site. Car parks and delivery/vehicle waiting bays Other building exhausts, including from building services plant industrial/agricultural processes
Excluded sources	Service and access roads with restricted and infrequent access (for example roads used only for waste collection) are unlikely to represent a significant source of external pollution. These roads can therefore be excluded from the criteria of this issue. This does not include vehicle pick-up/drop-off or waiting bays.
Filters	It must be noted that filters fitted on the air supply are not considered by BREEAM to provide adequate protection from sources of external pollution. As such the distance criteria cannot be relaxed where filters are specified.

Areas with a large and unpredictable occupancy	<p>The following are examples of these types of spaces:</p> <ul style="list-style-type: none"> • Auditoria • Gyms • Retail stores/malls • Cinemas • Waiting rooms • Schools • Meeting locations <p>Where the assessed building does not have any areas deemed to be large with an unpredictable pattern of occupancy, the third BREEAM requirement does not apply.</p>
---	---

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1, 2 and 5	<p>A copy of the relevant area(s) in the specification that confirm: Design team calculations and/or performance specification criteria confirming:</p> <ul style="list-style-type: none"> • The fresh air rate set for each space • That the fresh air rate can be met using the chosen strategy • The relevant standard(s) to which the design is in accordance with. <p>Where applicable, a confirmation that the minimum requirements that are established in the Technical Regulations are satisfied.</p>	<p>Commissioning report confirming that:</p> <ul style="list-style-type: none"> - the required fresh air quantities and qualities have been achieved.
3	<p>A copy of the relevant clause(s) of the specification confirming:</p> <ul style="list-style-type: none"> • Air quality monitoring sensors • How these boost ventilation when set points are triggered. 	<p>Assessor's building/site inspection and as built drawings confirming:</p> <ul style="list-style-type: none"> • Installation of air quality sensors. • The sensors boost ventilation when set points are triggered
4	<p>A marked-up proposed site plan highlighting:</p> <ul style="list-style-type: none"> • Locations of intakes, extracts, openable windows, ventilators • Any existing or proposed sources of external pollution. 	<p>Assessor's building/site inspection and as built drawings confirming:</p> <ul style="list-style-type: none"> • Locations of intakes, extracts, openable windows, ventilators <p>Proximity of any sources of external pollution to the above.</p>
5	<p>An operating and maintenance plan in Norwegian</p>	<p>Assessor's inspection report that confirms:</p> <ul style="list-style-type: none"> • That an operating and maintenance plan in Norwegian for the ventilation system has been submitted

7	<p>A labelled proposed building development plan showing:</p> <ul style="list-style-type: none"> • Where/how the user can override any possible nighttime reductions 	<p>Assessor's inspection report that confirms:</p> <ul style="list-style-type: none"> - that the user has the possibility to override any possible nighttime reductions
8	<p>Document that contains a description of training courses for operating personnel in the operation and maintenance of the ventilation system</p>	<p>Assessor's confirmation:</p> <ul style="list-style-type: none"> - that a plan for training course have been submitted

Additional Information

Relevant definitions

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	2	2	2	Hea 9 – Pollutants in the indoor environment	-	-	1	2	2

Aim

To reduce pollutants in the indoor air (suspended dust and chemical compounds) through requirements for documented good building cleanliness and the choice of materials and products with documented low emissions of volatile organic compounds and other chemical signal substances/compounds.

Assessment Criteria

The following demonstrates compliance:

First point

- Documentation being available that fixed procedures have been established for clean and tidy building processes with respect to recommendations given in Building Detail 501.107.
- The quality of the cleaning upon the delivery of the building being documented and fulfilling at least quality level 4 given in Building Detail 501.108 and NS-EN-INSTA-800.
- All decorative paints and varnishes have been tested against EN ISO 11890-2:2006 Paints and varnishes. *Determination of volatile organic compound (VOC) content. Gas-chromatographic method* and meet the phase II maximum VOC content limit values set in Annex II of Decorative Paint Directive 2004/42/CE. All decorative paints and varnishes must also be fungal and algal resistant.
- The aim must be to use health-friendly interior paint in the building. Degassing (TVOC) from the interior painting three full days after application must be specified. The degassing must be measured with respect to SVEFF's trade standard "Chemical Emission from paint and lacquer" with FLEC method, SP method 1598 or ISO 16000-10.
- At least five out of the eight product categories listed in table 5.5 below (where specified) have been tested against and meet the *relevant standards* outlined in the table below for Volatile Organic Compound (VOC) emissions.
- Mineral fibre products and other products with small fibres that might come loose are shaped or built-in such that emission of fibres to the air in the room is prevented. Polluting activities and processes are encapsulated, equipped with point exhaust vacuuming or take place in premises with suitable separate ventilation.

Second point

- The first point must be achieved.
- At least six of the eight product categories that are listed in table 5.5 below (if specified), have been tested against and satisfy the relevant standards that are outlined in the table below.

Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue:

9. Two credits HEA 9 is awarded
10. All product categories listed below (where specified) have been tested against and meet the relevant standards outlined in the table below for Volatile Organic Compound (VOC) emissions.

Table 5.5 VOC criteria by product type

<p>Wood Panels</p> <ul style="list-style-type: none"> • Particleboard, • Fibreboard including MDF, • OSB, • Cement-bonded particleboard • Plywood • Solid wood panel and acoustic board 	<p>EN 13986:2002 NS-EN 15251:2007</p>	<p>Formaldehyde E1 (Testing req 1 – see below) 2. The level of emissions 4 weeks after production must be lower than what is posed as a requirement for low pollutant materials in NS-EN 15251:2007, Supplement C, and which are based upon the same measurement methodology/test methodology that is used in Emission Classification of Building Materials (M1). Verify that regulated wood preservatives are absent and of the minimum content.</p>
<p>Timber Structures</p> <ul style="list-style-type: none"> • Glued laminated timber 	<p>EN 14080:2005 NS-EN 15251:2007</p>	<p>Formaldehyde E1 (Testing req 1) 2. The level of emissions 4 weeks after production must be lower than what is posed as a requirement for low pollutant materials in NS-EN 15251:2007, Supplement C, and which are based upon the same measurement methodology/test methodology that is used in Emission Classification of Building Materials (M1).</p>
<p>Wood flooring</p> <ul style="list-style-type: none"> • e.g. parquet flooring 	<p>EN 14342:2005 NS-EN 15251:2007</p>	<p>Formaldehyde E1(Testing req 1) 2. The level of emissions 4 weeks after production must be lower than what is posed as a requirement for low pollutant materials in NS-EN 15251:2007, Supplement C, and which are based upon the same measurement methodology/test methodology that is used in Emission Classification of Building Materials (M1). Verify that regulated wood preservatives are absent and of the minimum content.</p>

<p>Resilient, textile and laminated Floor coverings</p> <ul style="list-style-type: none"> • Vinyl/linoleum • Cork and rubber • Carpet • Laminated wood flooring 	<p>EN 14041:2004 NS-EN 15251:2007</p>	<p>Formaldehyde E1 (Testing req 1) 2. The level of emissions 4 weeks after production must be lower than what is posed as a requirement for low pollutant materials in NS-EN 15251:2007, Supplement C, and which are based upon the same measurement methodology/test methodology that is used in Emission Classification of Building Materials (M1). Verify that regulated preservatives are absent and of the minimum content.</p>
<p>Suspended ceiling tiles</p>	<p>EN 13964:2004 NS-EN 15251:2007</p>	<p>Formaldehyde E1 (Testing req 1) 2. The level of emissions 4 weeks after production must be lower than what is posed as a requirement for low pollutant materials in NS-EN 15251:2007, Supplement C, and which are based upon the same measurement methodology/test methodology that is used in Emission Classification of Building Materials (M1). No asbestos.</p>
<p>Flooring adhesives</p>	<p>EN 13999-1:2007 NS-EN 15251:2007</p>	<p>1. The level of emissions 4 weeks after production must be lower than what is posed as a requirement for low pollutant materials in NS-EN 15251:2007, Supplement C, and which are based upon the same measurement methodology/test methodology that is used in Emission Classification of Building Materials (M1). Verify that carcinogenic or sensitising volatile substances are absent (Testing req. 2-4).</p>
<p>Sealants</p>		<p>1. Emissions Level to 4 weeks after production will be lower than the primary requirement for low polluting materials in EN 15251:2007, Appendix C, which is based on the same measurement method / test method used in Emission Classification of Building Materials (M1)</p>
<p>Wall-coverings</p> <ul style="list-style-type: none"> • Finished wallpapers • Wall vinyl's and plastic wall-coverings • Wallpapers for subsequent 	<p>EN 233:1999 EN 234:1989 EN 259:2001 EN 266:1992 NS-EN 15251:2007</p>	<p>Formaldehyde (testing req. 5) and Vinyl chloride monomer (VCM) (testing req. 5) release should be low and within the EN standard for the material.</p>

decoration. <ul style="list-style-type: none"> • Heavy duty wall-coverings • Textile wall-coverings 		2. The level of emissions 4 weeks after production must be lower than what is posed as a requirement for low pollutant materials in NS-EN 15251:2007, Supplement C, and which are based upon the same measurement methodology/test methodology that is used in Emission Classification of Building Materials (M1). Verify that the migration of heavy metals (5) and other toxic substances are within the EN standard for the material.
Testing requirement: <ol style="list-style-type: none"> 1. EN 717-1:2004 2. EN 13999-2:2007 - Volatile Organic Compounds (VOCs) 3. EN 13999-3:2007 - Volatile aldehydes 4. EN 13999-4:2007 - Volatile diisocyanates 5. EN 12149:1997 		

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	<p>Compliance with this BREEAM issue can be demonstrated via one of the following means in shell only buildings/areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide (ref chapter 2) for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Furnishings	The scope of this BREEAM issue does not extend to furnishings e.g. desks/shelving, it focuses on the key internal finishes and fittings integral to the building.

Relevant standards	<p>All standards outlined in the table above are standards recognised across Europe for VOC content, with the exception of the requirements that are posed for indoor painting. In this area there currently are no other boundary values /requirements that are able to give the manufacturers who focus on low-emission paint the requisite assistance in delineating their products. We thus have taken a point of departure in NAAF's requirement for TVOC specifically in order to contribute to manufacturers who have high quality paint with low emissions receiving such assistance with their segment.</p> <p>Other standards and guidelines: Building Details 501.107 Clean, dry building processes Building Details 501.108 Cleanliness during the building period SP method No. 1598, Swedish National Testing and Research Institute, www.sp.se</p> <p>SVEFF's trade standard "Chemical Emission from paint and lacquer" with FLEC method (Field and Laboratory Emission Cell), The Swedish Paint and Ink Makers Association NS-EN ISO 16000-10:2006 Air examination in indoor air – Part 10: Determination of emissions of volatile organic compounds from building materials and interior fittings – Emission cell method. NS-INSTA 800:2010 Cleaning quality – System for establishing and assessing cleaning quality</p>
---------------------------	---

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1 and 2	A copy of the control plan/checklist that documents procedures for clean, dry building processes and cleaning quality	A copy of a completely filled in control plan/checklist that documents fulfilment of criteria for clean, dry building processes and cleaning quality
3, 4 and 5	A copy of the relevant specification clause confirming: <ul style="list-style-type: none"> The VOC content of the relevant specified product types will comply with the standards specified above. That the products fulfil the requirements posed for degassing from building materials and indoor paint 	For each relevant product, a formal letter from or copies of the manufacturer's literature confirming: <ul style="list-style-type: none"> The standard(s) against which the product is tested The VOC content in the relevant specified product groups correspond with the standards that are mentioned above. That the products fulfil the requirements posed for degassing from building materials and indoor paint

6	<p>Drawings or specifications that confirm that:</p> <ul style="list-style-type: none"> • Mineral fibre products and the like are shaped or built-in such that emission of fibres to the air in the room is prevented. • Polluting activities and processes are encapsulated, equipped with point exhaust vacuuming or take place in premises with suitable separate ventilation. 	<p>Assessor's inspection report and as built drawings that confirm that:</p> <ul style="list-style-type: none"> • Mineral fibre products and the like are shaped or built-in such that emission of fibres to the air in the room is prevented. • Polluting activities and processes are encapsulated, equipped with point exhaust vacuuming or take place in premises with suitable separate ventilation.
---	---	---

Additional Information

Relevant definitions

None.

Pollutants in the indoor environment upon takeover

The indoor environment is often worse in new buildings than in buildings that have been in use for a while. This is due to the emissions from materials being greater when the materials are new, and that the indoor air contains pollutants in the form of dust that is not removed to a sufficient degree during the building process.

Dust in the indoor environment from the building process

Dust and waste from the building process are often found in large quantities inside shells and in hollow areas such as shafts, spaces above suspended ceilings, spaces under raised floors, ventilation ducts, etc. The dust is released gradually and injected into the indoor air when the building is placed into service. The process is influenced by the pressure conditions in the rooms and can occur for an extremely long time. One common problem is cement dust from the building process that sits as a thin layer over surfaces in the rooms. Dust in the indoor air is a common cause of skin and mucous membrane irritations in humans.

In order to reduce that content of dust in indoor air due to the building process, fixed procedures must be established for tidying up and cleaning during the entire building process with respect to recommendations given in Building Details 501.107 and the cleaning quality upon delivery of the building must be documented and fulfil the requirements given in Building Details 501.108 and NS-EN-INSTA-800 for the type of building concerned.

Volatile Organic Compounds

VOCs are emitted by a wide array of products numbering in the thousands. Examples include: paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, glues and adhesives, Urea-formaldehyde foam insulation (UFFI), pressed wood products (hardwood plywood wall panelling, particleboard, fibreboard) and furniture made with these pressed wood products.

'No' or 'low' VOC paints are available from most standard mainstream paint manufacturers. There 'eco-friendly' paints are made from organic plant sources and also powdered milk-based products. The emissions of VOCs from paints and varnishes are regulated by the Directive 2004/42/CE, implemented in the UK by the Volatile Organic Compounds in Paints, Varnishes and Vehicle Refinishing Products Regulation 2005. Products containing high organic solvent content should also be avoided (EU VOC Solvent Directive 1999/13/EC).

Wood products that contain phenol-formaldehyde (PF) generally emit formaldehyde at considerably lower rates than those containing urea-formaldehyde (UF). Although formaldehyde is present in both types of resins, pressed woods that contain PF would be preferable to those containing UF resin.

Exposure risk assessment of any possible release of chemicals from manufactured products and their possible impact on health and the environment generally, is an important requirement of European regulations. The possible impact of a building product on indoor air quality is included in the European Construction Products Directive, 89/106/EEC. The amended Directive, 93/68/EEC provided the criteria for CE Marking of products.

Products to be fitted in buildings should not contain any substances regulated by the Dangerous Substances Directive 2004/42/CE, which could cause harm to people by inhalation or contact. Materials containing heavy metals (e.g. antimony, barium, cadmium, lead and mercury) and other toxic elements (e.g. arsenic, chromium and selenium) or regulated biocides (e.g. pentachlorophenol) should be avoided.

Materials emitting low levels of pollutants must be used in buildings to the greatest extent possible. What is meant by low polluting materials is specified in NS-EN 15251:2007, supplement C.

Various labelling schemes identify products that have been tested and shown to be low emitting and these have been summarised in BRE Digest 464³.

Dangerous substances are defined in the Dangerous Substances Directive (67/548/EEC)

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	2	2	2	Hea 10 - Thermal Comfort	-	-	-	-	-

Aim

To ensure, with the use of design tools, that appropriate thermal comfort levels are achieved in occupied areas.

Assessment Criteria

The following demonstrates compliance:

One credit

1. An analytical measurement and evaluation of the thermal comfort levels of the building has been carried out using the PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied) indices in accordance with NS-EN ISO 7730:2005 *Ergonomics of the thermal environment – analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria*.
2. National criteria (Technical Regulations and guidance to technical regulations) have been used to determine the level of thermal comfort in the building; in particular internal winter and summer temperature ranges will be in line with the recommended comfort criteria within NS-EN ISO 7730:2005 with no areas falling within the levels defined as representing local dissatisfaction.
3. Thermal comfort levels in occupied spaces meet the Category B requirements set out in Annex A of NS-EN ISO 7730.

Two credits

1. Thermal modelling has been carried out aimed at optimising thermal comfort.
2. The modelling is used to guide the following design decisions (that influence thermal comfort levels);
 - a. Basic building form and orientation
 - b. Internal layout
 - c. Exploiting the effect of trees and building overshadowing on solar heat gain and shielding effects on transmission losses
 - d. Balancing the maximisation of daylight for reduced lighting energy use against increased cooling loads and thermal comfort levels
 - e. Checking for overheating risk.
3. Thermal comfort levels in *occupied spaces* meet the requirements local thermal comfort criteria; in particular internal winter and summer temperature ranges will be in line with the recommended comfort criteria.
4. The software used to carry out the simulation at the detailed design stage must provide *full dynamic thermal analysis*. For smaller and more basic building designs an alternative less complex means of

analysis may be appropriate (further guidance can be found in CIBSE AM11 “Building energy and environmental modelling”^[3]).

Note: those two credits are independent from the first one being achieved.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where the existing building falls within the scope of the assessment, then the criteria extend to all <i>occupied spaces</i> of the new and existing building. If only the new extension is being assessed then the criteria apply to the occupied areas of the new building.
Shell Only	<p>Thermal modelling completed on the basis of a notional layout will be acceptable. Alternatively, compliance with this BREEAM issue can be demonstrated via one of the following means in shell only buildings/areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>

Fit Out Only	There are no additional or different criteria to those outlined above specific to the assessment of fit out-only projects.
Local or national thermal comfort criteria	Please refer to national criteria (Technical Regulations and guidance to technical regulations) to identify the proper guidelines for thermal comfort.
Buildings with office space <500m² (industrial only)	If the building being assessed contains office space that totals <500m ² then this BREEAM issue does not need to be assessed as a standalone issue. The criteria for this issue form a part of BREEAM issue Hea 14 'Office Space'. The aim of Hea 14 is to recognise relevant Health & Wellbeing issues in buildings with a small amount of office space, ensuring the issues are weighted relative to the overall proportion of the building and users who utilise this type of space.
Allocation of credits	The maximum number of credits can only be awarded where a detailed thermal analysis is carried out at early design stage in order to take the thermal comfort issue into account within the design. This is the second option set out above. Where the first option has been followed to check that adequate thermal comfort levels have been designed for the building it is only possible to award one credit.
Buildings with air-conditioning	For the second credit to be awarded, modelling is required in any case even for new air-conditioned buildings which are likely to be designed to achieve thermal comfort levels. This is to ensure that the building has been designed to minimise the demands on the system before the cooling system is specified.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
One credit		
All	<p>A copy of the report confirming:</p> <ul style="list-style-type: none"> A thermal comfort analysis has been undertaken in accordance with NS-EN ISO 7730:2005 Thermal comfort criteria used to carry out the assessment <p>OR</p> <p>A copy of the relevant specification clause confirming:</p> <ul style="list-style-type: none"> A thermal comfort assessment will be undertaken. The requirements for thermal comfort analysis. <p>A copy of the results from the modelling demonstrating thermal comfort levels in compliance with Annex A of EN ISO 7730:2005.</p>	<p>Formal written confirmation from the design team confirming:</p> <ul style="list-style-type: none"> No changes have occurred since design stage thermal comfort assessment was carried out, therefore design stage evidence demonstrates compliance at the post construction stage. <p>Where changes have occurred, an updated copy of the results from the modelling demonstrating the internal temperatures in compliance with the relevant standards.</p>
Two credits		

All	<p>A copy of the report confirming:</p> <ul style="list-style-type: none"> • A thermal comfort modelling has been undertaken • Indicative examples of how the modelling has been used in the design • The name of the thermal comfort modelling software used <p>OR</p> <p>A copy of the relevant specification clause confirming:</p> <ul style="list-style-type: none"> • A thermal comfort modelling will be undertaken and influence the design. • The requirements for thermal comfort analysis. <p>A copy of the results from the modelling demonstrating thermal comfort levels in compliance with Annex A of EN 15251:2007</p>	<p>Formal written confirmation from the design team confirming:</p> <p>No changes have occurred since design stage thermal comfort assessment was carried out, therefore design stage evidence demonstrates compliance at the post construction stage.</p> <p>Where changes have occurred, an updated copy of the results from the modelling demonstrating the internal temperatures in compliance with the relevant standards.</p>
-----	--	---

Additional Information

Relevant definitions

Occupied space: For the purpose of this BREEAM issue an occupied space is a room or space within the assessed building that is likely to be occupied for 30 minutes or more by a building user. The definition excludes the following:

- a. Atria/concourses
- b. Entrance halls/reception areas
- c. Ancillary space e.g. circulation areas, storerooms and plant rooms

Predicted Mean Vote: the PMV is an index that predicts the mean value of the votes of a large group of persons on the 7-point thermal sensation scale based on the heat balance of the human body. Thermal balance is obtained when the internal heat production in the body is equal to the loss of heat to the environment.

Table 5.6 Seven-point thermal sensation scale

+ 3	Hot
+2	Warm
+1	Slightly warm
0	Neutral
-1	Slightly cool
-2	Cool
-3	Cold

Predicted Percentage Dissatisfied: the PPD is an index that establishes a quantitative prediction of the percentage of thermally dissatisfied people who feel too cool or too warm; for the purposes of EN ISO 7730, thermally dissatisfied people are those who will vote *hot*, *warm*, *cool* or *cold*.

Thermal Dynamic Analysis: Thermal comfort analysis tools can be subdivided into a number of methods of increasing complexity. The most complex of these and the one that provides greatest confidence in results is the full dynamic model. This type of model enables annual heating/cooling loads, overheating risks and control strategies to be assessed.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Hea 11 - Thermal Zoning	-	-	-	-	-

Aim

To recognise and encourage the provision of user controls which allow independent adjustment of heating/cooling systems within the building.

Assessment Criteria

The following demonstrates compliance:

1. The heating/cooling system is designed to allow *occupant control* of zoned areas within all *occupied spaces* in the building.
2. The zoning allows *separate occupant control* (within the *occupied space*) of each perimeter area (i.e. within 7m of each external wall) and the central zone (i.e. over 7m from the external walls).

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where the existing building falls within the scope of the assessment, then the criteria extend to the <i>occupied spaces</i> of the existing building. If only the new extension is being assessed then the criteria apply to the relevant spaces of the new building.
Shell Only	<p>Compliance with this BREEAM issue can be demonstrated via one of the following means in shell only buildings/areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out only	There are no additional or different criteria to those outlined above specific to fit out-only projects.

Buildings with office space <500m² (Retail & Industrial only)	Where the building being assessed contains office space that totals <500m ² then this BREEAM issue does not need to be assessed as a standalone credit. The requirements form a part of BREEAM issue Hea 14 'Office Space'. The aim of Hea 14 is to recognise relevant Health & Wellbeing issues in buildings with a small amount of office space, ensuring the issues are weighted relative to the overall proportion of the building and users who utilise this type of space.
Long lag systems	Where <i>long-lag systems</i> are specified, the criteria can be met where they are designed to service the base load only and a responsive secondary heating system and controls are provided, zoned in compliance with the above criteria.
Distance requirement	The distance requirement is approximate; however, the assessor must use sound judgement considering fully the aims of this issue, before accepting solutions that do not strictly meet the above criteria.
Controls for wet heating systems	Adequate TRVs (thermostatic radiator valves) placed in zones around the building perimeter, and the provision of local occupant controls to internal areas, such as fan coil units, would satisfy the criteria for this BREEAM issue.
No office space (retail and industrial only)	Where the assessed building contains no office space and only an operational area, this BREEAM issue will be filtered from the list of applicable BREEAM issues by the BREEAM assessor's spreadsheet tool.

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1&2	<p>A copy of the relevant clauses of specification and/or marked-up M&E drawings confirming:</p> <ul style="list-style-type: none"> • Scope of the heating/cooling system • The type of user controls for the above systems • The scope of the controls i.e. control zone. 	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> • Installation of user controls in each <i>occupied space</i>.* <p>*For large buildings it would not be expected that the assessor check every individual <i>occupied space</i>, but a random selection of spaces that confirm compliance.</p>

Additional Information

Relevant definitions

Long-lag systems: These low temperature systems use the thermal mass of the building to provide a consistent supply of heat to the space during the occupied period. As the mass of the building is used to regulate and supply the heat, the temperature in the space lags behind any change required by the occupants via the systems controls. An example of a long-lag system is under-floor heating.

Separate Occupant Control: Heating/cooling controls for a particular area/zone of the building that can be accessed and operated by the individual(s) occupying that area/zone. Such controls will be located within, or within the vicinity of, the zone/area they control.

Zone: Area with one or more occupants that is regulated identically.

Occupied space: For the purpose of this BREEAM issue an occupied space is a room or space within the assessed building that is likely to be occupied for 30 minutes or more by a building user. The definition excludes areas where building users would not expect, or be expected, to control temperature in the space, including the following:

- a. Atria/association space
- b. Entrance halls/reception areas

- c. Circulation areas
- d. Storerooms

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Hea 12 - Microbial Contamination	-	-	-	-	-

Aim

To ensure the building services are designed to reduce the risk of legionella in operation.

Assessment Criteria

The following demonstrates compliance:

1. All *water systems* in the building are designed in compliance with the measures outlined in the relevant *national health and safety best practice guides*.
2. Where no humidification is specified or only steam humidification is provided.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	If the extended and existing building share the same water systems, then these systems must be assessed against the criteria regardless of whether the existing building forms a part of the assessment or not. If the extension is served by independent systems, only these need be assessed against the Assessment Criteria. If it is the intention that building users of the extended building will use water systems in the existing building, then it must be confirmed that the existing systems comply with the criteria.
Shell Only	<p>Compliance with this BREEAM issue can be demonstrated via one of the following means in shell only buildings/areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out Only	Any and all existing and new water systems in the fitted-out building/unit must comply with the BREEAM criteria. In some instances responsibility for water systems may lie with a landlord and not the tenant; in such cases confirmation will be required from the landlord, or their representative, confirming that the water system comply with ACoP.

Assessor's responsibility	The BREEAM assessor is not required to confirm that the design is compliant with the relevant standard; this is the responsibility of the design team. The assessor is simply required to record, for the purposes of validation, whether or not the design team confirms compliance.
National health and safety best practice guides	National guidelines for prevention of legionellosis are issued by the Norwegian Institute of Public Health, www.fhi.no .

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	<p>A copy of the relevant specification clause(s) confirming:</p> <ul style="list-style-type: none"> All types of water system in the building and on the assessed site. The standards to which all water systems in the building will be designed. <p>Where applicable, a copy of Checklist A10.</p> <p>Where design responsibility is to be passed on to the contractor/installer, a copy of the relevant specification clause(s) stating:</p> <ul style="list-style-type: none"> The requirements on the contractor/installer with regards to minimising the risk of Legionnaires disease from the specified water systems. 	<p>For all water systems in the building, a formal letter of declaration from the design team, main contractor or installer of the relevant systems confirming:</p> <ul style="list-style-type: none"> The design and installed systems comply with the relevant standard. If relevant, any existing water systems comply with the relevant standard.

Additional Information

Relevant definitions

Water systems: For the purpose of this issue, this refers to:

- Cooling towers
- Evaporative condenser
- Domestic hot and cold water systems
- Other plant and systems containing water which is likely to exceed 20°C and which may release a spray or aerosol during operation or when being maintained, for example:
 - humidifiers and air washers
 - spa baths and pools
 - car/bus washes
 - wet scrubbers
 - Indoor fountains and water features.

Legionnaires disease: The HSE describes Legionnaires disease as a type of pneumonia caused by the bacterium *Legionella pneumophila*. People catch Legionnaires' disease by inhaling small droplets of water suspended in the air, which contain the bacteria. See www.fhi.no.

Humidification Units

Humidification options fall into two broad groups; the first group relies on a heated air stream evaporating water vapour either from a pond or stream of water. This includes so-called 'trickle-down' systems. These are dependent on sterilisation technologies such as UV, ultrasonic etc, to ensure that the water vapour is not contaminated. Whilst these systems are effective when working properly, any

partial failure will allow untreated water into a warmed air stream. Where this occurs, the health-related consequences are likely to be significant.

The second group relies on failsafe systems that minimise risk if the plant fails. The only option in this group is steam humidification. This process sterilises the water vapour and ensures that untreated water cannot enter the air stream when no steam is being produced.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Hea 13 - Acoustic Performance	-	-	-	-	-

Aim

To ensure the acoustic performance of the building meets the appropriate standards for its purpose.

Assessment Criteria

The following demonstrates compliance:

1. Internal occupied areas satisfy at least noise class C in NS 8175.
2. Noise from technical installations satisfies at least class B in NS 8175.
3. Pre-completion acoustic testing is carried out by a *suitably qualified acoustician* to ensure that all relevant spaces (as built) achieve the performance standards required, and any required remedial works in spaces that do not meet the standards are completed prior to handover and occupation.

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to assessments of extensions to existing buildings.
Shell Only	<p>Where it is not possible to define the type of office space due to the speculative nature of the development, it must be assumed that it will be open plan with an occupancy rate of 1 person per 10m².</p> <p>For assessments of buildings that are not fully fitted, compliance with this BREEAM issue within shell-only areas may be demonstrated via one of the following means:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s requiring compliance with the criteria (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs demonstrating how to achieve the standards and the benefits of doing so (half the value of the available credits) • Option 3 – Developer/Tenant collaboration to ensure compliance with the criteria (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated within shell-only areas, the credit must be withheld regardless of compliance in fitted out areas (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using</i></p>

	<i>BREEAM</i> (Shell and Core / Speculative Assessments) for detailed description of the above options.
Fit Out Only	Fit out-only assessments of buildings with <i>acoustically sensitive spaces</i> must be assessed against the sound insulation criteria for this BREEAM issue.
Buildings with office space <500m2 (Retail & Industrial only)	If the building being assessed contains office space that totals <500m ² then this BREEAM issue does not need to be assessed as a standalone credit. The requirements form a part of BREEAM issue Hea 14 'Office Space'. The aim of Hea 14 is to recognise relevant Health & Wellbeing issues in buildings with a small amount of office space, ensuring the issues are weighted relative to the overall proportion of the building and users who utilise this type of space.
Measurement procedures	The Additional Information section outlines the criteria for carrying out measurements and calculations to demonstrate compliance with this BREEAM issue. The appointed acoustician must confirm that the acoustic performance has been measured/calculated in accordance with these procedures. Where the acoustician has felt it necessary to deviate from these procedures, they must give justifiable reasons why they have done so.
Factory noise	Where there is a known source of noise within the operational area of the building e.g. installed machinery/plant, such noises must be factored in to any calculations or measurements of indoor ambient noise levels.
Relevant Standards	NS 8175. Acoustic conditions in buildings. Sound classification of various types of buildings.

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1-2	<p>A copy of the design plan for each level of the building with each room/area clearly labelled.</p> <p>A copy of the specification clause or acousticians calculations confirming:</p> <ul style="list-style-type: none"> Indoor ambient noise levels in each relevant room/area. If relevant, sound insulation levels between each <i>acoustically sensitive room</i> and adjacent <i>occupied areas</i>. The standards to which calculations/measurements have complied, or are required to comply with. <ul style="list-style-type: none"> Relevant requirements situation for the building How the requirements are to be achieved Requirements that will be passed through to technical purchasing packages 	<p>Copies of acoustic field test report/results confirming:</p> <ul style="list-style-type: none"> The required performance levels have been achieved for each room/area of the completed building. Where relevant, any remedial work/actions required to meet the performance standards. <p>Evidence, such as a formal letter from the acoustician or their test report confirming that they meet BREEAM's definition of a <i>suitably qualified acoustician</i>.</p> <p>A letter from the design team or main contractor confirming: Any and all required remedial works have been carried out in accordance with the acoustician's recommendations.</p>
3	<p>A copy of the specification clause or a formal letter from the project team confirming:</p> <ul style="list-style-type: none"> A programme of pre-completion acoustic testing by a <i>suitably qualified acoustician</i> will be commissioned. Where rooms/areas do not comply with the required levels, appropriate remedial works will be actioned and completed. 	

Additional Information

Relevant definitions

Suitably qualified acoustician: an individual achieving all the following items can be considered to be "suitably qualified" for the purposes of a BREEAM assessment:

- Holds a degree, graduate engineer/Master's degree, or equivalent qualification in acoustics/sound testing.
- Has a minimum of three years relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting acoustics in relation to construction and the built environment; including, acting in an advisory capacity to provide recommendations for suitable acoustic performance levels and mitigation measures.

Where a suitably qualified acoustician is verifying the acoustic measurements/calculations carried out by another acoustician who does not meet the SQE requirements, they must, as a minimum, have read and reviewed the report and confirm in writing that they have found it to:

- represent sound industry practice
- be appropriate given the building assessed and scope of works proposed
- avoid invalid, biased and exaggerated recommendations.

Additionally, written confirmation from the third party verifier that they comply with the definition of a *Suitably Qualified Acoustician* is required.

Measurement/calculation procedures

The following procedures must be followed by the acoustician when measuring or calculating the levels required to demonstrate compliance with this BREEAM issue (see also compliance note above on measurement procedures):

- NS 8175:2008 "Noise conditions in buildings – Noise classes for different types of buildings" , supplement B: "Guidelines for assessment of compliance"
- All requirements parameters must be measured with respect to the relevant standards for each parameter
- All deviations from the requirements levels must be commented and a plan must be presented for addressing the deviations
- If measured values are lower than the requirements levels in more than 20% of the measurements, the scope of the measurements must be increased (with respect to the scope specified in NS 8175)

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	-	2	-	Hea 14 - Office Space	-	-	-	-	-

Aim

To recognise steps taken to provide a good working environment in smaller office areas within the development.

Assessment Criteria

The following demonstrates compliance:

First credit

1. For retail developments, three of the following measures must be achieved for at least 80% of the development's office space floor area:
 - a. View out: in accordance with the requirements of BREEAM issue Hea 2
 - b. Glare control: in accordance with the requirements of BREEAM issue Hea 3
 - c. Lighting controls & zones: in accordance with the requirements of BREEAM issue Hea 6
 - d. Potential for natural ventilation: in accordance with the requirements of BREEAM issue Hea 7
 - e. Thermal zoning: in accordance with the requirements of BREEAM issue Hea 11
 - f. Acoustic Performance: in accordance with the requirements of BREEAM issue Hea 13.
2. For industrial developments, three of the following measures must be achieved for at least 80% of the development's office space floor area:
 - a. View out: in accordance with the requirements for office space in BREEAM issue Hea 2
 - b. Glare control: in accordance with the requirements of BREEAM issue Hea 3
 - c. Lighting controls & zones: in accordance with the requirements of BREEAM issue Hea 6
 - d. Potential for natural ventilation: in accordance with the requirements of BREEAM issue Hea 7
 - e. Indoor air quality: in accordance with the requirements of BREEAM issue Hea 8
 - f. Thermal comfort: in accordance with the requirements of BREEAM issue Hea 10
 - g. Thermal zoning: in accordance with the requirements of BREEAM issue Hea 11
 - h. Acoustic Performance: in accordance with the requirements of BREEAM issue Hea 13.

Second credit

1. For retail developments, four of the six measures listed above must be achieved for at least 80% of the development's office space floor area.
2. For industrial developments, six of the eight measures listed above must be achieved for at least 80% of the development's office space floor area.

Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue.

1. An exemplary credit can be awarded where all the measures detailed above have been achieved for at least 80% of the development's office space floor area.

Compliance notes	
New Build	For guidance please refer to the compliance notes in each BREEAM issue for each individual Health & Wellbeing issue listed above.
Refurbishment	For guidance please refer to the compliance notes in each BREEAM issue for each individual Health & Wellbeing issue listed above.
Extensions to existing buildings	For guidance please refer to the compliance notes in each BREEAM issue for each individual Health & Wellbeing issue listed above.
Shell Only	For guidance please refer to the compliance notes in each BREEAM issue for each individual Health & Wellbeing issue listed above.
Fit Out Only	For guidance please refer to the compliance notes in each BREEAM issue for each individual Health & Wellbeing issue listed above.
Buildings with office space >500m²	<p>If the building being assessed contains office space that totals >500m², then this BREEAM issue does not need to be assessed. In such cases the relevant Health & Wellbeing issues (listed above) must be assessed separately.</p> <p>The aim of Hea 14 is to recognise relevant Health & Wellbeing issues in buildings with a small amount of office space, ensuring the issues are weighted relative to the overall proportion of the building and users who utilise this type of space.</p>
No office space	If the building does not contain any office areas this issue will not need to be assessed and the BREEAM assessor's spreadsheet tool will filter it from the list of applicable issues.
80% requirements	The 80% rule is set to provide some flexibility in collectively assessing each of the individual issues. In applying the 80% rule it must be the same 80% (or greater) of floor area that complies with each issue; it is not acceptable to 'pick and mix' the 80% of office area that complies with each issue in order to justify awarding a credit.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	For each individual measure, the evidence described in the 'Schedule of evidence required' section of the individual BREEAM issue relating to that measure must be provided.	For each individual measure, the evidence described in the 'Schedule of evidence required' section of the individual BREEAM issue relating to that measure must be provided.

Additional Information

Relevant definitions

Refer to the definitions section of each relevant BREEAM issue.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
3	3	3	3	Hea 20 - Moisture protection	-	-	1	1	1

Aim

To reduce the risk of incorporating moisture and prevent moisture and mold problems through appropriate design and construction measures.

Assessment Criteria

The following demonstrates compliance:

One credit:

1. Establish a control plan that describes how to secure the building from moisture damage in the design and construction phases as described in Building Detail 474.511 "Evaluation of moisture protection. Checks list", Building Detail 501.107 "Clean, dry and tidy building process" and Building Detail 474.533 "Drying and preventive measures". Control plans shall include material moisture content, storage of materials, protection against rain, control of moisture before capping / closing.
2. Customized checklists for moisture protection must be prepared and used in the design and construction phases. A template for such a check list is included in Building Detail 474.511 'Evaluation of moisture protection. Control Points'
3. There must be adequate evidence to indicate critical values for moisture in relation to microbiological growth, emission of harmful gases and other essential characteristics of the product. Terms of use for the materials must be documented.

Two credits

4. First credit must be achieved
5. It must be documented that the drying of the building construction is carried out according to methods recommended in Building Detail 474.533 "Drying and preventive measures"
6. It must be documented that there has been moisture measurements according to the methods specified in NS 3420-T and Building Detail 474.531, "Measurement of moisture in buildings", and that the moisture level meets the requirements in NS 3420-T.

Three credits

7. The two first credit must be achieved
8. Construction under cover, e.g. with a tent-based cover system.

Compliance notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only projects.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only projects.
Interior	Not relevant
Relevant standards	NS 3420-T Specification texts for building, construction and installations Part T: Painting, papering and flooring Building Detail 501.107 Clean, dry and tidy building process. Building Detail 474.511 Evaluation of moisture protection – control points Building Detail 474.533 Drying and preventive measures Building Detail 474.531 Measurement of moisture content in buildings

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1	The Project Manager, and / or the construction manager when the contractor is appointed, submits a copy of the plan for quality assurance, or a copy of the specification	Construction Manager's plan for quality assurance
2	The Project Manager, and / or the construction manager when the contractor is appointed, submits checklists for moisture protection, or a copy of the specification	A copy of the completed checklists used during the construction phase
3	Project Team's verification that requirements for materials documentation will be specified.	Project and / or construction manager's list of critical values for the materials selected.
5	Project Manager and / or design team verification that requirements for drying procedures will be specified.	A copy of the documentation for how the drying of the building structures will be conducted during the the construction phase
6	Project Manager and / or design team verification that requirements for method statements and performance criteria for moisture measurement will be specified.	A copy of the documentation which describes how the moisture measurements have been carried out and the results from the measurements

8	Project Team's report on the requirements for tent-coverage , and how this can be implemented cost effectively.	The auditor's report and photographic evidence. If the auditor has been engaged in structural work phase, the project report and photographic evidence to document compliance.
---	---	--

Additional Information

Relevant definitions

Control plan

A control plan, as described in the Building Regulations, should contain the following:

- A description of what is to be designed and constructed, and critical issues to be controlled and how the control should be carried out.
- The basis for the control, i.e. design and construction documents
- Who are responsible for the control, both for design and construction

Background

High relative humidity can cause fungal growth, bacterial contamination, bad odours and adverse chemical reactions in building materials, as well as damages and reduced life times of structures and components. Emissions from the materials will also increase with increasing moisture content. Moisture is probably the single factor that contributes the most to poor indoor environment and can cause serious health problems like allergies, asthma and other issues related to hypersensitivity. In addition, exposure to moisture damage may cause general symptoms such as abnormal fatigue, headaches and concentration problems.

Building materials must be kept sufficiently clean and dry both during storage, transport and assembly at the construction site to prevent moisture problems. The materials must also be kept dry and clean after they are installed and while the building is in use.

Materials must be able to withstand the moisture stresses they are likely to be exposed to. There must be satisfactory material documentation that indicates critical values of moisture in relation to microbial growth, emission of harmful gases and other essential characteristics of the product.

Structures (roofs, façades, etc.) must be designed and constructed so that they are resistant to moisture in the construction and operational phases

6.0 Energy

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
13	13	13	13	Ene 1 - Energy Efficiency	-	-	-	7	9

Aim

To recognise and encourage buildings that are designed to minimise their operational energy consumption.

Assessment Criteria

The following demonstrates compliance:

Determination of the building's energy performance in the computation of energy delivered to the building

1. The number of points obtained is based upon the percentage improvement in the building's calculated delivered energy, E (kWh/m²/yr) in relation to the level required to achieve an energy mark of C in the Norwegian energy labelling scheme - E_{ref} .
2. Delivered energy to the building is calculated according to the method in NS 3031:2010
3. The percentage improvement is used to allocate the number of credits, as illustrated in the table below;

Table 6.1 Percentage improvement over the requirements of local Building Regulations

BREEAM Credits	New buildings	Refurbishments
1	5%	-20%
2	7%	-9%
3	11%	0%
4	15%	8%
5	19%	15%
6	25%	21%
7	31%	28%
8	37%	36%
9	45%	45%
10	55%	55%
11	70%	70%
12	85%	85%
13	100%	100%

For buildings that are part new-build part refurbishment refer to Compliance Notes.

Example:

Calculate the percentage improvement of delivered energy (E_{lev}) over the current standard for energy label C in the national energy certification scheme (Energimerkeordningen):

Current standards Energy label C in the energy certification scheme (E_{ref}) = 168 kWh/m²

Calculated delivered energy for the building (E_{lev}) = 110 kWh/m²

Improvement as percentage

$$\frac{E_{ref} - E_{lev}}{E_{ref}} \times 100 = \text{improvement \%}$$

$$= \frac{168 - 110}{168} \times 100 = 34,5 \%$$

Therefore 34,5 % improvement = 7 Credits

Historic Buildings only

In addition to the above an additional 2 credits may be awarded up to a maximum of 13 for carrying out the following:

1. A specialist study has been undertaken by a heritage conservation specialist to investigate the implications of improving building fabric performance whilst minimising the potential negative impacts on both the historic character of the building and the condition of the building fabric.
2. The report makes recommendations for potential improvements to the building fabric and, as a minimum, covers the following issues:
 - a. Each element of the following building elements (as a minimum) must be considered and recommendations for improvements made:
 - i. Roof
 - ii. External/Sheltered walls
 - iii. Ground floor
 - iv. Upper floors
 - v. Windows and external doors
 - vi. Junctions between building elements such as between roof and walls.
 - vii. Junctions between different parts of the building such as between different ages or methods of construction.

Where significant improvement cannot be made to an element then the report should state the reason, setting out in detail the conservation and/or building performance issues that have resulted in this recommendation.

- b. The potential for improvements in ventilation, air tightness and moisture control within the building, ensuring that these are considered in balance with that of the welfare of the historic building fabric. In general, tighter building fabric can be balanced with controlled ventilation improvements (passive and mechanical) and the benefits and disadvantages must be set out together with the recommendations.
3. The study must have been carried out at or prior to concept design stage (equivalent to RIBA stage C or earlier).

4. The building design has implemented and accounted for the study's recommended improvements and, in particular, demonstrates:
- The design strategy chosen is that which has the greatest impact in terms of potential improvements in energy use, whilst minimising the detrimental impacts on the historic building fabric, i.e. the best compromise between the two considerations.
 - That any improvements made to the thermal insulation of the building have been specified in accordance with the recommendations in *national best practice for thermal insulation*.

New Build	New buildings should compare their Energy Rating to the New Build benchmark scale.
Refurbishment	Existing buildings that have undergone or are undergoing major refurbishment should compare their percentage improvement to the refurbishment benchmark scale. This separate scale aims to better recognise and encourage the energy-efficient refurbishment of existing buildings which results in a significant reduction in the energy demand for that building.
Extensions to existing buildings	<p>Where an existing building is being extended (and only the new extension is being assessed) and that extension uses existing building services plant, the energy modelling and % improvement must be based on the building fabric of the new extension and any existing, common, building services plant and new building services plant installed that will service the new extension.</p> <p>The energy modelling does not have to consider the existing building fabric where this will not form part of the scope of the BREEAM assessment. Nor does it have to consider existing building services where they are not supplying services (heating, cooling and/or ventilation) to the new extension being BREEAM assessed.</p>
Part new-build extension part refurbishment	<p>For assessments of buildings that are a mixture of new build and existing building refurbishment a weighted benchmark scale is used.</p> <p>The weighted benchmark scale is determined using the area (m²) for new build and area (m²) for refurbishment and the two benchmark scales. If there is a higher proportion of new build to refurbishment then the weighted scale will be biased towards the benchmark scale for new buildings and vice-versa if there is a higher proportion of refurbished element. As the benchmarks are influenced by the split in areas between the new build element and major refurbished element of the assessed building, the benchmarks will change if the new build/refurbishment area totals change.</p> <p>Calculation Example: The assessed building has a total area of 1000 m², where 250 m² (25%) is a new extension and 750 m² (75%) is refurbished. Calculations show that the project achieves a total improvement of 10%, That equals 2 credits for the new construction part, and 4 credits for the refurbished part according to table 6.1. Based on the area weighting, the project achieves a following total amount of credits for Ene 1;</p> <p>$2 \text{ credits} * 0,25 + 4 \text{ credits} * 0,75 = 3,5 \approx 3 \text{ credits.}$</p> <p>Total number of credits scored for Ene 1 is rounded down to the nearest whole number.</p>

Shell Only	<p>For the purposes of the BREEAM assessment it is permissible, when conducting the energy modelling and calculating the % improvement, for the design team to use the performance specifications confirmed within a <i>Green Lease Agreement as starting point</i>. This rule applies only to those areas of the building that the scope of the Green Lease covers. Tenanted areas not covered by the scope of the Green Lease must assume energy efficiency performance equivalent to minimum requirement in the technical building regulations.</p> <p>The use of a <i>Green Building Guide</i> for tenants fit out (as defined in the Scope section 2.2) cannot be used to substitute the maximum design fit out specification (TEK), for the purpose of assessing BREEAM issue Ene 1 Energy Efficiency.</p> <p>Refer to the <i>Scope section 2.2 Types of project that can be assessed using BREEAM (Shell and Core / Speculative Assessments)</i> for further description of the options available for assessing shell only buildings.</p>
-------------------	--

Refit	If the Fit Out-only assessment is a refit of an existing building then the refurbishment benchmark scale must be used to determine the number of credits awarded.
Suitably qualified energy modelling engineer and/or accredited expert	<p>If there is a NCM in place in the country of assessment, and the NCM requires Accredited experts to undertake the energy performance calculations, then an Accredited expert as per defined in the country NCM is required.</p> <p>If the NCM does not require accredited experts, then a suitably qualified energy modelling engineer as defined in the Additional Information section must carry out the modelling.</p>
Recognised energy Dynamic Simulation Modelling (DSM) software	Recognised DSM software are software approved according to the specification in NS 3031.

Energy exported to the grid	Any energy from an <i>onsite</i> LZC energy source that is exported to the grid may be included in the calculations as if it were used within the building.
EPC certificates, BREEAM & building use/tenancy arrangement	The Norwegian EPC requires that calculations are carried out for each unit. For the purposes of determining the number of BREEAM credits, the energy performance index is the total of the area-weighted average of the energy performance index of each individual unit. Where the development contains conditioned common and/or landlord spaces, the area of these spaces, unless otherwise accounted for, should be divided and attributed amongst the separate units. The proportion of common area attributed to each unit must be equivalent to the ratio of each unit's area as a proportion of the total area of all units.
Relevant standards and references	Norwegian energy labelling of buildings, www.energimerking.no NS 3031 Calculation of energy performance of buildings. Method and data

Schedule of Evidence Required

	Design Stage	Post Construction Stage
Options 1 & 2		
All	<p>A copy of the report produced by the approved calculation tool for the assessed building at the design stage illustrating:</p> <ul style="list-style-type: none"> Actual computed delivered energy for the building (E_{deliv}) and applicable standard for energy label C (E_{ref}) Name of the approved software used to carry out the modelling for calculating the energy performance. Confirmation of the expertise and experience of the individual carrying out the modelling in compliance with the requirements of the local Building Regulations. <p>AND Where appropriate, a letter from the person carrying out the modelling confirming:</p> <p>Data used to model the Current Standards Building is taken from NS 3031.</p>	<p>Third party documentation, as follows:</p> <ul style="list-style-type: none"> Print-out from calculation program that confirms that the building has achieved the planned energy standard with respect to NS 3031. As built' drawings to demonstrate that the specification used and modelled at the design stage matches the specification of the completed building. <p>*The final rating must account for any changes to the specification during construction; and the measured air leakage rate, ductwork leakage and fan performances (as required by Building Regulations).</p>
Historic buildings only		
1-3	<p>A copy of the heritage conservation specialist's report.</p> <p>A letter from the specialist confirming the qualifications, experience and IHBC status.</p>	The evidence required at this stage of assessment does not differ from that outlined at the design stage of assessment.

4	<p>Marked-up drawings or a specification document demonstrating:</p> <ul style="list-style-type: none"> • Implementation of the study's recommendations • Compliance with <i>national best practice for thermal insulation</i> <p>OR</p> <p>Where a formal letter from the design team confirming the above will be implemented.</p>	<p>'As built' drawings and specification demonstrating:</p> <ul style="list-style-type: none"> • Implementation of the study's recommendations • Compliance with '<i>Thermal Insulation: avoiding risks</i>'. <p>Assessor's building/site inspection and photographic evidence demonstrating:</p> <ul style="list-style-type: none"> • Examples of the recommendations of the study having been manifested in the actual complete building (as highlighted by the design team during the building inspection).
---	---	---

Additional Information

Relevant definitions

Suitably qualified energy modelling engineer: is a person with at least 3 years relevant experience in energy modelling within the last 5 years and a recognised qualification such as a building services engineer or building energy modelling engineer. Their expertise should be broad enough to cover all required technical aspects guaranteeing that the data entered in the energy model is appropriate and that the results reflect the actual performance of the building. It can be someone operating as sole traders or employed by public or private enterprise bodies.

Heritage Conservation Specialist A person with at least 3 years of relevant experience with the upgrading of existing buildings worthy of protection during the course of the past 5 years, and recognised qualifications within the occupational areas of architecture/building physics/cultural monument protection.

Historic buildings - For the purpose of assessing this BREEAM issue, historic buildings are defined as:

- a. Listed buildings
- b. Existing buildings situated in conservation areas (where the existing building itself has conservation status and contributes to the status of the conservation area)
- c. Existing buildings which are of architectural and historical interest and which are referred to as a material consideration in a local authority's development plan
- d. Existing buildings of architectural and historic interest within national parks, areas of outstanding natural beauty, and world heritage sites.

National best practice for thermal insulation

Refers to Technical Regulations and relevant SINTEF Building Research Design Guides (Byggforskserien) including [722.506 Etterisolering av etasjeskillere over kjeller og kryperom](#), [723.312 Etterisolering av betong- og murvegger](#), [723.511 Etterisolering av yttervegger av tre](#), [725.403 Etterisolering av tretak](#), [700.012 Veiledning for vedlikehold og utbedring av eldre bygninger](#), [720.015 Utbedring av kuldebroer](#).

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Ene 2 - Sub-metering of Substantial Energy Uses	-	-	1	1	1

Aim

To recognise and encourage the installation of energy sub-metering that facilitates the monitoring of in-use energy consumption.

Assessment Criteria

The following demonstrates compliance:

1. Separate *accessible energy sub-meters*, labelled with the end use of the consumed energy that is being sub-metered, are provided for the following systems (where present):
 - a. Space Heating
 - b. Domestic Hot Water
 - c. Humidification
 - d. Cooling
 - e. Fans (major)
 - f. Lighting
 - g. Small Power (lighting and small power can be on the same sub-meter where supplies are taken at each floor/department).
 - h. Other major energy-consuming items where appropriate (see Compliance Notes).

OR

2. Where a BMS (Building Management System) has been installed, with individual monitoring and outputs for the systems listed under point 1 above.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where an existing building is being extended and it has existing building services plant and systems that will be common to both the new extension and existing building, the criteria for energy metering cover the entire building.

Shell Only	<p>Where present core building services should be assessed in accordance with the assessment criteria. In shell only areas/building, where final decisions concerning the specification of particular building services and systems will be made by a new owner/tenant, compliance with this BREEAM issue can be demonstrated via one of the following means:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s • Option 2 – A Green Building Guide for tenant fit outs (template released 9.2.12 by Norwegian Real Estate) • Option 3 – Developer/Tenant collaboration <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out Only	<p>Where the assessment stakeholder is a tenant within a landlord-owned/operated development with central plant provision, then the central plant must be assessed against the criteria of this issue. This is in addition to the provision of sub-metering of any other substantial uses within the tenant's space that are independent of other tenant units and common areas.</p>
Lighting & small power	<p>Due to traditional distribution methods, it can be difficult to cost-effectively separate lighting and small power. It is acceptable for lighting and small power to be combined for metering purposes, provided that sub-metering is provided for each floor plate or per tenant as applicable.</p>
Other major energy-consuming items	<p>Other major energy-consuming items, depending on the building type, might include, for example, plant used for swimming or hydrotherapy pools, kitchen plant, cold storage plant, laboratory plant, sterile services equipment, transportation systems (e.g. lifts & escalators) drama studios and theatres with large lighting rigs.</p>
Modular boiler systems	<p>Where the building uses a modular system and the rated input power of the lead boiler is less than the figure in Error source not found, but greater than 10kW (see Additional Information), sub-metering of the lead boiler is still required to comply with the criteria of this issue.</p>
Accessible meters	<p>The energy meters must be located in an area of the building that allows for easy access to facilitate regular monitoring and readings by the buildings staff and facilities manager. Typically this will be the plant room, main distribution room or control room (where BMS is installed).</p>
Centralised production of space and water heating and/or cooling	<p>In a building with a number of units, where the production of heat and/or cooling is centralised for the building and tenants are connected to the central production system, typically in a shopping centre, only the central production system needs to be submetered along with any other energy-consuming uses as listed in the assessment criteria.</p>

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	Specification document or technical drawings confirming: <ul style="list-style-type: none"> • Energy-consuming systems and their rated outputs • Metering arrangements for each system, type and location of meter specified. • If applicable, scope of BMS and its energy-monitoring capability. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • Location and labelling/function of the individual sub-meters or BMS.

Additional Information

Relevant definitions

BMS: Building (energy) Management System is a central computer controlling, monitoring and optimising building services and systems such as heating, air-conditioning, lighting and security.

Common areas: Developments that have several tenant units, particularly large retail developments, may also share common facilities and access that is not owned or controlled by any one individual tenant, but used by all. Common areas are typically managed and maintained by the development's owner, i.e. landlord or their managing agent. Examples of common areas include an atrium, external areas e.g. parking, stairwells and main entrance foyers/reception.

Table 6.2 Size of plant for which separate metering would be required

Plant Item	Rated input power (kW)
Boiler installation comprising one or more boilers or CHP plant feeding a common distribution circuit	50
Chiller installations comprising one or more chiller units feeding a common distribution circuit	20
Electric humidifiers	10
Motor control centres providing power to fans and pumps	10
Final electrical distribution boards	50

Detailed guidance on how to develop an appropriate metering strategy for the energy criteria of a new building is available in General Information Leaflet 65: Metering energy use in new non-domestic buildings.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Ene 3 - Sub-metering of High Energy Load and Tenancy Areas					
					-	-	-	-	-

Aim

To recognise and encourage the installation of energy sub-metering that facilitates the monitoring of in-use energy consumption by tenant or end user.

Assessment Criteria

The following demonstrates compliance:

General retail/office/industrial and secondary schools, sixth form and further and higher education colleges only

1. Provision of *accessible* sub-meters covering the *energy supply* to each tenanted, or in the case of single occupancy buildings, *relevant function areas or departments* within the building/unit.
2. The meters are labelled with the end energy consuming use.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	For speculative buildings, meters must be installed on the energy supply to each separate tenanted unit or floor plate within the assessed development.
Fit Out Only	There are no additional or different criteria to those outlined above specific to Fit Out-Only assessments.
Relevant function areas / departments – offices projects	This list is not exclusive and where other areas/departments exist these should also be metered: <ul style="list-style-type: none"> • Office areas (Metering by floor plate) • Catering

Relevant function areas / departments – retail projects	<p>This list is not exclusive and where other areas/departments exist these should also be metered:</p> <ul style="list-style-type: none"> • Sales area • Storage and warehouse • Cold storage • Offices • Catering • Tenant units
Relevant function areas/ departments . educational buildings	<p>This list is not exclusive and where other areas/departments exist these should also be metered:</p> <ul style="list-style-type: none"> • Kitchens (excluding small staff kitchens and food technology rooms) • Computer suites • Workshops • Lecture halls • Caonference rooms • Drama studio • Swimming pool • Sports hall • Process areas • Laboratories • High containment suites within laboratories • Controlled environment chambers • Animal accommodation areas • Data centers • IT work and study rooms, including IT equipped library space and any space with provision of more that 1 PC terminal per 5 m² <p>Individual sub-metering of standard classrooms/seminar rooms is not required.</p>
Relevant function areas / departments – industrial projects	<ul style="list-style-type: none"> • Office areas • Operational area • Ancillary areas (e.g. canteen etc)
Small Units	<p>For a development consisting of a number of small units a single meter per unit is sufficient to achieve this credit. Individual areas within each unit do not need to be sub-metered. For the purpose of this BREEAM issue, a small unit is defined as <500m². (Please note that other BREEAM issues may define 'small' using a different size band. This is the case only where necessary due to the assessment criteria and the scope of the BREEAM issue.)</p>
Large units	<p>A development consisting of one or more larger units (i.e. >500m²), sufficient sub metering to allow for monitoring of the <i>relevant function areas/departments</i> within the unit must be specified, in addition to metering of the unit as a whole.</p>
Accessible meters	<p>Refer to the Compliance Notes in BREEAM issue Ene 2 for a description.</p>

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	Marked-up drawings and site plan detailing: <ul style="list-style-type: none"> • Building areas by department/function and/or tenancy • Location of meters. Specification document or technical drawings confirming: <ul style="list-style-type: none"> • Metering arrangements for each department/function and/or tenancy area • Type of meter specified. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • Location and function of the individual sub-meters or BMS.

Additional Information

Relevant definitions

BMS: Refer to definitions in BREEAM issue Ene 2.

Energy supply: This includes any incoming energy types such as electricity, gas, oil, LPG, etc.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Ene 4 - External Lighting	P	G	VG	E	O
					-	-	-	-	-

Aim

To recognise and encourage the specification of energy-efficient light fittings for external areas of the development.

Assessment Criteria

The following demonstrates compliance (where provided):

1. All external light fittings for the building, access ways and pathways have a luminous efficacy of at least 50 lamp lumens/circuit Watt when the lamp has a colour rendering index (Ra) greater than or equal to 60. **OR** 60 lamp Lumens / circuit Watt when the lamp has a colour rendering index (Ra) less than 60.
2. All external light fittings to car parking areas, associated roads and floodlighting has a luminous efficacy of at least 70 lamp lumens/circuit Watt when the lamp has a colour rendering index (Ra) greater than or equal to 60. **OR** 80 lamp Lumens / circuit Watts when the lamp has a colour rendering index (Ra) less than 60.
3. All external light fittings for signs and uplighting have a luminous efficacy of at least 60 lamp lumens/circuit Watt when the lamp wattage is greater than or equal to 25W. **OR** 50 lamp lumens/circuit Watt when the lamp wattage is less than 25W.
4. External light fittings are controlled through a time switch, or daylight sensor, to prevent operation during daylight hours. Daylight sensor override on a manually switched lighting circuit is acceptable.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Refer to the guidance below for single building assessments on large existing developments/campuses.
Single building assessments on larger developments/campuses	Where the building being assessed forms part of larger development (or is an extension to an existing building) containing common areas and other buildings, the scope of the external lighting criteria apply only to external new and existing lighting within the <i>construction zone</i> of the assessed building.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.

No external lighting specified	Where the building is designed to operate without external lighting, including external lighting on the building, signs and at entrances, the credit can be awarded.
Low energy innovative light fittings	Any fitting that consumes less than 5W complies with the criteria provided each individual fitting is a direct replacement for an alternative, individual BREEAM-compliant fitting and provides an equivalent amount of light for the necessary task. The assessor must ensure that several low watt fittings are not being specified in place of one higher watt but overall more energy-efficient fitting. This compliance note is to allow for the specification of innovative low energy light sources, such as LEDs.
Decorative and floodlighting	Decorative lighting and floodlighting must not be exempt from the assessment criteria although temporary lighting such as theatrical, stage or local display installations, where specified, may be excluded.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-4	<p>Marked-up site plan and building elevations showing:</p> <ul style="list-style-type: none"> Location and purpose of all external lighting fittings. <p>Lighting specification or lighting designer's calculations confirming:</p> <ul style="list-style-type: none"> Lamp lumens/circuit watt for each type of fitting as well as the colour rendering index Ra (where appropriate) External lighting control strategy.. 	<p>As design stage, but 'as built' documentation.</p> <p>AND</p> <p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> External lighting controls. <p>Manufacturers' literature confirming:</p> <ul style="list-style-type: none"> Technical spec for the installed external light fittings.

Additional Information

Relevant definitions

Colour rendering index (Ra): A measure, between 0 and 100, of the ability of a lamp to reproduce the colour of objects in comparison to their aspect under a natural or reference source of light. An incandescent source has a Ra of 100 and a low pressure sodium source a Ra of 0 (see below for further information on colour rendering).

Construction zone: For the purpose of this issue the construction zone is defined as the site which is being developed for the BREEAM-assessed building and its external site areas i.e. the scope of the new works.

Daylight Sensors: A type of sensor that detects daylight and switches lighting on at dusk and off at dawn.

Luminous efficacy in lamp Lumens per circuit Watt: The ratio between the luminous flux produced by a lamp (in Lumens) and the total power consumed by both the lamp and its associated control gear (in Watts).

Time switch: A switch with an inbuilt clock which will allow lighting to be switched on and off at programmed times.

Colour Rendering

At night time, the sensitivity of the eye is shifted towards the blue region of the visual spectrum. As a result, lamps with poor colour rendering index, such as some sodium lamps that emit light between the yellow and red region of the visual spectrum, require more luminous output to light an object with the same level of brightness than a source with better colour rendering index. Sources with a poor colour rendering index also make the differentiation of coloured objects more difficult for individuals.

The colour rendering index requirement means compliance with this issue using sources of light with a poor colour rendering index is harder to achieve than those with an index greater than or equal to 60. Other benefits of using sources with an index greater than 60 include an increased feeling of safety for individuals, making recognition of spaces and other individuals easier. In areas where CCTV is used, the colour rendering index of lighting sources is critical; an Ra value of at least 80 is recommended (but not required by BREEAM).

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
3	3	3	3	Ene 5 – Energy supply with low greenhouse gas emissions	-	-	-	1	1

Aim

To reduce greenhouse gas emissions by encouraging local energy generation from renewable sources to supply a significant proportion of the energy demand.

Assessment Criteria

The following demonstrates compliance:

First credit

1. A feasibility study has been carried out by an *energy specialist* (see Compliance Notes) to establish the most appropriate local (on-site or near-site) LZC energy source for the building/development. This study covers as a minimum:
 - a. Energy generated from LZC energy source per year
 - b. Payback
 - c. Land use
 - d. Local planning criteria
 - e. Noise
 - f. Feasibility of exporting heat/electricity from the system
 - g. Life cycle cost/lifecycle impact of the potential specification in terms of carbon emissions
 - h. Any available grants
 - i. All technologies appropriate to the site and energy demand of the development.
 - j. Reasons for excluding other technologies.
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 concept design or equivalent procurement stage.

OR

4. The organisation that occupies the building has in place a contract with an energy supplier to provide electricity for the assessed building/development from a 100% renewable energy source. This supply must be delivered by an *accredited external renewable* source. The contract must be valid for a minimum of 3 years from the date the assessed building becomes occupied.

Second credit

1. The first credit for a feasibility study must be achieved.
2. A local LZC energy technology has been installed in line with the recommendations of the above feasibility study and this method of supply results in a 15% reduction in the building's GHG emissions. See compliance notes for how to calculate the percentage reduction.

- Figures used for calculations of the percentage carbon reduction provided by LZO technology are based on the output from a recognised *energy modelling software*.

Third credit

- The first credit for a feasibility study must be achieved.
- A local LZO energy technology has been installed in line with the recommendations of the above feasibility study and this method of supply results in a 35% reduction in the building's GHG emissions.
- Figures used for calculations of the percentage carbon reduction provided by LZO technology are based on the output from a recognised *energy modelling software*.

Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue:

One credit

One innovation credit can be awarded where evidence provided:

- A local LZO energy technology has been installed in line with the recommendations of the above feasibility study and this method of supply results in a 50% reduction in the building's GHG emissions.
- Figures used for calculations of the percentage carbon production provided by LZO technology are based on the output from a recognised *energy modelling software*.

Two credits

Two innovation credits can be awarded where evidence provided

- The first credit must be achieved.
- A local LZO energy technology has been installed in line with the recommendations of the above feasibility study and this method of supply results in a 100% reduction in the building's GHG emissions.
- Figures used for calculations of the percentage carbon production provided by LZO technology are based on the output from a recognised *energy modelling software*.

Buildings complying with the exemplary level criteria would therefore achieve five credits for this issue.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	Existing installed LZO technologies can be used to assess compliance with this BREEAM issue. In circumstances where the percentage total building energy demand requirement is met by such existing systems, the credit(s) can be awarded without the need for a feasibility study.

Feasibility study	<p>When undertaking a feasibility study at a later stage than <i>outline proposals</i>, an additional element will need to be included in the report to highlight the local LZC energy sources which have been discounted due to the constraints placed on the project by the late consideration, and the reason for their omission. If the feasibility study discounts all local LZC as unfeasible due to the late stage in the project that the study was commissioned, then the credit for the feasibility study must be withheld.</p> <p>If the feasibility was commissioned at the <i>outline proposals</i> stage or earlier and in the unlikely event the study concludes that the specification of any local LZC technology is unfeasible, the first credit can still be awarded. Subsequent credits for installing LZC technology that meets a percentage of building energy demand will not be achievable.</p>
Calculation of percentage reduction in GHG emissions	<p>Emissions of CO₂ equivalents must be computed based upon energy delivered to the building, as per NS 3031.</p> <p><i>The reference level, C_{ref}</i>, must be computed as the emission of CO₂ equivalents from the energy use for the building assessed where 40% or 60% of the heating needs are covered with an energy supply other than directly acting electricity or fossil fuels (low/zero carbon solution). The 40% figure are to be used if the building's heated floor area is less than or equal to 500 m², otherwise 60% is used, similar to the minimum requirements in the Technical Regulations. The low/zero carbon solution (which is reported on in the feasibility study) that gives the highest GHG emissions may be used as a reference. As a minimum requirement, the following LCZ technologies must be considered for the reference level calculation: Heat pump systems (air- and water based), solar thermal systems, and bioenergy systems). The rest of the energy supply should be based upon electricity from the grid, with a GHG factor of 278 g/kWh delivered energy to the building (see additional information for background on GHG-factors).</p> <p>Computation of the actual GHG emission for total delivered energy to the building with the selected low/zero carbon solution(s), <i>C_{deliv}</i>, must be based upon the methodology in NS 3031. The following GHG factors must be used for different energy carriers and fuels:</p> <p>Electricity from the grid: 278 g/kWh delivered energy to the building Biofuel: 14 g/kWh delivered energy to the building Natural gas: 211 g/kWh delivered energy to the building Heating oil: 284 g/kWh delivered energy to the building</p> <p>Please refer to the additional information at the end for background on the choice of GHG-factors.</p> <p>For local heating/district heating, the actual emission factor must be calculated for the relevant local/district heating system based upon the actual quantity of fuel / energy sources expended, and the associated degrees of efficiency for the systems. Documentation must then be provided for such. If contractually agreed upon plans exist for the redesign of the energy supply or replacement of production equipment for local/district heating system during the course of the first 20 years after the building has been constructed, the actual emission factor may be computed based upon the data for such, provided that satisfactory documentation is delivered. If satisfactory documentation is not delivered for the actual emission factors, a factor of 231 g/kWh of delivered energy must be used.</p> <p>With the use of energy carriers other than those mentioned above, the actual GHG emissions must be documented as per the method in NS-EN 15603:2008.</p>

	<p>Percentage reduction in GHG emissions is calculated as:</p> $\frac{C_{ref} - C_{deliv}}{C_{ref}} \times 100 = \% \text{ reduction}$
<p>List of recognised LZC technologies</p>	<p>The following technologies will be deemed acceptable by BREEAM as LZC technologies provided that the relevant percentage outputs are achieved:</p> <p>Solar</p> <ul style="list-style-type: none"> • Solar hot water • Photovoltaics <p>Water</p> <ul style="list-style-type: none"> • Small scale hydro power • Tidal power • Wave power <p>Wind</p> <ul style="list-style-type: none"> • Wind turbines <p>Biomass</p> <ul style="list-style-type: none"> • Biomass single room heaters/stoves • Biomass boilers • Biomass community heating schemes <p>Combined Heat and Power (CHP) for use with the following fuels:</p> <ul style="list-style-type: none"> • Biomass • Sewerage gas and other biogases <p>High efficiency cogeneration technologies should meet minimum standards defined in the EU CHP directive or according to national standards associated with implementing this directive.</p> <p>Community heating, including utilising waste heat from processes such as large scale power generation where the majority of heating comes from waste heat (see also Compliance Notes below).</p> <p>Heat Pumps</p> <ul style="list-style-type: none"> • Ground source heat pumps • Water source heat pumps • Geothermal heating systems • Air source heat pumps <p>For heat pumps to comply, the heat source (ground or water) must be from a renewable source, for example soil, outside air, ground water, or a river.</p> <p>Other</p> <ul style="list-style-type: none"> • Fuel cells using hydrogen generated from any of the above 'renewable' sources <p>The list above is not a definitive list of technologies compliant with BREEAM, but a list of those technologies that may be considered to comply. If the assessor has a justified reason to doubt the low or zero carbon credentials/feasibility of the above technologies, where specified for a</p>

	development they are assessing, they can justifiably withhold the available BREEAM credits.
LZC technology not listed	Other systems may be acceptable as part of a LZC strategy under this issue but are not inherently considered as LZC technologies. Acceptability will be dependent on the nature of the system proposed. The BREEAM Assessor must confirm acceptability with NGBC if in doubt.
Waste heat from a building related operational process	Waste heat from a process that takes place within the assessed building (or on the assessed site), for the purpose of this BREEAM issue, can be considered as 'Low carbon'. This is on the condition that the generation of the heat from the process is integral to the assessed building.
Waste incineration	Waste heat from an incineration plant can only be considered as a low carbon for the purpose of this BREEAM issue under the following circumstances: <ol style="list-style-type: none"> 1. The Local Authority or region in which the incineration plant is located is demonstrably meeting its annual waste reuse/recycling targets and waste management policies. Or 2. A near- or onsite facility connected to the building, via a <i>private wire arrangement</i>, which demonstrably removes re-usable and recyclable waste material prior to incineration.
Biofuels	Given the current uncertainty over their impact on biodiversity, global food production and green house gas savings, plus the ease of inter-changeability between fossil fuels, BREEAM-NOR does not recognise or reward building systems fuelled by <i>first generation biofuels</i> manufactured from feedstock's e.g. biofuels manufactured from sugars, seeds, grain, animal fats etc. BREEAM-NOR will recognise systems using <i>second generation biofuels</i> (see relevant definitions) or biofuels manufactured from biodegradable waste materials e.g. biogas, or locally and sustainably sourced solid biofuels e.g. woodchip, wood pellets.
Community and off-site schemes	'Local' does not have to mean <i>on-site</i> and community schemes (near site) can be used as means of demonstrating compliance. As this BREEAM issue seeks to encourage the installation of <i>on-site</i> and <i>near-site</i> LZC technologies, <i>accredited external renewables</i> (accept where stated to achieve one credit) cannot be used to demonstrate compliance with the criteria of this BREEAM issue.
Export to the grid	Any electricity from an <i>onsite</i> LZC energy source that is exported to the grid may be included in the calculations as if it were used within the building.
More than one technology	The percentage can be made up from more than one of the above technologies.
Building assessed part of a larger development	Where the building under assessment forms part of a larger development and either a new or existing LZC installation is provided for the whole site, then the amount of LZC energy generation counted for in this issue, and subsequent GHG emissions saved, should be proportional to the building's energy demand compared to the total energy demand for the site (see also note below on existing LZC technology).

LZC technology already available on site	For developments where there is an existing LZC energy source that can supply a compliant percentage of energy to the assessed building, a feasibility study will still have to be carried out to demonstrate that the existing technology is the most appropriate for the assessed building/development. The study should seek to identify any other options to supply a higher proportion of the building's energy demand in addition to that supplied by the existing source.
Process-related energy	For the purpose of assessing this BREEAM issue, energy and subsequent GHG emissions from process-related activities can be excluded from the total when calculating the percentage reduction in GHG emissions. For example energy required for cold storage, catering facilities and laundry equipment can be excluded. Display lighting energy demand, where specified, must not be excluded.
Relevant standards and references	<i>NS 3031</i> Calculation of energy performance of buildings. Method and data <i>NS-EN 15603</i> Energy performance of buildings Overall energy use and definition of energy ratings "Proposal for CO2-factor for electricity and outline of a full ZEB-definition", Memo dated 2011-05-03, www.zeb.no.

Schedule of Evidence Required

	Design Stage	Post Construction Stage
First Credit		
1&3	A copy of the feasibility study report. Letter from the energy specialist confirming: <ul style="list-style-type: none"> Compliance with the definition of an energy specialist The timing of the feasibility report within the plan of works. 	Assessor's building/site inspection (or "as built" drawings) and photographic evidence confirming: <ul style="list-style-type: none"> Installation of LZC technology.
2	Marked-up design plan or specification confirming: Reduction in the building's GHG emissions as a result of the installed LZC technology Manufacturer's technical data and details or calculations stating the carbon savings as a result of the installed LZC technology.	
4	Where an offsite supply is being used as a method of compliance, supplier's documentation confirming: <ul style="list-style-type: none"> Name and details of supplier Details of the source of supply. A copy of the contract or other formal documentation confirming the length of contract to supply 100% renewable energy.	As design stage evidence.
Second, Third & Exemplary Level Credit		
1	Evidence (as outlined above) confirming compliance with the first credit.	Evidence (as outlined above) confirming compliance with the first credit.

2	<p>A specification that confirms:</p> <ul style="list-style-type: none"> Reduction of the building's GHG emissions in consequence of the LZC technology installed. <p>The manufacturer's technical data and details of calculations that establish that the carbon savings are due to the installed LZC technology.</p>	<p>Assessor's inspection report (or "As-Built" drawings) and photographic evidence that confirms: Installation of LZC technology</p>
2	<p>If an energy supply is used outside the parcel of land, documentation is required from the supplier that confirms:</p> <ul style="list-style-type: none"> Name and information about the supplier Information about the supply source. Documentation of GHG emissions from the supply source. <p>A copy of the contract or other formal documentation that confirms the length of the contract for LZC delivery</p>	<p>As for the design stage</p>
2&3	<p>A copy of the report produced by the <i>recognised energy modelling software</i> illustrating;</p> <ul style="list-style-type: none"> The name of the approved software used to carry out the modelling Confirmation of the expertise and experience of the individual carrying out the modelling Total GHG emissions for the assessed building (without LZC energy technology). <p>AND</p> <p>Calculations/outputs from the manufacturer, supplier, engineer or <i>recognised energy modelling software</i> confirming:</p> <ul style="list-style-type: none"> Total carbon savings as a result of the installed LZC technology. 	<p>Where there have been changes to the proposed design or LZC technology specification, a copy of the 'as built' report produced by the <i>recognised energy modelling software</i> confirming the same data as outlined at the design stage.</p>

Additional Information

Relevant definitions

Energy use in BREEAM-NOR is used synonymously with *delivered energy*, as defined and calculated with respect to NS3031:2007. The concept of "purchased energy" is often also used to designate delivered energy. Delivered energy is the sum of energy, expressed per energy product, delivered across the building's system boundaries in order to cover the building's total energy needs, including system losses that are not recoverable. When delivered energy is computed, the energy supply system and its degree of efficiency must be included in the assessment.

GHG-factor. When climate gas emissions from an energy supply system are to be assessed, the *GHG factor* or *CO₂ equivalents of the energy carrier/fuel* must be computed. The GHG factor designates the total emissions of climate gases from production and supply of one unit of delivered energy to the building, weighted together in relation to the influences of the climate gases on the greenhouse effect. Carbon dioxide (CO₂) is the dominant climate gas from the production of energy. The GHG factor is specified in grams of CO₂ equivalents per kWh of delivered energy to the building.. The GHG-factors specified to be used in the calculation of Ene 5, are provided by the National research centre Zero

Emission Buildings (ZEB), www.zeb.no. The ZEB centre is developing GHG emission factors for different energy carriers and fuels used to supply buildings, viewed in a life cycle perspective. The technologies for production of energy are constantly evolving, and new knowledge on the associated emission of greenhouse gases are being produced. Thus, the GHG-emissions from different energy supply options may and will change over time. The GHG-factors specified in Ene 5 are identical to the preliminary factors applied by the ZEB centre, and specified in the memo "Proposal for CO₂-factor for electricity and outline of a full ZEB-definition", dated 2011-05-03. These GHG-factors may be subject to change as more research is carried out and national/international regulations are implemented.

Accredited External Renewables: For the purpose of this BREEAM issue, **accredited external renewables** are renewable energy schemes located off-site, but within Norway, which:

- Create new installed generation capacity, designed to meet the loads of the building (i.e. not just units of carbon)
- Are additional to capacity already required under pre-existing commitments

At the time of writing, the NGBC are not aware of a mechanism for accrediting off-site renewables, and thus not any renewable energy schemes that meet the above definitions; though some Energy Service Companies (ESCOs) may achieve these criteria.

Energy Specialist: An individual who has acquired substantial expertise or a recognised qualification for undertaking assessments, designs and installations of low or zero carbon solutions in the commercial buildings sector; and is not professionally connected to a single low or zero carbon technology or manufacturer.

First and second generation biofuels: first generation biofuels are biofuels made from sugar, starch, vegetable oil, or animal fats using conventional technology. Second generation biofuels are biofuels from lignocellulosic biomass feedstock using advanced technical processes. Common first generation biofuels include vegetable oil, biodiesel and bioalcohols.

Profitability calculation: The present value is used to assess the profitability of an investment. Present and future revenues and expenses will be converted to the present value. A positive present value means that the investment is profitable. It encompasses costs associated with planning, design, acquisition, operation, maintenance and disposal, less any possible residual value. This is done in accordance with the method given in the guidelines for TEK'10, section 14.7.

Life Cycle Costs: the total cost of a building or its parts throughout its life, including the costs of planning, design, acquisition, operations, maintenance and disposal, less any residual value, in terms of carbon emissions.

Life cycle impact: this is the requirement to look at the carbon balance of each technology over its whole life. Encouraging people to not just the savings or emissions over its operational life but also the savings or emissions over the whole life of the technology (from 'cradle to grave'), therefore reflecting the fact that different technologies have different life spans.

Recognised Energy Modelling Software: for the purposes of assessing this BREEAM issue, the approved energy modelling software is the one that is compliant with requirements set in Ene 1. . It may be software that has been approved with respect to criteria in NS 3031, or a recognised software package for dynamic simulation (DSM) that has been approved by NGBC.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	-	1	1	Ene 6 - Building fabric performance and avoidance of air infiltration for the delivery/dispatch of goods	-	-	-	-	-

Aim

To recognise and encourage measures taken to minimise heat loss and air infiltration through the building fabric in connection with the delivery/dispatch of goods.

Assessment Criteria

The following demonstrates compliance:

Higher Education building types only, in addition to general retail and industrial

Design measures

At least 5 of the following design measures have been specified/installed to minimise heat loss and air infiltration through the building fabric from treated/conditioned spaces:

1. Installation of personnel door(s) between internal and external areas within proximity of any adjacent openings for goods delivery access; **AND** a draught lobby between office areas (where present) and the external building access.
2. Delivery loading/unloading areas and operational and/or storage areas are partitioned (see also compliance note on relevancy of design measures).
3. Where present all goods/personnel access, vents in the roof and backdraught dampers on extract fans are draught sealed.
4. Loading/unloading bay doors insulated to a U-value of $0.6 \text{ W/m}^2\text{K}$ or better (concerns the door/gate panel itself, not the included surrounding frames).
5. Plastic strip curtains are specified between internal delivery areas and other internal warehouse storage or operational areas (where there is no other draught sealing or doors). The strip curtains should have a partial overlap.
6. Either of the following are specified on the external goods doors/vehicle delivery bays:
 - a. Plastic strip curtains (with a partial overlap)
 - b. Air curtains (not door heaters) covering the entire width of the opening
 - c. Pneumatic dock seals mounted on all vehicle delivery bays.
7. Rapid rise loading/unloading bay doors with at least 1.0 m/sec closing speed or less than 5 seconds closing time between fully opened and fully closed are specified/installed.

As built performance measures

8. In addition to the above, a comprehensive thermographic inspection of the building fabric (once construction is complete) has been or will be undertaken to confirm the following:
 - a. Continuity of insulation in accordance with the construction drawings
 - b. Avoidance of excessive thermal bridging
 - c. No air leakage paths through the fabric (except through intentional openings)
9. The inspection has been, or will be, carried out in accordance with an appropriate national thermographic best practice standard.
10. Any defects identified via the inspection are rectified and the building re-inspected to confirm it complies with the criteria of point 1.
11. Plus, where integral cold storage facilities are present, these have been tested and commissioned in accordance with the cold storage criteria of BREEAM issue Man 1 (this does not necessarily require BREEAM issue Man 1 to have been awarded).

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
Scope of the issue	This issue is applicable only for assessments of buildings that have a warehouse storage/operational area and/or dedicated vehicle delivery bays/access. Where this is not the case the issue will be filtered from the list of applicable issues by the BREEAM assessor's spreadsheet tool. Where the issue is applicable, the 'as built' performance measures i.e. the requirement for a thermographic survey applies to the whole building, not just the warehouse/delivery area (to ensure completeness of the measures).
National thermographic best practice standard	The design team should demonstrate compliance with NS-EN 13187 <i>Qualitative detection of thermal irregularities in building envelopes. Infrared method.</i>
Where some design measures are not relevant	If some of the design measures are not relevant, e.g. partitioning between delivery and storage areas may not be practical because of operational reasons or the building/unit is too small; the assessor may omit them from the assessment. In such instances the design team must provide the assessor with an adequate statement of justification as to why this is the case. The assessor must use their discretion in determining the validity of the case and reference any justification and design team statement in the formal BREEAM report.
No heated or air conditioned areas – industrial projects	Where the scope of the building specification covers fitted-out elements and the building is designed to be untreated then the requirement to comply with the 'as built' performance measures can be omitted. The design measures are still applicable for future-proofing i.e. in the event that the building at some point has heating and/or air conditioning plant installed.

Synergy with Ene1	It should be recognised that whilst there is only one credit available for this BREEAM issue, the benefit of installing the above measures will also be recognised in BREEAM issue Ene 1, Energy Efficiency. This BREEAM issue is provided in addition to Ene 1 to recognise and encourage specific measures taken to reduce air infiltration to and heat loss from the internal storage, warehousing and delivery areas of the building.
--------------------------	---

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1-7	A copy of the relevant clauses of the specification or proposed design plan confirming: <ul style="list-style-type: none"> Each of the relevant measures incorporated into the design. 	Assessor's building/site inspection and photographic evidence confirming compliance.
8-10	A copy of the specification clause(s) confirming: <ul style="list-style-type: none"> A requirement to commission a thermographic study The standards/method to which the survey will be carried out A requirement to rectify any defects and re-inspect to confirm performance. 	A copy of the survey report or certificate confirming either: <ul style="list-style-type: none"> No consequential defects in construction details or continuity of insulation. OR All consequential defects remedied following re-inspection.

Additional Information

Relevant definitions

Thermographic inspection: A method of producing images of a building using thermal radiation. The images help to identify areas of the building fabric with a higher (or lower in the case of internal fabric) than expected surface temperatures, thus indicating heat loss from, or air infiltration to, the building and therefore highlighting construction defects.

Air curtain: A fan heater that directs a curtain of warm air downwards over an opening which prevents the transfer of heat through the opening. Air curtains help to manage and minimise heat loss from the building when it is necessary to open external doors or access a cold storage enclosure.

Air permeability: physical property used to measure air tightness of the building fabric

Pneumatic dock seals: Also referred to as inflatable shelters, are structures that surround the top and sides of a vehicle loading dock forming a seal between the building and delivery vehicle and therefore minimising heat loss from the building.

Treated: A term to describe an area of the building that is heated and/or mechanically cooled by plant integral to the building.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
3	-	3	3	Ene 7 - Cold Storage	P	G	VG	E	O
					-	-	-	-	-

Aim

To recognise and encourage the installation of energy efficient cold storage systems, therefore reducing operational CO₂ emissions.

Assessment Criteria

The following demonstrates compliance:

First credit

- The following components, where specified as part of the cold storage refrigeration plant/strategy, are recognised as meeting published energy-efficiency criteria, e.g. the ECA Energy Technology Product List or equivalent:
 - Air cooled condensing units
 - Automatic air purgers
 - Cellar cooling equipment
 - Commercial service cabinets (cold food storage)
 - Curtains, Blinds, Sliding Doors and Covers for Refrigerated Display Cabinets
 - Evaporative condensers
 - Forced air pre-coolers
 - Liquid pressure amplification
 - Refrigerated display cabinets
 - Refrigeration compressors
 - Refrigeration system controls

Second credit

- Where the cold storage refrigeration plant complies with the following minimum criteria:
 - Variable speed drives, or piston compressors that regulate capacity by lifting an upstroke valve, are fitted to the compressors, pumps and fans
 - Strip curtains are installed on the cold storage opening(s)
 - Low powered/heat lighting is fitted e.g. fibre optics, LEDs
 - Defrost on demand* controls for evaporators are installed
 - The installed refrigeration plant has a computerised monitoring system with either automated and/or programmable control to monitor the following operational variables:
 - Compressor suction temperature
 - Compressor discharge temperature
 - Compressor current draw
 - Secondary refrigeration temperature
 - Ambient temperature
 - Electricity consumption
 - Evaporator air on/liquid inlet
 - Evaporator air on/liquid outlet.

- f. The plant has been commissioned in compliance with the criteria for cold food storage commissioning outlined in BREEAM Issue Man 1 Commissioning (this does not necessarily require BREEAM Issue M1 to have been awarded).

Note: this credit is not dependent on the previous one.

Third credit

3. Where the plant is capable of **EITHER** of the following free cooling/heating strategies:
- Thermal storage during periods of low load to provide additional cooling during periods of peak cooling load **OR**
 - Heat recovery of the waste heat to meet in part or full space heating and/or hot water criteria for the assessed building or other local demand e.g. air curtain above the cold storage enclosure entrance.

Note: this credit is not dependent on the previous ones.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	The criteria apply to any new or existing refrigeration plant. If the existing building contains refrigeration plant that will remain, then this plant must meet the criteria in order to achieve the credit.
Extensions to existing buildings	If the assessment comprises of a part new build-extension and part refurbishment and there is existing cold storage plant in the existing building that also serves the new extension, then the compliance note above for refurbishment applies.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
Awarding the credits	Each of the three credits can be awarded independently of each other i.e. it is not a requirement of the second credit that the first credit is achieved, likewise for the third credit.
Scope of this issue	This issues is applicable only in instances where commercial/industrial sized refrigeration and storage systems are specified, for example storage and refrigeration of food in supermarkets or cold storage facilities in industrial buildings and laboratories
Heat recovery or thermal storage unfeasible	Where the specification of thermal storage or heat recovery is unfeasible because there will be no low load periods and/or there is no demand for recovered heat, then the third credit can be awarded provided all the criteria of the second credit are met. The design team must justify why there are no feasible opportunities for heat recovery, free cooling or thermal storage.
Local alternative available for the ECA Energy Technology Product List	Where the design team wishes to use a local alternative to the ECA Energy Technology Product List, please refer to the country specific reference sheet to check acceptability. Alternatively, please demonstrate applicability as follows; <ul style="list-style-type: none"> • The minimum requirements as set out in Checklist A10 are covered by the proposed document. • The eligibility criteria are equal to or more onerous than those in the ECA Energy Technology Product List .

No Cold Storage	Where the assessed building contains no Cold Storage, this BREEAM issue will be filtered from the list of applicable BREEAM issues by the BREEAM assessor's spreadsheet tool.
------------------------	---

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	<p>A copy of the relevant clause of the specification requiring the specific undertaking.</p> <p>OR</p> <p>A letter from the manufacturer/supplier or copies of their technical literature confirming the specific components meet published energy-efficiency criteria.</p> <p>OR</p> <p>A print out of the energy-efficient products list (e.g. ETPL) confirming the specific products meet the criteria.</p>	The evidence required at this stage is the same as that outlined at the design stage.
2a-e & 3	<p>A copy of the relevant clause of the specification confirming:</p> <ul style="list-style-type: none"> • Cold storage plant and enclosure criteria. <p>AND/OR</p> <p>A letter from the manufacturer/supplier or copies of their technical literature confirming compliance.</p>	The evidence required at this stage is the same as that outlined at the design stage.
2f	Evidence as outlined under BREEAM issue Man 1 for the relevant requirement.	Evidence as outlined under BREEAM issue Man 1 for the relevant requirement.

Additional Information

Relevant definitions

Defrost on demand controls for evaporators: A control system that automatically initiates a defrost sequence when an appropriate amount control of ice has built up on the evaporator surface.

ECA Energy Technology Product List (ETPL): The EPTL list is part of the Governments Enhanced Capital Allowance Scheme, a key part of the Government's programme to manage climate change. The Scheme provides a tax incentive to encourage investment in low carbon energy-saving equipment that meets published energy-efficiency criteria. The Energy Technology List (ETL) details the criteria for each type of technology, and lists those products in each category that meet them: www.eca.gov.uk.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	2	2	2	Ene 8 - Lifts					
					-	-	-	-	-

Aim

To recognise and encourage the specification of energy-efficient transportation systems.

Assessment Criteria

The following demonstrates compliance:

First credit

1. An analysis of transport demand and patterns for the building has been carried out by the design team to determine the optimum number and size of lifts and *counterbalancing ratio* on the basis of anticipated passenger demand.
2. The energy consumption for at least two types of lift or lift strategy 'fit for purpose' has been estimated and the system with the lowest energy consumption specified.

Second credit

3. The first credit is achieved.
4. Of the following energy-efficient features, the three that offer the greatest potential energy saving are specified:
 - a. The lifts operate in a stand-by mode during off-peak and idle periods. For example the power side of the lift controller and other auxiliary equipment such as lift car lighting and ventilation fan switch off when the lift is not in motion.
 - b. Where lift motors use a drive controller capable of variable-speed, variable-voltage, variable-frequency control of the drive motor.
 - c. The lift has a regenerative unit so that energy generated by the lift (due to running up empty and down full) is returned back to the grid or used elsewhere on site.
 - d. The lift car uses energy-efficient lighting and display lighting (>60 Lumens/watt or fittings that consume less than 5W e.g. LEDS).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.

Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
Building has no lifts	Please note that this issue will not be assessed where a building contains no lifts. In such instances the BREEAM assessor's spreadsheet tool will filter this issue from the list of applicable issues.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-2	A copy of the relevant report or documentation detailing the analysis undertaken and findings/recommendations. A copy of the lift specification.	The evidence required at this stage is the same as that outlined at the design stage.
3-4	A copy of the lift specification. OR Formal letter from the lift manufacturer/supplier confirming that the lift to be installed on the project meets the relevant criteria for the number of credits sought.	The evidence required at this stage is the same as that outlined at the design stage.

Additional Information

Relevant definitions

Counterbalancing ratio: Lifts use a counterweight to balance the weight of the car plus a proportion of the maximum weight of the passengers; this reduces the size of the drive motor required for the lift. Lowering the counterbalancing ratio means a smaller motor and controlling drive unit are required, thus saving energy.

ISO Draft standard CD25745-1 Energy performance of lifts, escalators and moving walks – Part 1 Energy and conformance

It has been estimated that between 5-15% of a building's total energy consumption can be attributed to the operation of lifts and 58% of the energy consumption of lifts is attributable to stand-by mode.

A Working Group of an International Standards Organisation's Technical Committee is developing a draft standard for the Energy performance of lifts, escalators and moving walkways. This standard draft standard outlines proposed procedures to be used when making energy measurements of lifts, escalator and moving walkways.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	-	-	Ene 9 - Escalators and travelling walkways	-	-	-	-	-

Aim

To recognise and encourage the specification of energy-efficient transportation systems.

Assessment Criteria

The following demonstrates compliance:

1. Where each escalator and/or horizontal travelling walkway complies with **EITHER** of the following:
 - a. Is fitted with a load sensing device that synchronises motor output to passenger demand through a variable speed drive. **OR**
 - b. Is fitted with a passenger sensing device for automated operation, so the escalator operates in stand-by mode when there is no passenger demand.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
Building has no escalators or travelling walkways	Please note that this issue will not be assessed where a building contains no escalators or travelling walkways. In such instances the BREEAM assessor's spreadsheet tool will filter this issue from the list of applicable issues.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the specification and manufacturer's technical literature confirming: <ul style="list-style-type: none"> • No. and type of escalators specified • Escalator control strategy. 	Escalator manufacturer's/supplier's technical literature. Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • Installation of compliant escalators.

Additional Information

Relevant definitions

None.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
-	-	-	1	Ene 11 - Energy Efficient Fume Cupboards	-	-	-	-	-

Aim

To ensure the energy-efficient design and operation of fume cupboards in laboratory areas.

Assessment Criteria

The following demonstrates compliance:

1. Recirculatory filtered fume cupboards (as oppose to ducted fume cupboards) are specified as the preferred option for the majority of applications (see compliance notes where ducted fume cupboards are specified/required).
2. The specification of fume cupboards has been carried out in accordance with all relevant guidelines and recommendations contained in;

<http://www.arbeidstilsynet.no/artikkel.html?tid=79289>

3. If ducted fume cupboards are specified, the fume cupboards have a face velocity of less than or equal to 0.5 m/s (see compliance notes).

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Fit Out Only	There are no additional or different criteria specific to fit-out only assessments.
Filter exhaust air with fresh air vs. Outdoor exhaust of air.	<p>Filtered fume hood with fresh air, are more energy efficient than the fume hood with an outdoor exhaust. Performance specifications for fume hoods used in high school, tend to be lower than those required for universities, research institutes and industry, and is easier to design with no external return.</p> <p>In projects which require external returns, the point still to be awarded. For example, where the laboratory must plan addressed separately from other areas. Normally, this applies only in relation to research and some forms of higher education.</p>
Front speed	Where for safety reasons requires a face velocity of more than 0.5 m / s, this must be justified. At the same time the lowest possible front speed is calculated / specified

Building has no fume cupboards	Please note that this issue will not be assessed where a building contains no lab space and fume cupboards. In such instances the BREEAM assessor's spreadsheet tool will filter this issue from the list of applicable issues.
---------------------------------------	---

Schedule of evidence required

Req.	Design stage	Post Construction
First credit		
1, 3	<p>A highlighted copy of the fume cupboard specification or a formal letter from the design team confirming:</p> <ul style="list-style-type: none"> - Type of fume cupboards to be installed - Design & specification will be in compliance with relevant standard(s) - The fume cupboards face velocity (where applicable) 	<p>The evidence required at this stage is the same as that outlined at the design stage.</p> <p>AND</p> <p>Formal written confirmation from the design team or relevant contractor that the fume cupboards are installed in line with specification.</p>

Additional information

Relevant definitions

None

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
-	-	-	1	Ene 12 - Swimming pool ventilation and heat loss	-	-	-	-	-

Aim

To reduce unnecessary energy consumption of heating and ventilation plant for pool areas.

Assessment Criteria

The following demonstrates compliance:

1. Where automatic or semi-automatic pool covers are fitted to ALL pools, including spa pools and jacuzzi (if relevant) within the building.
2. The covers envelop the entire pool surface when fully extended.
3. Where the air temperature in the pool hall can be controlled so that it is 1°C above the water temperature.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
Building has no pools	Please note that this issue will not be assessed where a building contains no pools. In such instances the BREEAM assessor's spreadsheet tool will filter this issue from the list of applicable issues.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1,2	Design drawing highlighting: <ul style="list-style-type: none"> • All pools within the building. A copy of the specification confirming: <ul style="list-style-type: none"> • Requirement and type of pool covers to be installed. If available at the time of assessment, manufacturer's/supplier's details/technical documentation. <ul style="list-style-type: none"> • 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • Installation of compliant covers on all pools. •
3	A copy of the M&E specification confirming: Heating and ventilation control strategy for the pool areas.	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • Heating and ventilation control strategy for the pool areas.

Additional Information

Relevant definitions

None.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
-	-	-	1	Ene 19 - Energy Efficient Laboratories	-	-	-	-	-

Aim

To recognise and encourage building that are designed to minimise the GHG- emissions associated with their operational energy consumption in laboratory areas.

Assessment Criteria

The following demonstrates compliance:

Higher education buildings only,
In buildings where space allocated to the laboratory accounts for more than 25% of the total area (BRA), requirements and specifications fulfill the requirements for reduced energy needs, without compromising on health and safety..

The following applies:

1. Fume cupboards shall meet the requirements according to EN 14175-2 (Specification of Laboratory Fume Cupboard), in a way in which a reduction of air flow will do in an uncompromising manner in relation to health and safety.
2. Specification, clauses, modeling and / or drawings document the choice of technology that reduces energy use

New Build	There are no additional or different criteria to those outlined above specific to new-build projects
Refurbishment	There are no additional or different criteria to those outlined above specific to new-build projects
Extensions to existing building	There are no additional or different criteria to those outlined above specific to new-build projects
Limitation of space for laboratory	Area to the laboratory shall not include offices, meeting rooms, storage or service areas. Lecture is regarded as a laboratory, only if the energy needs for technical equipment is at least 50% higher than typical office equipment.

Filter exhaust air with fresh air vs. Outdoor exhaust of air.	Filtered fume hood with fresh air, are more energy efficient than the fume hood with an outdoor exhaust. Performance specifications for fume hoods used in high school, tend to be lower than those required for universities, research institutes and industry, and is easier to design with no external return. In projects which require external returns, the point still to be awarded. For example, where the laboratory must plan addressed separately from other areas. Normally, this applies only in relation to research and some forms of higher education.
front speed	Where for safety reasons requires a face velocity of more than 0.5 m / s, this must be justified. At the same time the lowest possible front speed is calculated / specified
Building without cupboards	The assessor will ensure that the course does not apply to buildings without the fume hood, by removing the subject of the audit report .

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1, 2	Specification, clauses, modeling and / or drawings document the choice of technology that reduces energy use Specification clauses and / or drawings and / or modeling results demonstrating: <ul style="list-style-type: none"> • Compliant technologies / energy reduction Measures 	Documentation similar to the design and engineering phase. AND Written (formal) verification of the design team or relevant contractor that fume hoods are installed in accordance with the specifications.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
-	-	-	1	Ene 20 - Energy Efficient IT Solutions	-	-	-	-	-

Aim

To recognise and encourage efficient specification, design and use of *data centres* and *IT-intensive operating areas*.

Assessment Criteria

The following demonstrates compliance:

Higher Education Buildings only

Data centres

1. The *data centre* is designed in accordance with the '*Best practices for the EU Code of Conduct on Data Centres*⁴ principles with the *data centre* achieving at least the 'Expected minimum practice' level (as defined in the *Code of Conduct*).
2. Temperature set points are not less than 24°C, as measured at the inlet of the equipment in the rack.

IT-intensive operating areas

3. The *IT intensive operating area* uses a natural ventilation and cooling strategy as standard, with forced ventilation only to be used when the internal temperature exceeds 20°C and active cooling only when the internal temperature exceeds 22°C.
4. There is a mechanism to achieve automatic power-down of equipment when not in use, including overnight.

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Fit out only	There are no additional or different criteria to those outlined above specific to fit out only assessments.

Shell only	<p>Compliance with this BREEAM issue can be demonstrated via one of the following means in shell only buildings/areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p>
Relevant standards	<p>EU Code of Conduct on Data Centres Best practice for the EU Code of Conduct on Data Centres</p>

Schedule of Evidence Required

	Design Stage	Post Construction Stage
1-3	<p>A copy of the contract/specification clauses confirming:</p> <ul style="list-style-type: none"> • That the data Centre will achieve 'Expected minimum practice' level (as defined in the Code of Conduct on Data Centres). • Ventilation/cooling strategy. 	<p>Written confirmation or demonstration that the 'Expected minimum practice' has been implemented.</p> <p>AND</p> <p>Copy of relevant section of commissioning report confirming that design set points have been achieved.</p> <p>OR</p> <p>'As built' plans or specification clauses demonstrating compliant ventilation settings for IT-intensive areas and/or data centres.</p>
4	<p>Manufacturer's details or specification confirming the power-down strategy used.</p>	<p>Written confirmation or demonstration of the installation of the power-down method.</p>

Additional Information

Relevant definitions

Data centre: For the purpose of this BREEAM issue, the term 'data centres' includes all buildings, facilities and rooms which contain enterprise servers, server communication equipment, cooling equipment and power equipment, and may provide some form of data service (e.g. large scale mission critical facilities all the way down to small server rooms located in office buildings).

I.T-intensive areas: These include computer areas where more than 1 PC per 5 m² is provided, e.g. training suites, design studios, libraries' I.T areas and other areas with a high density of computing devices.

Examples of methods that can be used to lower energy and heat within IT suites are specification of low power PCs, sharing of PCs between several users, or 'thin clients' (a client computer or software which uses a central server for processing information).

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	2	2	2	Ene 23 - Energy performance of building structure	-	-	-	1	2

Aim

To recognize and encourage the building designed and built to minimize the need for energy for heating and cooling.

Assessment Criteria

The following demonstrates compliance:

First credit

Design Initiatives:

1. The building's net energy demand for heating and cooling shall be calculated according to NS 3031 and the criteria given for the low-energy and passive houses - Non-residential building in the NS 3701 Until this standard exists, the SINTEF Project Report 42 is used
2. The building is designed to reduce the extent of air leaks
3. Energy requirements calculated in paragraph 1 is less or equal to the requirement for heating and cooling needs of *low-energy buildings* for the building category, as specified in NS 3701 / Project Report 42

Performance Measures "as built"

4. It has been performed a air leakage testing combined with a thermographic survey of the building construction to confirm the following:
 - a. Insulation continuity in accordance with construction drawings
 - b. Avoidance of unnecessary thermal bridges
 - c. No paths of air leakage through construction (except through the openings are made intentionally)
 - d. Air leakage number ≤ 1.5 ACH measured at 50 Pa pressure difference.
5. Tightness Testing and Thermographic survey is conducted in accordance with the provisions of NS-EN 13829 and NS-EN 13187.
6. Any errors that were discovered during the inspection and density testing, has been repaired and the building is inspected again to verify that it matches the criteria in section 4.

Second credit

7. Similar to the first credit, but the energy requirements of paragraph 3 shall be less or equal to the respective requirement levels for the net heating and cooling needs for *passive houses* AND

8. The leakage figure of section 4 should be ≤ 0.6 ACH measured at 50 Pa pressure difference.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	Net energy requirements to be satisfied as described in 1, 3 and 7 divided by a factor of 0.85. In other respects the criteria for refurbishment are similar to those described above.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
The extent of the thermal survey	The thermal survey must ensure that all exterior walls to the treated areas and all the walls separating treated from untreated areas, are tested.
Relevant standards and references	NS 3031: Calculation of the energy performance of buildings - Methods and data SINTEF Report 42: Criteria for passive houses and low energy buildings – commercial buildings, www.sintef.no NS 3701: Criteria for passive and low energy houses - Commercial Buildings NS-EN 13829: Thermal performance of buildings - Determination of air permeability of buildings - Fan pressurization method NS-EN 13187 Thermal performance of buildings - Qualitative detection of thermal irregularities in building envelopes - Infrared method
No heated or air conditioned areas - industrial projects	If the building is designed to be not heated or air conditioned, one can omit the requirement for compliance with performance measures' as-built ". Design measures will still be applicable for future testing, ie, in the event that at some point there will be installed heating and / or air conditioning in the building.
The area's extent	The criteria basically encompass the entire building. The exception is any unheated areas in connection with the delivery of goods. If this is the case, BREEAM Assessor-Spreadsheets tool filter area away from the list of relevant areas. For those areas that are relevant performance measures' as-built", ie the requirement for density testing and thermographic survey of the entire building.
Synergy with Ene1	One must be aware that even though there are only two available points for this BREEAM-NOR area, the initiatives will also be recognized in the BREEAM-NOR area Ene 1, Energy Efficiency. This BREEAM-NOR area is thus in addition to Ene 1 to recognize and encourage specific actions to reduce air infiltration and heat loss in the building.

Req.	Design Stage	Post Construction Stage
1-3 and 7	A copy of the report which was made with an approved calculation tool is assessed based on the design stage, to illustrate: <ul style="list-style-type: none"> • Actual estimated net energy for heating and cooling. • The name of the approved software that was used to perform modeling for 	Documentation from a third party, as follows: <ul style="list-style-type: none"> • Printing from the calculation program, confirming that the building has achieved projected energy standard according to NS 3031 and NS 3701 • 'As-built "drawings that demonstrate that the specification that was used and modeled at

	<p>determining energy performance.</p> <ul style="list-style-type: none"> • Confirmation of the expertise and experience of the person who performed the modeling in accordance with the requirements of the energy labeling scheme. <p>AND</p> <p>Where appropriate, a letter from the person who did the modeling, which confirms:</p> <p>The data was used to model the current standard building is in accordance with the rules of NS 3031 and NS 3701 / SINTEF Report 42.</p>	<p>the design stage, consistent with the specification of the finished building.</p>
4, 5, 6 and 8	<p>A copy of the specification clause(s) confirming:</p> <ul style="list-style-type: none"> • A requirement to commission a thermographic study and air leakage measurement • The standards/method to which the survey will be carried out • A requirement to rectify any defects and re-inspect to confirm performance. 	<p>A copy of the survey report or certificate confirming either:</p> <ul style="list-style-type: none"> • No consequential defects in construction details or continuity of air tightness layers and insulation. OR <p>All consequential defects remedied following re-inspection.</p>

Additional Information

Relevant definitions

Thermographic survey: A method for creating images of a building by means of heat radiation. The images help identify areas in the building with a higher (or lower if it concerns the inner structure) surface temperatures than expected, which indicates the heat loss from, or air infiltration to, the building, which again highlights the failure of the building.

7.0 Transport

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
4	2	2	4	Tra 1 - Provision of Public Transport	P	G	VG	E	O
					-	-	-	-	-

Aim

To recognise and encourage developments in proximity to good public transport networks, thereby helping to contribute to reducing transport-related emissions and traffic congestion.

Assessment Criteria

The following demonstrates compliance:

OFFICES ONLY

First credit;

1. The distance from the building entrance to the public transport node (i.e. bus stop, station etc.) is less than 500m.
2. The transport node has a service at least once every 15 minutes at peak times (i.e. 7.00am-9.00am and 3.00pm to 5.00pm) on working days to a local urban centre.

Second credit;

1. The distance from the building entrance to the public transport node (i.e. bus stop, station etc.) is less than 500m.
2. The transport node has a service at least once every 30 minutes through the working day (i.e. 7.00am - 5.00pm) to a major transport node serving local and regional infrastructure systems.

RETAIL AND EDUCATION ONLY

1. There is a public transport service from a nearby public transport node, going to and/or from a local urban centre
2. The table below, illustrating frequency of the public transport and proximity to the building being assessed, is used to determine the number of credits achieved.

Table 7.1 Frequency and distance to public transport requirements for retail developments.

The frequency applies to normal opening hours for retail (09.00 – 20.00) and higher education (08.00-17.00). For primary and secondary school, frequency applies from 08.00 – 16.00.

Frequency	Same as or less than 5 mins	Less than 10 mins	Less than 15 mins	Less than 20 mins	Less than 25 mins
	Credits available				
100m	4	4	3	2	1
200m	4	3	2	1	0
300m	4	3	2	1	0
400m	4	3	2	1	0
500m	3	2	1	0	0

INDUSTRIAL ONLY

1. There is a public transport service from a nearby public transport node, going to and/or from a local urban centre
2. The table below, illustrating frequency of the public transport and proximity to the building being assessed, is used to determine the number of credits achieved.

Table 7.2 Frequency and distance to public transport requirements for industrial developments

Proximity	Frequency/Number of Credits	
	≤15mins	≤30mins
≤500m	2	1
≤800m	1	0

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.

Operating hours	<p>BREEAM seeks to define the building's accessibility to the public transport network for the period during which the majority of building users will travel to and from the building. In most cases the normal operating hours of the building can be used; however, some buildings will operate for 24 hours a day and on a shift work basis. As a result, during what typically would be deemed unsociable hours and therefore periods where a) there is little if any public transport operating and b) the number of total building users travelling to the building during this time is a minority; such periods are not required to be accounted for in the assessment of this issue.</p> <p>Where the assessed building operates on a 24-hour basis, or the operating hours are unknown at the time of assessment, then refer to and use table 7.3 of default operating hours, which can be found in the Additional Information section of this issue.</p>
Compliant public transport node	<p>A compliant node includes any bus stop, railway, tram or underground station, measured from the building entrance via a safe pedestrian route (not '<i>as the crow flies</i>'). The service stopping at each node must provide transport from, or onward travel to, either a local urban centre, major transport node or a community focal point e.g. doctor's surgery, library, school or village centre.</p>
Multiple services	<p>Services that operate from more than one node within proximity of the building, i.e. two separate bus stops served by the same bus, must be considered only once - at the node in closest proximity to the building. Different services at the same node, however, should be considered as separate entities.</p>
Bi-directional routes	<p>Routes will be bi-directional; however for the purpose of assessing the issue, consider only the direction with the highest frequency.</p>
Rural areas	<p>The criteria remain the same where the project assessed is located in a rural location. This BREEAM issue aims at mitigating the CO2 emissions associated with the transport of staff and visitors to and from that building. Developers are therefore encouraged to consider this issue at a very early stage before the site of the project is determined.</p> <p>Where the location of the site is already determined, the developer may work with the local authority to develop the public transport infrastructure in the area or consider providing dedicated transport services</p>
Phased developments	<p>In the case of a large phased development where new transport facilities will be provided, but at a later stage than the building being assessed, the assessment can consider such facilities provided that:</p> <ul style="list-style-type: none"> • A commitment to provide transport facilities has been made in the General Contract Specification. And the shortest of the following periods - Either • The transport facilities will be available for use by the time 25% of all phases have been completed and are ready for occupation. Or • The transport facilities will be available for use within 25% of the total build time for the phase in which the assessed building forms a part, measured from the completion date of that phase. <p>The most appropriate rule for the development in question must be used, ensuring that the time building users have to wait before having use of the transport facilities is as short as possible. Where the transport facilities will not be available for use within a period of five years from occupation of the building, they cannot be considered for determining compliance with the BREEAM requirements.</p>

Dedicated transport services	Where a dedicated company bus service is provided for staff during, or before or after, <i>operating hours</i> (as defined below), the building entrance can be substituted for the drop-off/pick-up destination point of this service and therefore public transport accessibility measured from that point. The dedicated service may pick up and drop off staff within 500m of their homes, or at a public transport node.
More than one Transport Node in the same proximity	Where there is more than one transport node in the same proximity of the building for example one node at 100m and another at 200m (i.e. both within 250m) then the average service frequency between these nodes may be taken.
More than one Transport Node in different proximities	Where there is more than one transport node but they are in different proximities of the building for example one node at 100m and another at 400m (i.e. one within 250m and another within 500m) then each node should be assessed separately and the credit awarded on the basis of the better performing node.
Transport Nodes served by more than one service	Where a transport node is served by more than one service that goes to a local urban centre, the frequency of time between one service and the next can be used as the frequency for assessment. For example, where there are three services, each with a 20 minute frequency but each follows on 10 minutes after the other, then the frequency used for assessment purposes would be 10 minutes.
Measuring the frequency of services	The frequency is measured as the average frequency between one service and the next, for at least 75% of the assessed development's opening hours for a typical day's operation. This is subject to there being at least one service every 45 minutes during opening hours. This requirement is to ensure that credits are not awarded in instances where there is a good average frequency but a poor spread of service frequency throughout the day.
Average service frequency	The typical day is that which represents the period when travel to and from the building by staff and visitors will be at its highest. For most buildings this should be taken as a mid-week day. In choosing a typical day the assessor should check that the timetabled information for that day is, within reason, representative of the public transport provision for the entire operating week (excluding Sundays). Where the opening hours are not known and the default hours (in the Additional Information section) are used, it must be assumed that the retail development will be open six days a week.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	Scale map highlighting the location of the building and all public transport nodes in proximity of the building.	The evidence required at this stage is the same as that outlined at the design stage.
2	Timetables for each service at each public transport node considered.	Where changes have occurred since the design stage which could affect the compliance, full details of the changes will be required to demonstrate compliance.

Additional Information

Relevant definitions

Local Urban Centre: This is any community focal point, as these will be served by public transport networks, This includes local shops and/or community facilities such as doctor's surgery/dentist/library/school, a major transport node such as a railway/bus station/transport node, or another type of significant non-leisure related meeting place.

Main building entrance: The main building entrance is the entrance to the assessed building accessed by the majority of the building's staff and visitors, not the site entrance (unless the site entrance is also the building entrance e.g. building with a boundary on a public highway).

Major Transport Node: This is any node on a regional/national transport infrastructure system.

Table 7.3 Default hours of operation for a typical day

Office	8.00am – 5.00pm
Industrial	7.00am - 5.00pm
Shopping centre	9.00am – 8.00pm
Supermarket	8.00am – 10.00pm
Bank/Service provider	9.00am – 4.00pm
Convenience store	10.00am – 10.00pm
DIY/retail park	8.00am - 8.00pm
High street store	9.00am – 8.00pm
Car showroom	8.00am – 7.00pm
24 hour use building	7:00am – 8:00pm

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Tra 2 - Proximity to amenities	-	-	-	-	-

Aim

To encourage and reward a building that is located in proximity to local amenities, thereby reducing the need for extended travel or multiple trips.

Assessment Criteria

The following demonstrates compliance:

1. For developments in *rural locations*, the building is within 500m of the following amenities:
 - a. Grocery shop and/or food outlet
 - b. Postal facilities
2. For all other developments (inclusive pre-school/school), the building is **also** within 1000m of at least **two** of the following:
 - a. Bank/Cash machine
 - b. Pre-school/school
 - c. Hairdresser
 - d. Doctors surgery/medical centre
 - e. Pharmacy
 - f. Dry cleaners

For higher education (university), the following:

Where the building is within 500m of at least five of the following facilities, or where at least five of the following facilities are located within the campus where the building is developed:

- a. Grocery store and / or food outlet
- b. Post
- c. Cash Withdrawal
- d. Leisure-/sportscenter
- e. Library
- f. Student
- g. Child health

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.

Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
Food Outlet	This includes the following: <ul style="list-style-type: none"> • Grocery shop • Supermarket • Sandwich shop • On- or off-site cafeteria or staff canteen
Collective amenities	One type of amenity may also exist within or a part of other types of amenities e.g. grocery store in a petrol station, cash point or pharmacy in a supermarket etc. It is not a requirement of the assessing this issue that each amenity is 'stand alone'.
Accessible local amenities	The distance must be measured via safe pedestrian routes e.g. pavements and safe crossing points or, where provided, dedicated pedestrian crossing points. The distance should not be measured in a straight line, ' <i>as the crow flies</i> '.
Amenities within building	Amenities within the building or on the site (provided within 500m of assessed building) meet the assessment criteria. For example, where there is no postal box within 500m of the building, the building occupier can provide an alternative facility, such as a contract with the postal office or alternative mail/courier service. Alternatively the building occupier can provide a facility to collect the mail within the building on a daily basis and arrange to have them delivered to the nearest postal facility. Daily collection of the mail will need to be guaranteed for the facility to be deemed compliant.
Phased developments	The guidance provided in BREEAM issue Tra 1, concerning phased developments, also applies to this issue.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	<p>Marked-up site plan or map highlighting:</p> <ul style="list-style-type: none"> • Location of assessed building • Location and type of amenities • The route to the amenities • Plan/map scale 	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> • The existence of the local amenities • The route and distance to the amenities.
	<p>Where the amenities do not currently exist, but are due to be developed, a letter from the client/developer confirming:</p> <ul style="list-style-type: none"> • The location and type of amenities to be provided • The timescale for development of the amenities. 	<p>Evidence as outlined at the design stage of assessment.</p> <p>OR</p> <p>As above where amenities developed, or under development at the time of post construction review/assessment.</p>

Additional Information

Relevant definitions

Rural location: Rural areas are set equal to all other areas that are not encompassed by the definition of a population cluster from Statistics Norway, <http://www.ssb.no/befteft/> = a set of houses must be

registered as a population cluster if at least 200 people live there and the distance between the houses does not normally exceed 50 metres.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	2	2	2	Tra 3 - Alternative modes of transport	P	G	VG	E	O
					-	-	-	-	-

Aim

To recognise the provision of adequate facilities on site allowing building users to use alternative modes of transport to go to and from the building.

Assessment Criteria

Two credits can be awarded where one of the following measures has been implemented to encourage the use of alternatives to the private car for commuting:

Option 1

First credit - Compliant cycle storage spaces

1. Offices, Education and Industrial projects: the number of *compliant cycle storage spaces* provided is as follows:
 - a. 10% of the number of *building users* up to 500 **PLUS**
 - b. 7% for the number of *building users* in the range of 501 – 1000 **PLUS**
 - c. 5% for the number of *building users* over 1000

This is subject to providing a minimum of 2 cycle storage spaces.
See complains notes for definition of users in the building
2. Retail developments: the number of *compliant cycle storage spaces* provided is as follows:
 - a. 10% of the number of *full-time equivalent* staff that will commute to the development **PLUS**
 - b. 5% of the total number of customer car parking spaces (excluding disabled spaces and mother-and-baby spaces where provided). This is subject to providing a minimum of 10 cycle racks. Any development that provides at least 50 customer cycle storage spaces will comply regardless of the number of parking spaces

The staff spaces must be provided in addition to customer spaces and whilst they do not need to be separate from customer spaces, this is encouraged.

Second credit - Compliant facilities

1. The first credit has been achieved.
2. At least two of the following *compliant facilities* must be provided for the *building users*:
 - a. Compliant showers
 - b. Compliant changing facilities and lockers for clothes
 - c. Compliant drying space for wet clothes

For educational buildings only the option 1 above is available to 2. credits

Option 2

1. During the preparation of the brief (equivalent to stage B) the design team has consulted with the local authority on the state of the local cycling network and how the development could contribute to improving it.

2. One proposition has been chosen in agreement with the local authority and implemented. This proposition must be additional to what would have been done by the local authority without the support from the project and must have a significant impact on the local cycling network.

Option 3

1. Negotiations with local bus companies have resulted in an increase of the local service provision in the development's local area.

Option 4

1. For office and industrial developments, electric recharging stations have been provided for at least 3% of the total carparking capacity for the building.
2. For retail developments, electric recharging stations have been provided for at least the following number of vehicles;
 - a. 3% of the carparking capacity up to 300 **PLUS**
 - b. 2% of the carparking capacity in the range of 301 – 1000 **PLUS**
 - c. 1% of the carparking capacity over 1000.

Option 5

1. A car sharing platform has been set up to facilitate and encourage building users to sign up to a carsharing scheme.
2. Marketing material has been developed to help raise awareness of the system and will be communicated to the tenants where applicable.
3. Priority spaces for car sharers are provided for at least 5% of the total carparking capacity for the building.
4. Priority spaces are located in the nearest available spaces in the nearest available parking area to the main building entrance on site.

Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue.

1. Two of the options above have been implemented.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Refer to the compliance note below on existing compliant facilities.
Shell Only – Offices	If it is not possible to confirm the number of <i>staff</i> due to the speculative nature of the building then a default occupancy rate of 1 person per 10m ² of net lettable area should be used.

Shell Only – Retail	<p>If it is not possible to confirm the number of <i>full time equivalent staff</i> commuting to the development due to the speculative nature of the building then a default occupancy rate of 1 person per 10m² of net lettable area should be used. Alternatively, the number of <i>full time equivalent staff</i> in an existing retail development of similar type and size can be used (the assessor needs to justify/validate the number used in their certification report).</p> <p>Where tenants will be installing cyclist facilities as part of their fit-out specifications, these might be taken into account in order to demonstrate compliance with the criteria, provided that a tenancy lease agreement between the developer and the tenant/s confirm that all the BREEAM requirements will be met.</p>
Shell Only – Industrial	<p>If it is not possible to confirm the number of <i>building users</i> due to the speculative nature of the building then a default occupancy rate of 1 person per 10m² of net lettable office area and 1 person per 20m² of operational floor space should be used. Operational floor space does not include warehouse storage space. Alternatively, the number of <i>staff</i> in an existing industrial unit of similar type/operation and size can be used (the assessor needs to justify/validate the number used in their certification report).</p> <p>Where tenants will be installing cyclist facilities as part of their fit-out specifications, these might be taken into account in order to demonstrate compliance with the criteria, provided that a tenancy lease agreement between the developer and the tenant/s confirm that all the BREEAM requirements will be met.</p>
Fit Out Only	<p>There are no additional or different criteria to those outlined above specific to fit out-only assessments.</p>
Option 1 only	
Building users	<p>OFFICE RETAIL AND INDUSTRIAL</p> <p>Where the term <i>building users</i> is referenced this refers to the staff, therefore the number of staff that will work within the building must be used to determine the number of <i>compliant facilities</i> that must be provided to achieve the credit. Whilst staff numbers are the means by which compliance with the assessment criteria is determined, the percentage requirements account for visitors that will travel to and use or work within the building. As such the compliant cycle facilities must be accessible to all these types of building users.</p> <p>EDUCATION ONLY</p> <p>Where the term users of the building is used for the purpose of calculating compatible bicycle parking, this refers to the typical number of employees and the estimated or actual number of pupils / students likely to use the building during a typical school / day of the current school.</p> <p>The following are exceptions to this definition:</p> <ul style="list-style-type: none"> • The first credit (cycle storage) for pre-school buildings, where building users are defined as staff only. • The second credit (cycle changing facilities) for pre-schools, primary schools and higher education, where building users are defined as staff only. <p>For reviews of higher education buildings, where the term staff is used, this includes students, doctoral and post-doctoral. Bachelor, diploma and Master Pupils / students are considered to be students in order to evaluate this BREEAM-topic.</p>

	<p>The requirement for provision of cyclist facilities based on staff and student/pupil numbers also accounts for other community users who will use the building, it is therefore not necessary to estimate and include within the calculation the number of predicted community users.</p>
Compliant cycle storage space	<p>Cycle storage facilities should be designed to ensure maximum health and safety of building users and should therefore meet the following wherever possible:</p> <ul style="list-style-type: none"> • The space is covered overhead and protected from the rain • The covered area and the cycle racks are set in or fixed to a permanent structure (building or hardstanding) and allow both the wheel and frame to be locked securely (e.g. Sheffield type). OR racks are located in a locked structure with CCTV surveillance and access from staff only. Fixtures to lock bikes are not required in the second instance. • There must be sufficient space for all bikes to be stored without having to move others or rely on integral stands. • Adequate lighting is provided in accordance with national best practice lighting guide as defined in issue Hea 5. • The facilities are in a prominent site location that is viewable from the building. • The majority of the cycle racks are within 100m of a building entrance (ideally within 50m). • Where there is indoor parking for automobiles, such must also be offered for bicycles as per the criteria given above. Arrangements must also be made for rinsing road salt, etc., off bicycles. <p>Where any of those requirements are not deemed suitable in relation to the health and safety of the users, they may be excluded provided that adequate justification has been provided and approved by BRE.</p>
Vertical bike racks	<p>Vertical racks, which allow direct access (without the need to get alongside the locked bike) and permit one bike per vertical stack can comply with the criteria (provided all other criteria are met).</p>
Non compliant cycle racks	<p>These types of cycle storage devices do not comply with BREEAM:</p> <ul style="list-style-type: none"> • Hooks and wall attachments • Single wheel (butterfly) bike rack holders (these racks provide less security and can cause damage to bike wheels).
Public bicycle sharing systems	<p>Bicycle sharing systems are increasingly popular and diverse systems have appeared over the past few years in major cities in Europe whereby a number of bicycles are made available for shared use amongst people who do not own a bicycle. The central concept of many of the systems is free or affordable access to bicycles for city transport in order to reduce the use of automobiles for short trips inside the city thereby diminishing traffic congestion, noise and air-pollution.</p> <p>Up to 50% of the BREEAM cycle racks requirement may be provided by a public bicycle sharing system where it complies with the following:</p> <ul style="list-style-type: none"> • The program is implemented by the municipality or through a public-private partnership. • The system must be open to casual users who wish to use them for one-way rides to work, education or shopping centres. • Bicycles are available at unattended urban locations; and they operate in a manner that could be seen as "bicycle transit" • Service terminals must be available throughout the city • The average distance between service terminals is 500 m maximum in

	<p>inner city areas.</p> <ul style="list-style-type: none"> • A service terminal is available within 500m of the main building entrance. • The station terminals do not need to comply with the design requirements listed above. <p>The number of compliant facilities is calculated based on the total number of cycle racks required. For retail projects, public bicycle racks can also count towards the number of customer cycle racks required.</p>
City centre locations – Offices and Industrial	In city centre locations the criteria for <i>compliant cycle spaces</i> can be reduced by 50% where at least two of the available BREEAM credits for provision of public transport (Tra 1) have been awarded.
City centre locations – Retail	Sites in city centre locations can reduce by 50% the criteria for <i>compliant cycle spaces</i> where at least three of the available BREEAM credits for provision of public transport (Tra 1) have been awarded.
Individual buildings/units that form part of a larger development or business district	<p>For the assessment of individual buildings/units that form part of a larger development or business district (eg retail parks, shopping centres), and do not have the scope to provide their own dedicated cyclist facilities (i.e. no external publicly accessible areas), awarding the credit does not require that individual facilities are provided for each individual retail unit. The credit can be awarded where:</p> <ul style="list-style-type: none"> • The development has compliant centralised facilities, provided their number caters for and can be accessed by all staff that work at the development. • At least 10 publicly accessible <i>compliant cycle storage spaces</i> are within proximity of the main shop entrance i.e. 100m. <p>Those facilities should comply with all the BREEAM design requirements as listed above in order for the credit to be awarded.</p> <p>50% of those may be provided by a public bicycle sharing system.</p>
Rural locations	Sites can reduce by 50% the criteria for <i>compliant cycle spaces</i> where the building is located in a rural location as defined under Tra2 AND the average building user commuting distances are likely to be greater than 10 miles.
Sites in mountainous locations	<p>Sites in mountainous/hilly areas where the average slope is more than 8% around the site and is likely to prohibit commuting by bicycle can reduce by 50% the criteria for <i>compliant cycle spaces</i>.</p> <p>Buildings located in a plain but at the top of a hill do not comply with this definition.</p>
Compliant showers	<p>One shower must be provided for every 10 cycle storage spaces and both male and female users catered for i.e. either separate showers within shared gender-specific facilities or single shower cubicles and changing space for mixed use. The showers can be available for others to use in addition to cyclists.</p> <p>EDUCATION ONLY:</p> <p>In the case of a pre-school or primary school one shower must be provided for every 10 staff (subject to a minimum of one shower). In secondary, sixth form and further education buildings, one shower must be provided for every 10 cycle storage spaces. In the case of a higher education building, one shower must be provided for every 10 staff cycle storage spaces. Both male and female users catered for i.e. either separate showers within shared genderspecific facilities or single shower cubicles and changing space for mixed use. The showers can be available for others to use in addition to staff.</p>

	The compliant showers for this issue must be separated from showers used for students as part of their school activities.
Compliant changing facilities & lockers	<p>Changing facilities and locker criteria;</p> <ul style="list-style-type: none"> The assessor can use their judgement to determine whether the changing area is appropriate given the number of cycle storage spaces/showers provided. As guidance to aid the assessor, where a shower/changing cubicle is provided there should be a minimum of one square metre of changing space adjacent to the shower(s) with a bench seat and hooks for hanging clothes. Where there is more than one shower provided there should be a minimum of one square metre of changing space per shower, subject to a minimum changing area of four square metres. Where there are no showers specified, but there is a changing facility, there is a minimum of one square metre of changing space for every 10 cycle storage spaces, subject to a minimum of four square metres of changing area with a bench seat and hooks for hanging clothes. The number of lockers is at least equal to the number of cycle spaces provided. Lockers are either in or adjacent to compliant changing rooms. Where the changing space is a cubicle the locker(s) must not be located within the cubicle. Each locker is at least 900mm high by 300mm wide by 450mm deep, or a locker with dimensions that provide an equivalent volume of storage space. Both male and female users are catered for i.e. either gender specific, shared facilities or single changing cubicles in mixed use areas. Toilet cubicles do not count as changing facilities. The minimum universal design requirements for corresponding rooms/facilities must be satisfied (See Dynamic Guide for Tek-10, http://byggeregler.be.no/dxp/content/tekniskekrav/).
Compliant drying space	The drying space (for wet clothes) must be a specially designed and designated space with adequate heating/ventilation. A plant room is not a compliant drying space.
Existing compliant facilities	For assessments of new <i>infill</i> buildings on an existing site, where there are existing compliant facilities, such facilities can be assessed against the criteria of this issue. The number of existing compliant facilities must be large enough to cater for the building users of the assessed building, in addition to the users from any existing buildings.
Minimum number of facilities	Where more than the minimum number of compliant cycle spaces is provided, it is not necessary to also provide more than the minimum number of showers/lockers/changing facilities.
Option 2 only	
Contribution to the local cycling network	<p>Where the local infrastructure around the site doesn't cater adequately for cyclists, building users will not be encouraged to cycle to the building. Therefore, in order to increase the usage of the cycle racks, and promote cycling in a cyclist-unfriendly environment, developers should consult with the local authority to identify options to influence and contribute to the development of suitable cyclist infrastructure in the area.</p> <p>Examples of cyclist infrastructures include the development of cycle lanes in the surrounding area, the creation of a public cycle racks or bicycle pools, the installation of a cyclist lift in hilly parts of the city etc.</p> <p>Contributions will need to have a significant impact on the development of</p>

	those infrastructures to be recognised under this BREEAM issue and this should be justified accordingly in the assessment report.
Option 5 only	
No parking on site	The option 5 remains applicable where there is no carparking on site provided that the first and second requirements are met.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
Option 1		
First Credit		
1&2	<p>Site plan, design drawings and/or a copy of the specification confirming:</p> <ul style="list-style-type: none"> The location of the building and its surroundings The location of the cycle storage facilities The number of cycle spaces provided The type, dimensions and layout of cycle racks The materials and construction specified for the facility. The lighting for the facility is in accordance with the appropriate standard. Building occupancy or, where relevant, net lettable/floor area. <p>Where the building is in a city centre location, and the benchmarks reduced, evidence as outlined under BREEAM credit Tra 1 demonstrating the relevant number of credits achieved.</p>	Assessor's building/site inspection and photographic evidence confirming the installation of the compliant facilities.
Second credit		
1	Evidence (as outlined above) confirming compliance with the first credit.	Evidence (as outlined above) confirming compliance with the first credit.
2	<p>Design drawings or a copy of the specification confirming:</p> <ul style="list-style-type: none"> Number of showers Changing room Secure locker locations, dimensions and numbers Drying space 	Assessor's building/site inspection and photographic evidence confirming the installation of the compliant facilities.
Option 2 & 3		

All	<p>Minutes of discussions and negotiations with the relevant stakeholders demonstrating:</p> <ul style="list-style-type: none"> • A list of the stakeholders present • The process and scope of the consultation • The stage in plan of works that consultation occurred. • The different options to contribute to the local network <p>A copy of the contract outlining:</p> <ul style="list-style-type: none"> • How the developer will contribute to the development of the local cycling infrastructure OR • The number of bus services provided before and after the development 	<p>Assessor's building/site inspection and photographic evidence confirming the cycling infrastructure is in place.</p> <p>OR</p> <p>Timetables for each service at each public transport node considered.</p> <p>Where changes have occurred since the design stage which could affect the compliance, full details of the changes will be required to demonstrate compliance.</p>
Option 4		
All	<p>A marked-up copy of the site plan confirming:</p> <ul style="list-style-type: none"> • Location and number of electric recharging stations 	<p>Assessor's building/site inspection and photographic evidence confirming the electric recharging stations are in place</p> <p>Where changes have occurred since the design stage which could affect the compliance, full details of the changes will be required to demonstrate compliance.</p>
Option 5		
All	<p>A copy of the contract with a relevant carsharing platform.</p> <p>A copy of the relevant clause or specification confirming:</p> <ul style="list-style-type: none"> • Marketing material will be developed to raise awareness of car sharing • Material will be communicated to all tenants. <p>A marked-up copy of the site plan confirming:</p> <ul style="list-style-type: none"> • Location and number of priority spaces for car sharers 	<p>As design stage evidence</p>

Additional Information

Relevant definitions

Carsharing scheme: a carsharing scheme is aimed at providing the facility and incentives for people to share lifts to go to work. The benefits of car sharing include reduced travel costs for staff and customers and reduced local congestion and pollution. Different types of carsharing scheme exist. Ready-to-use web-platforms may be created or purchased for the benefit of the building users and/or close neighbourhood where the building is located in a business park. However, in any case, a commitment from the developer will be required under the form of management policies/procedures to run and manage the scheme efficiently. This includes marketing and monitoring the system, providing

incentives to encourage people to join the system (such as financial incentives or specific parking spaces in busy areas) or providing marketing material to help raise awareness of the system.

Net lettable area (NLA) – also called usable floor area: In order to calculate this, the standardised used floor area (UFA) for the building must be used.

Operational area (for industrial buildings): in order to compute this, the used floor area (UFA) excluding the net office space leased out and storage areas must be used.

The used floor area (UFA) is the areas of measurable parts delineated by the inner side of the exterior wall and to the middle of the wall against the adjacent tenancy or common area. When computing a building's used floor area, the measurements are taken from the inner side of the exterior wall.

Reference is made in general to NS 3940:2007 – Area and volume calculations for buildings and “Use of area designations is the selling of residential dwellings. A guide based upon NS 3940:2007 - P648”

this is the gross internal floor area excluding all internal structural and party walls (but not partitioning or other non load-bearing walls within the tenancy area which are included in the area), ancillary areas for services, ancillary areas to main function areas and circulation areas. Please refer to the relevant country appendix sheet to find national equivalent where relevant.

Full Time Equivalent (FTE) staff: FTE is a unit of measure which is equal to one filled, full-time position.

Rural location: please see definition in Tra2.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	1	1	2	Tra 4 - Pedestrian and Cyclist Safety	P	G	VG	E	O
					-	-	-	-	-

Aim

To recognise and encourage the provision of safe and secure pedestrian and cycle access routes on the development.

Assessment Criteria

The following demonstrates compliance:

- Where external site areas form part of the assessed site and these areas contain vehicle access roads, parking and/or pedestrian access to the building, adequate cycle lanes and pedestrian pathways must be provided. If the building does not have any external areas and internal access is directly from the public highway/footpath, then the credit(s) can be awarded on a default basis.

Cycle access criteria

- The cycle lanes meet the following minimum width dimensions:
 - Where pedestrian and cycle routes are shared the minimum total width of the combined path is 3.0m
 - Where the cycle lane is segregated from both the pedestrian route and carriageway the minimum width of the cycle path is 2.0m
 - Where the cycle route forms a part of the carriageway, the minimum width of the lane is 1.5m
- Cycle lanes provide direct access to any cycle storage facilities provided on the site, without the need to deviate from the cycle path and, if relevant, connect to offsite cycle paths where these run adjacent to the development's boundary.
- Delivery areas do not cross or share cyclist routes.
- Lighting design of cycle paths on site are in compliance with national best practice road lighting guide.

Pedestrian access criteria

- The pedestrian paths meet the following minimum width dimensions:
 - Where pedestrian and cycle routes are shared the minimum total width of the combined path is 3.0m
 - Where the pedestrian route is segregated from both the cycle lane and carriageway the minimum width of the pedestrian path is 1.5m
- Delivery areas are not accessed through parking areas and do not cross or share and other outside amenity areas accessible to building users and general public.
- Lighting design of pedestrian pathways on site is in compliance with national best practice road lighting guide.

9. Onsite footpaths connect to public footpaths off site, providing access to local transport nodes and other offsite amenities (where present).
10. Where provided, drop-off areas are designed off the access road and provide direct access to pedestrian pathways/areas, therefore avoiding the need for the pedestrian to cross vehicle access routes.
11. Where dedicated pedestrian crossing of a vehicle access route is provided, the road is raised to the pavement level (i.e. the pavement is not lowered to road level).
12. For larger developments with a high number of public users/visitors, pedestrian pathways must be signposted to other local amenities off site, including public transport nodes.

Note: For office and industrial buildings, all criteria need to be met in order for the credit to be awarded.

Note: For retail buildings and education, one credit can be achieved where the cycle access criteria are complied with, and a second credit where the pedestrian access criteria are complied with. The credits can be awarded independently of each other i.e. one credit can still be awarded for compliant pedestrian routes where cycle routes do not comply and vice versa.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell only assessments.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
National best practice road lighting guide	The level for lighting strength is the same or stricter than those that have been established in the guidelines for roadway lighting in effect at any point in time (see the Norwegian Public Roads Administration –Technical planning of road and street lighting - Handbook 264 or the equivalent national guidelines)
Covered parking area	Where the assessed building has no external areas but does have a covered parking facility and cyclists and/or pedestrians access the assessed building via this area, then the criteria apply and this area must be assessed against them.
Operational safety measures	Operational safety measures such as speed reduction are often recognised as an efficient measure to reduce risks to cyclists and pedestrians. However, these being dependent on the way they will be enforced, they cannot be recognised under BREEAM and only safety design measures will be assessed under this BREEAM issue.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
------	--------------	-------------------------

1-4 & 6-7 & 9-12	A scaled proposed site plan, specification and/or design details highlighting all necessary features and dimensions.	Assessor's building/site inspection and photographic evidence confirming compliance. AND/OR 'As built' site plan and design details.
5&8	A copy of the specification, site plan and/or manufacturer's technical details. confirming: <ul style="list-style-type: none"> External lighting design strategy in compliance with relevant standard. <p>Where applicable, a confirmation that minimum requirements in Håndbok 264 from Statens veivesen (Manual from National road administration) or equivalent national guidelines are met, and the level of illuminance are equal to or stricter than those required in Håndbok 264 or equivalent National guidelines.</p>	Assessor's building/site inspection and photographic evidence confirming compliant installation. The assessor is not expected to check every detail but that the lighting strategy is broadly compliant with the relevant guidance, demonstrated by checking compliance at their discretion with select key issues.

Additional Information

Relevant definitions

None.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Tra 5 - Travel Plan					
					-	-	-	-	-

Aim

To recognise the consideration given to accommodating a range of travel options for building users, thereby encouraging the reduction of user reliance on forms of travel that have the highest environmental impact.

Assessment Criteria

The following demonstrates compliance:

1. A travel plan has been developed as part of the feasibility and design stages which considers all types of travel relevant to the building type and *users*.
2. The travel plan is structured to meet the needs of the particular site and takes into consideration the findings of a site-specific transport survey and assessment that covers the following (as a minimum):
 - a. Where relevant, existing travel patterns and opinions of existing *building or site users* towards cycling and walking so that constraints and opportunities can be identified
 - b. Travel patterns and transport impact of future *building users*
 - c. Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children)
 - d. Disabled access (accounting for varying levels of disability and visual impairment)
 - e. Public transport links serving the site
 - f. Current facilities for cyclists
3. The travel plan includes a package of measures that have been used to steer the design of the development in order to meet the travel plan objectives and minimise car-based travel patterns. This is demonstrated via specific examples such as:
 - a. Providing parking priority spaces for car sharers
 - b. Providing dedicated and convenient cycle storage and changing facilities
 - c. Lighting, landscaping and shelter to make pedestrian and public transport waiting areas pleasant
 - d. Negotiating improved bus services, i.e. altering bus routes or offering discounts
 - e. Restricting and/or charging for car parking
 - f. Criteria for lobby areas where information about public transport or car sharing can be made available
 - g. Pedestrian and cycle friendly (for all types of user regardless of the level of mobility or visual impairment) via the provision of cycle lanes, safe crossing points, direct routes, appropriate tactile surfaces, well lit and signposted to other amenities, public transport nodes and adjoining offsite pedestrian and cycle routes.
4. The travel plan includes measures tailored to minimise the impacts of operational-related transport e.g. deliveries to and from the site.

Compliance Notes

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	Where the occupier is not known a travel plan is still required, albeit that it may only be an interim travel plan or one that broadly addresses all the above issues.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
Building users – Offices and Industrial	Where the term <i>building users</i> is referenced, this refers to staff (commuter journeys and business travel), visitors and personnel who make deliveries/collections to and from the development.
Building users – Retail	Where the term <i>building users</i> is referenced in this BREEAM issue it refers to staff, customers and personnel who make deliveries/collections to and from the development.
Building users-education	The number of staff and students who will access the building for work or study during a typical academic term-time / semester day
Existing Travel Plan	The first credit can be awarded if the building being assessed is a refurbishment or infill new build on an existing site that has an existing up-to-date travel plan that is compliant with BREEAM and applicable to all building users (in the existing and assessed buildings).

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First credit		
1-3	A copy of the Travel Plan. A copy of the site-specific transport survey/assessment.	The evidence required at this stage is the same as that outlined at the design stage.
3	A marked-up copy of the site plan demonstrating examples of design measures, implemented in support the travel plan's findings. OR Where a detailed site plan is not available, a formal letter from the client confirming that measures will be implemented into the final design in support the travel plan's findings.	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> The installation of measures that support the travel plan.
4	A section within the Travel Plan or written confirmation that the plan will address operational related transport impacts.	The evidence required at this stage is the same as that outlined at the design stage.

Additional Information

Relevant definitions

Travel Plan: A travel plan is a strategy for managing all travel and transport within an organisation, principally to increase choice and reduce reliance on the car by seeking to improve access to a site or development by sustainable modes of transport. A travel plan contains both physical and behavioural measures to increase travel choices and reduce reliance on single-occupancy car travel.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
-	2	2	2	Tra 6 - Maximum Car Parking Capacity	P	G	VG	E	O
-	-	-	-		-	-	-	-	-

Aim

To encourage the use of alternative means of transport to the building other than the private car, thereby helping to reduce transport related emissions and traffic congestion.

Assessment Criteria

The following demonstrates compliance:

First credit Office and Industry only

1. No more than one parking space is provided for every three *building users*.

Second credit Office and Industry only

1. No more than one parking space is provided for every four *building users*.

OR

First credit - Higher Education buildings only

1. No more than one parking space is provided for every fifteen *building users*.

Second credit - Higher Education buildings only

1. No more than one parking space is provided for every twenty *building users*.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only - Offices	If it is not possible to confirm the number of building users due to the speculative nature of the building then a default occupancy rate of 1 person per 10m ² of net lettable area of the building can be used.
Shell Only – Industrial	If it is not possible to confirm the number of building users due to the speculative nature of the building then a default occupancy rate of 1 person per 10m ² of net lettable office area and 1 person per 20m ² of operational floor space. Alternatively, the number of <i>staff</i> in an existing industrial unit of similar type/operation and size can be used (the assessor needs to justify/validate the number used in their certification report).

Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
Building users	Where the term <i>building users</i> is referenced in this BREEAM issue it refers to the staff who will work within the building.
Determining number of building users	If known actual building occupancy rate figures should be used. If this figure cannot be confirmed use the default occupancy rate detailed above under the <i>Shell Only</i> compliance note.
Variable occupancy	Where the number of building users is variable, provision of parking spaces should be based on the maximum number of building users likely to be using the building at any time.
Disabled, mother & baby & motorbike spaces	Especially adapted parking included requirements for universal design, motorcycle parking or other purposes and is reserved for this use through design and clear markings / signs may be omitted from the assessment of car parking capacity.
Car share spaces	Car share spaces can be excluded from the assessment provided these spaces are dedicated for this use with the appropriate signage and the future building occupier confirms they have an enforceable car share policy. The assessor must obtain a copy of the policy and related documentation. Where there is no policy these spaces must be included within the calculation.
Local authority car parking requirements	As a general rule, where the local authority sets car parking requirements that are different from the BREEAM criteria, the most onerous of the requirements will need to be complied with: <ul style="list-style-type: none"> • Where the local authority requires a minimum car parking capacity that is higher than the maximum limit set by BREEAM, the BREEAM criteria will need to be met for the credit to be awarded. • Where the local authority requires a maximum car parking capacity that is lower than the one set by BREEAM, then the local authority criteria should be met for the credit to be awarded.
Parking shared with other buildings	Where the building being assessed forms part of a wider site development and parking is not designated to specific buildings, then this credit must be assessed on the provision of parking spaces for the whole development, accounting for all existing and new users and parking spaces. Where the numbers of users for the whole site cannot be confirmed, then the parking spaces can be attributed to the assessed development on the basis of the ratio of assessed building floor area to total building floor area of the whole site. E.g. if the assessed building is 20% of the total building area for the site then attribute 20% of the parking spaces to the building for the purpose of the assessment.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	<p>A site plan or copy of the specification confirming:</p> <ul style="list-style-type: none"> • Number and type of parking spaces provided for the building. <p>Relevant documentation or correspondence from the design team or client confirming the number of building users.</p>	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> • Number and type of parking spaces provided for the building. <p>Evidence as outlined at the design stage.</p> <p>OR</p> <p>A physical check by the assessor of the relevant number of building users (if practical).</p>

Additional Information

Relevant definitions

Net lettable area (NLA): Refer to BREEAM issue Tra 3.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	-	-	1	Tra 7 - Travel Information Point					
					-	-	-	-	-

Aim

To ensure the building has the capacity to provide users with up-to-date information on local public transport routes and timetables.

Assessment Criteria

The following demonstrates compliance:

1. A real-time public transport information system, where *building users* can access up-to-date public transport information and plan their journey, is provided.
2. The system must be in a publicly accessible area with adequate signage at its point of use and throughout appropriate areas of the development indicating its purpose and location/existence.

For education, this BREEAM issue does only apply to higher education.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
Building users	Where the term <i>building users</i> is referenced this refers to staff and customers.
Scope of BREEAM issue	This BREEAM issue applies only to retail buildings >500m ² .
Location of 'Travel Information Point'	The information point does not necessarily have to be situated internally. If sited externally however, it must be covered, in an area that is readily accessible to building users and within close proximity of the main entrance or pedestrian routes to and from local public transport nodes, parking areas and the main building entrance.
Existing travel information facilities	The credit can be awarded where there is an existing maintained real-time information point within 250m of the assessed development's main entrance via a safe pedestrian route (not ' <i>as the crow flies</i> ').

Buildings with very high levels of public transport	Where the assessed building has achieved all credits available under the BREEAM issue Tra1, ie has very high levels of public transport in close proximity, the travel information point does not need to provide real time information. The second BREEAM requirement will however need to be met for the credit to be achieved.
--	---

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	Design plan and/or a copy of the relevant specification clause(s) confirming: <ul style="list-style-type: none"> • Location and scope of the travel information point/facility 	Assessor's building/site inspection and photographic evidence confirming compliant installation of the travel information point(s).

Additional Information

Relevant definitions

Real time passenger information system: An electronic system that provides up-to-date, i.e. real time, information on local public transport service(s). Primarily how close the service is running to time and when it is due at a node/interchange and, potentially, incidents that affect service operations, platform changes etc.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	-	1	1	Tra 8 – Deliveries & Manoeuvring	P	G	VG	E	O
					-	-	-	-	-

Aim

To ensure that safety is maintained and disruption due to delivery vehicles minimised through well-planned layout and access to the site.

Assessment Criteria

The following demonstrates compliance:

1. 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.
2. There is a separate parking area for waiting goods vehicles, away from the manoeuvring area and staff/visitor car parking.
3. Delivery areas are not accessed through parking areas and do not cross or share pedestrian and cyclist routes and other outside amenity areas accessible to building users and general public.
4. 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.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	Where the building occupier is known then the design team must be able to demonstrate that the layout of the manoeuvring area is suitable for the specified types and number of delivery vehicles typically used by the occupier. For speculative developments it must be demonstrated that the manoeuvring area can accommodate a range of goods vehicle types.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.

Small buildings/units	<p>For the purpose of assessing this issue, smaller buildings/units (i.e. <200m²) and developments where heavy goods vehicles are unlikely to access the site, the criteria for the manoeuvring area need be sized only to accommodate large delivery vans (i.e. transit type or similar).</p> <p>Also, requirement 3 '<i>delivery areas are not be accessed through parking areas</i>' can be relaxed for smaller sites if it can be confirmed that all deliveries to the building will be made by small vans and not heavy goods vehicles.</p>
Scope of issue Tra8	<p>This BREEAM issue is not assessed where the development does not have a significant vehicle delivery and manoeuvring area (ie a typical 'back-of-house' facility wouldn't comply). This is likely to be the case in most office developments. In such cases this issue will be filtered from the list of relevant issues by the assessor's spreadsheet tool.</p>

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-4	<p>Proposed site plan clearly showing:</p> <ul style="list-style-type: none"> • Manoeuvring area • Delivery vehicle waiting area • Designated area for skips/pallets <p>Appropriate documentation or correspondence from the design team confirming:</p> <ul style="list-style-type: none"> • Likely vehicle delivery type that will access the development. • Predicted frequency of deliveries 	<p>Assessor's building/site inspection and photographic evidence confirming the existence of a compliant delivery area.</p>

Additional Information

Relevant definitions

None.

8.0 Water

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
3	3	3	3	Wat 1 - Water Consumption	-	-	-	-	-

Aim

To minimise the consumption of potable water in sanitary applications by encouraging the use of low water use fittings.

Assessment Criteria

The following demonstrates compliance:

First Credit:

1. All WCs have a dual flush or flush buttons and the maximum flush volume is 6 liter. If toilets are present without dual flush buttons or flush control buttons, the maximum flush volume is 4 liters.
2. Where dual flush toilets are specified they have guidance or symbols instructing the user on the appropriate operation of the flushing device. This can be provided on the flush control buttons, cistern, or nearby for a group of cisterns.

Second credit:

1. All WCs have a dual flush or flush control buttons and the maximum flush volume is 4 litres.
2. Where dual flush toilets are specified they have guidance or symbols instructing the user on the appropriate operation of the flushing device. This can be provided on the flush control buttons, cistern, or nearby for a group of cisterns.

Third credit

3. At least one of the two first credits is achieved
4. Of the following, the two that offer the greatest possible reduction in annual water consumption have been specified:
 - a. All taps except kitchen taps, cleaners' sinks and external taps have a maximum flow rate less than 6 litres/min for a water pressure of 0.5 Mpa (= 3 bar) and are one of, or a combination of the following types;
 - Timed automatic shut-off taps e.g push taps
 - Electronic sensor taps
 - Low flow screw-down/lever taps
 - Spray taps

- b. All showers, where specified, have a measured flow rate that does not exceed 9 litres per minute for a water pressure of 0.3 MPa (3 bar), assuming a delivered water temperature of 37°C
- c. All urinals are either:
- Fitted with individual presence detectors that operate the flushing control after each use or
 - Ultra low flush or waterless urinals.
- d. At least 50% of all gentlemen's toilets are urinals, which are specified according to the requirements in c.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where a project under assessment consists solely of an extension, and no new sanitary facilities are to be provided, facilities provided in the existing building should be assessed (this refers to the nearest accessible facilities for each gender/function, where appropriate, i.e. those likely to be used by the occupants and visitors in the extension building).
Shell Only	<p>If a water supply is provided to tenanted areas of the building but sanitary fittings will be specified/fitted by future tenants, compliance with this BREEAM issue can be demonstrated via one of the following means in shell only buildings/areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide is prepared for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated for the shell only areas of the building, the assessor must assume that only industry-standard fittings will be installed (see additional guidance). For such instances therefore, it is likely that none of the credits will be achieved. When industry-standard fittings are not known, the following default values must be used:</p> <ul style="list-style-type: none"> • Regular taps for wash hand basins (12 litres/minute) • High flow shower (14 litres/minute) • WC (6 litre cistern) • Cistern serving single urinal = 10 litres per use (flush). • Cistern serving two or more urinals = 7.5 litres per use (flush). • Urinals with manual flush on each stall or automatic pressure flushing valves = 1.5 litres per use. <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
No Fittings specified	Where no sanitary fittings are to be installed in the building being assessed then the credit must be assessed on the basis of the nearest accessible facilities likely to be used by the occupants of the assessed building.

Showers with a range of flow rates	Where a shower head delivers a range of flow rates, the average or typical flow rate should be used.
---	--

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-3	<p>A copy of the relevant section of the M&E specification and/or manufacturer's details confirming:</p> <ul style="list-style-type: none"> Technical specification of sanitary fittings and controls to be installed 	<p>Assessor's building/site inspection report and photographs or purchase orders confirming:</p> <ul style="list-style-type: none"> The type and amount of fittings and controls installed. <p>Manufacturer's/installer's details for installed fittings/controls confirming:</p> <ul style="list-style-type: none"> Their technical specification <p>Where changes have occurred since design stage assessment, an explanation of such must be given.</p>

Additional Information

Relevant definitions

Net lettable area (NLA) – also called usable floor area: this is the gross internal floor area excluding all internal structural and party walls (but not partitioning or other non load-bearing walls within the tenancy area which are included in the area), ancillary areas for services, ancillary areas to main function areas and circulation areas. Please refer to the relevant country appendix sheet to find national equivalent where relevant.

Potable water: Drinking quality water that is taken from a connection to the main water supply to the building, which may be from the public water supply or from a private supply such as from groundwater via a borehole.

Rainwater recycling: The appropriate collection and storage of rain from hard outdoor surfaces for use instead of potable water in WC flushing.

Effective flush volume: The volume of water needed to clear the toilet pan and transport any content far enough to avoid blocking the drain.

Dual Flush Cisterns: Devices that have the facility to provide lower flush volume for liquids and higher flush volume for solids and paper.

Calculating the effective flushing volume of dual flush toilets: For dual flush WCs the ratio *full flush: reduced flush* is taken to be 1:3 for non-domestic buildings. The effective flush volume can therefore be calculated as follows, using a 6/4 litre dual flush volume WC:

$$((6 \text{ Litre} * 1) + (4 \text{ Litre} * 3)) / 4$$

$$= 4.5 \text{ Litre effective flushing volume}$$

Product Certification of Low Flush WCs

Product certification schemes provide specifiers and clients with greater assurance of manufacturers' claim regarding the performance of the actual flush volume of their products and therefore the potential water savings of different products. At present BREEAM does not require that the flushing volume of WCs (or any other water-consuming device) meet an approved standard to gain BREEAM credits.

BRE Global currently operates a certification and listing scheme for low flush WCs and products certified to this standard will be listed on www.greenbooklive.com. Green Book Live is a free-to-view online database designed to assist specifiers and end users in the identification of environmentally beneficial products and services. If you would like to know more information about the Certification and Listing of Low Flush WCs Scheme please contact BRE Global at enquiries@breglobal.com

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Wat 2 - Water Meter	P	G	VG	E	O
					-	-	-	-	-

Aim

To ensure water consumption can be monitored and managed and therefore encourage reductions in water consumption.

Assessment Criteria

The following demonstrates compliance:

1. The specification of a water meter on the mains water supply to each building; this includes instances where water is supplied via a borehole or other private source.
2. The water meter has a pulsed output to enable connection to a Building Management System (BMS) for the monitoring of water consumption.
3. For retail developments with multiple units, separate pulsed meters are required to cover the water supply to the following areas where present:
 - a. Letting area; on the water supply to each tenant unit
 - b. Common areas; e.g. covering the supply to toilet blocks
 - c. Service areas; covering the supply to outlets within storage, delivery, waste disposal areas etc.
4. For industrial developments with multiple units, a pulsed water meter is specified on the supply to each separate unit.
5. In addition, ancillary buildings separate from the main development, for example petrol stations on sites such as supermarkets, are metered separately with a pulsed meter.

Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue:

1. Where sub meters are fitted to allow the metering of individual water-consuming plant or building areas, where demand in such areas will be equal to or greater than of 10% of the total water demand of the building (see also compliance note).
2. Each sub meter has a pulsed output to enable connection to a Building Management System (BMS) for the monitoring of water consumption.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.

Extensions to existing buildings	If no new water supply is being installed because occupants of the extended building will use the facilities in, and therefore water supply to the existing building, then the issue should be assessed on the basis of whether a compliant water meter is installed on the existing supply.
Shell Only	<p>Where metering arrangements within tenanted units/areas will be the responsibility of the future tenant, compliance with the relevant criteria for this BREEAM issue can be demonstrated via one of the following means for such areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out Only	There are no additional or different criteria to those outlined above specific to Fit Out-only assessments.
No water supply to the building/unit	If there is no water supply to the building during operation because there will be no installed water-consuming fittings in the building, then the issue must be assessed on the basis of the water supply to the nearest accessible building with such facilities, likely to be used by the future occupants of the assessed building.
Tenanted areas with low or no water consumption – retail buildings	For tenanted areas that can demonstrate that there will be no more than a couple of WC's and associated wash hand basins present in that particular unit and no other usage of water for the purposes of the retail activity, then no water meter is required on the water supply to this unit. Typical retail units that would not comply with this note are catering units, supermarkets, hairdresser, launderette etc.
Industrial buildings consisting of several small units	For a building consisting of a number of small units, each $\leq 200\text{m}^2$, a water sub meter must be fitted on the water supply to each unit. A pulsed output on each sub meter is not required. A water meter with a pulsed output fitted to the main supply to the building is still required.
Exemplary level criteria	It is widely accepted that water usage can be decreased by how water is consumed by building users. If there are only small water consuming units used within the building such as singular toilets, small kitchen etc. It is unlikely there will be an opportunity to reduce water consumption by increased water management. And therefore there will be no benefit to installing a sub-meter; in such instances the exemplary credit is not available. Compliance with the criteria can also be demonstrated where the water metering/monitoring equipment is integral to the water consuming plant, as opposed to a sub meter on the water supply to the plant.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	A copy of the specification clause confirming: <ul style="list-style-type: none"> • The specification and type of water 	Assessor's building/site inspection report and photographs or 'as built' drawings confirming:

	<p>meter(s).</p> <p>Design plan(s) showing:</p> <ul style="list-style-type: none"> • Location of the water meter(s) in each assessed building/unit. 	<ul style="list-style-type: none"> • The location of the water meter(s). <p>Manufacturer's details confirming:</p> <ul style="list-style-type: none"> • The specification of a pulsed output on the installed meter(s). <p>If connected to a BMS, the assessor's site inspection confirming live meter readings can be used in lieu of manufacturer's details confirming specification of a pulsed output.</p>
--	--	--

Additional Information

Relevant definitions

The requirement for a pulsed output has been included to encourage the use of meters capable of transmitting (by wire or wirelessly) a continuous or pulsed signal with water management information such as total water consumed or flow rate to a Building Management System. This allows demand patterns on water systems to be monitored and evaluated over time. A significant increase in demand may indicate the presence of a leak or inappropriate or unexpected water consumption.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educational		P	G	VG	E	O
1	1	1	1	Wat 3 - Major Leak Detection					
					-	-	-	-	-

Aim

To reduce the impact of major water leaks that may otherwise go undetected.

Assessment Criteria

The following demonstrates compliance:

1. A leak detection system capable of detecting major leaks on the water supply has been installed. The system must cover all mains water supply within the building and its site.
2. The leak detection system is:
 - a. Audible when activated
 - b. Activated when the flow of water passes through the water meter/data logger at a flow rate above a pre-set minimum for a pre-set period of time
 - c. Able to identify different flow and therefore leakage rates, e.g. continuous, high and/or low level, over set time periods
 - d. Programmable to suit the owner/occupiers' water consumption criteria
 - e. Where applicable, designed to avoid false alarms caused by normal operation of large water-consuming plant such as chillers.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	If the water supply to the new extension is via the existing building then the water supply to the existing building must be assessed against the criteria of this issue.
Shell Only	There are no additional or different criteria to those outlined above specific to assessments of shell-only buildings.
Fit Out Only	There are no additional or different criteria to those outlined above specific to Fit Out-only assessments.
Mains water supply between the building and the site boundary	Where the mains water supply between the building and the site boundary is not under the client's authority, but is managed by the local water authority, this can be excluded from the assessment. Where the site is owned and managed by another body such as another landlord, compliance will still need to be demonstrated.
Ancillary or multiple buildings	The criteria apply to the water supply to all buildings falling within the scope of the assessment.

Mains supply shut-off	It is not a requirement of this issue that the leak detection system shut off the water supply when the alarm is triggered.
No water supply to the building/unit	If there is no water supply to the building because there will be no installed water-consuming fittings in the building, then the issue must be assessed on the basis of the water supply to the nearest accessible building with such facilities, likely to be used by the future occupants of the assessed building.
Leakage Rates	This issue does not specify what the high and low level leakage rates should be; however, the equipment installed must have the flexibility to distinguish between different flow rates to enable it to be programmed to suit the owner/occupier's usage patterns.
Pre-set flow rates	Pre-set flow rates and time periods will vary depending on the building type and usage.
System criteria	It is anticipated that this credit will usually be achieved by installing a system which detects higher than normal flow rates at meters and/or sub-meters. It does not require a system that would directly detect water leakage along part or the whole length of the water supply system.
Water authority meters	Where there is a water authority meter at the site/building boundary, it may be necessary to install a separate flow meter to detect leaks; however, if the water authority agrees to some form of leak detection being installed on their meter, this would also be acceptable.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	<p>A copy of the specification clause confirming:</p> <ul style="list-style-type: none"> Scope and performance criteria of leak detection system. <p>AND/OR</p> <p>Manufacturer's details confirming:</p> <ul style="list-style-type: none"> The technical specification the specified systems. 	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> The installation and operation of the leak detection system. The pre-set variables of the system for triggering the alarm and the flexibility of the building occupier to vary these*. <p>* This can be confirmed in a letter from the contractor/installer to the assessor.</p>

Additional Information

Relevant definitions

None.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust	Educa t.		P	G	VG	E	O
1	1	1	1	Wat 4 - Sanitary Supply Shut Off	-	-	-	-	-

Aim

To reduce the risk of minor leaks in toilet facilities.

Assessment Criteria

The following demonstrates compliance:

- Solenoid valves are installed on the water supply to each toilet area in the building and the flow of water through that supply is controlled by a link to either:
 - Infra-red movement detectors within each toilet facility **OR**
 - Sensors or switches placed at or on entry doors to each facility.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	If the facilities are within the existing building then it is those existing facilities that must be assessed against the criteria of this issue.
Shell Only	<p>Where the installation of facilities within tenanted units/areas will be the responsibility of the future tenant, compliance with this BREEAM issue can be demonstrated via one of the following means for shell only buildings/areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
No toilet facilities in the assessed building	If no toilet areas exist in the building then the assessment criteria must be assessed on the basis of the nearest accessible building with such facilities likely to be used by the occupants of the assessed building.

Shut-off systems	Shut-off systems may control combined toilet areas, such as male and female toilets within a core.
Proximity detection criteria	Proximity detection shut-off is not required for each individual sanitary appliance to achieve the credit. The requirement is for the water supply to be isolated for each toilet block on a floor when not being used by the occupants.
Single WCs	The criteria for this issue apply to facilities with a single WC (potentially within smaller or low occupancy buildings). In these instances shut-off can be provided via the same switch that controls the lighting (whether proximity detection or a manual switch).
WCs in common public areas	Programmable timed controllers linked to the shut-off device are an acceptable means of compliance for facilities in this type of space, where constant public use is to be expected during opening or visiting hours.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	<p>A copy of the specification clause confirming:</p> <ul style="list-style-type: none"> The specification of shut-off valves The controls for the shut-off valves. <p>A design plan showing:</p> <ul style="list-style-type: none"> The location of the toilet facilities. 	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> The location and installation of proximity detection controls. <p>AND</p> <p>'As built' drawings showing:</p> <ul style="list-style-type: none"> The specification of shut-off valves

Additional Information

Relevant definitions

Solenoid valve: An electrically operated shut-off device that controls the flow of water in pipes.

Volume controller: An automatic control device to turn off the water supply once a maximum preset volume is reached.

Programmed time controller: An automatic time switch device to switch the water supply on and/or off at predetermined times.

Light fittings in toilets are often controlled by proximity detection by IR movement detectors or sensors placed at entry doors (the latter can be less accurate as more than one person can enter or depart in the opening of one door). The sensors used to control the lighting can also be linked to a solenoid valve in the cold water supply. This will then act as a proximity detection system.

Small water leaks can result in significant losses over time, increasing costs as well as causing damage. There is a significant risk of leaks going undetected, particularly as toilet accommodation is often unoccupied for long periods. A proximity detection shut-off system prevents waste water from minor leaks by shutting off the water supply when toilet accommodation is not occupied.

Valves in cisterns supplying urinals and WCs are especially prone to failure, leading to wastage of water via the overflow. Whilst leakage from any valve is variable, a typical value for a leaking valve toilet might be 4 litres/day.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educational		P	G	VG	E	O
1	1	1	1	Wat 6 - Irrigation Systems	P	G	VG	E	O
					-	-	-	-	-

Aim

To reduce the consumption of potable water for ornamental planting and landscape irrigation.

Assessment Criteria

The following demonstrates compliance:

1. Where the irrigation method specified for internal or external planting and/or landscaping complies with **ANY ONE** of the following:
 - a. Drip feed subsurface irrigation that incorporates soil moisture sensors. The irrigation control should be zoned to permit variable irrigation to different planting assemblages.
 - b. Reclaimed water from a rainwater or greywater system.
 - c. External landscaping and planting that relies solely on precipitation, during all seasons of the year.
 - d. The planting specified is restricted to species that thrive in the local climatic conditions.
 - e. Where no dedicated, mains-supplied irrigation systems (including pop-up sprinklers and hoses) are specified, and planting will rely solely on manual watering by building occupier or landlord.
2. Where a sub surface drip feed irrigation system is installed for external areas, a rainstat must also be installed to prevent automatic irrigation of the planting and the landscape during periods of rainfall.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only projects.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
No landscaped areas	This issue does not apply where there are no landscaped areas within the construction zone of the assessed building. In such instances the BREEAM assessor's spreadsheet tool will filter the issue from the list of applicable issues.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	<p>Design team confirmation via assessment meeting minutes, letter or email confirming the irrigation strategy for the site AND</p> <p>Proposed site plan, marked up to illustrate the scope of the irrigation specified AND</p> <p>One of the following:</p> <p>A copy of the specification clause confirming:</p> <ul style="list-style-type: none"> • Type of irrigation system and controls. <p>OR</p> <p>Manufacturer's information detailing:</p> <ul style="list-style-type: none"> • The technical details of the specified system. 	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> • The implementation of the proposed strategy. • If relevant, the installation of the specified system.

Additional Information

Relevant definitions

Construction zone: For the purpose of this issue the construction zone is defined as the site which is being developed for the BREEAM-assessed building and its external site areas i.e. the scope of the new works.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust	Educa t.		P	G	VG	E	O
1	-	-	-	Wat 7 - Vehicle Wash	-	-	-	-	-

Aim

To minimise the volume of potable water used by vehicle washing facilities.

Assessment Criteria

The following demonstrates compliance:

1. The vehicle washing system reclaims and recycles water that falls on, and drains off from, the vehicle pad. The reclaim system must be fully automatic.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	<p>Where present, vehicle wash facilities should be assessed in accordance with the assessment criteria. In shell only areas/building, where it is known that a vehicle wash system will be installed but final decisions concerning the specification will be made by a new owner/tenant, compliance with this BREEAM issue can be demonstrated via one of the following means:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be fully demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
Microbial contamination	Where vehicle wash systems are specified, the assessor should ask the design team to clarify that the installed system has been designed to minimise any legionella risk (refer to BREEAM issue Hea12).

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the specification clause confirming: <ul style="list-style-type: none"> • Type of vehicle wash system. <p>OR</p> Manufacturer's information confirming: <ul style="list-style-type: none"> • The technical details of the specified system. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • The installation of the specified system.

Additional Information

Relevant definitions

Vehicle Wash: A commercial automatic, semi-automatic or manual system for washing vehicles. This includes wheel and chassis wash, fixed gantry and screen wash systems using brushes, spray bars or handheld jet hoses.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educ.		P	G	VG	E	O
2	2	2	2	Wat 8 - Sustainable on-site water treatment	-	-	-	-	-

Aim

To encourage the treatment and re-use of waste water on-site to reduce the need for environmentally damaging centralised water treatment systems and enable the recycling of water and nutrients in a shorter time and distance.

Assessment Criteria

The following demonstrates compliance:

First credit

1. A feasibility study has been carried out by an *appropriate consultant* to establish the most appropriate sustainable on-site waste water treatment system. This study covers as a minimum:
 - a. Type of soil
 - b. Fall
 - c. Power supply
 - d. Odour nuisance
 - e. Tolerance to infiltration
 - f. Tolerance to load fluctuation (holidays and peak periods) where relevant
 - g. Installation cost
 - h. Maintenance
 - i. Required area
 - j. Effluent quality
 - k. Visual impact
2. A sustainable on-site treatment system 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 concept design stage or equivalent procurement stage.

Second credit

1. The first credit has been achieved.
2. A sustainable on-site treatment system has been designed in line with the recommendations of the above feasibility study and in accordance with NS-EN 12566: 2000+A1 – *small wastewater treatment systems for up to 50 PT – Part 1: Prefabricated septic tanks* and is able to treat at least 30% of the building/development's wastewater to *tertiary standards*.
3. Treated water must be infiltrated or reused on-site for WC/urinal flushing or irrigation purposes.
4. The system designer or installer will provide full maintenance and operation details to the building/site occupiers, in particular with regard to the water quality level.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	If the assessment is of the new extension only, then the wastewater associated with the use of the extended building may be used. If feasible however, the total wastewater of the new extension and existing building can be used. If the assessment is of the new build extension and existing building i.e. whole building, then the total wastewater must be used for the purposes of carrying out the calculation.
Shell Only	Assessment of this issue requires the design team to know the flush volumes of WC facilities. If WC facilities are contained within tenanted areas of the building and the sanitary fittings will be specified/installed by the future tenant, then for the purpose of the assessment of this issue, industry-standard fittings should be assumed in the tenant areas (see Additional Information section). Alternatively, if the tenant is committed through a green lease agreement to install sanitary fittings with performance standards better than industry standard, then the assessment of this issue can be based on the performance of those fittings.
Fit Out Only	There are no additional or different criteria to those outlined above specific to Fit Out-only assessments.
Feasibility study	<p>When undertaking a feasibility study at a later stage than <i>outline proposals</i>, an additional element will need to be included in the report to highlight the systems which have been discounted due to the constraints placed on the project by the late consideration, and the reason for their omission. If the feasibility study discounts all on-site treatment systems as unfeasible due to the late stage in the project that the study was commissioned, then the credit for the feasibility study must be withheld.</p> <p>If the feasibility was commissioned at the <i>outline proposals</i> stage or earlier and in the unlikely event the study concludes that the specification of any on-site water treatment system is unfeasible, the first credit can still be awarded. Subsequent credits for installing a system that meets the requirement will not be achievable.</p>
Wastewater	For the purposes of assessing this BREEAM issue, wastewater includes both greywater and blackwater.
Tertiary standards	Effluent water quality parameters should meet the local regulations requirements for harvested rainwater to be used in non-potable uses such as WC flushing or irrigation.

<p>Sustainable on-site treatment systems</p>	<p>Systems with processes that proceed at 'natural' rates should be preferred to those who are usually considered 'mechanical', in order to limit the major energy input to liquid transport, partial aeration and plant harvest when applicable. Typical sustainable systems include:</p> <ul style="list-style-type: none"> • Infiltration systems • Constructed wetlands, including vertical and horizontal flow reed beds • Biological sand filters • Anaerobic systems <p>Constructed wetland systems try to mimic natural reed beds, which have been shown to be effective in treating contaminated water. Reed bed filtration systems and other wetland-based processes have become popular in recent years. They benefit from low cost and energy requirements, simple operation, and a number of environmental plus points. Large systems encourage biodiversity - extensive reed beds are among the most important habitats for a variety of rare birds, invertebrates, flora, fish, amphibians, reptiles, and mammals. From a human perspective, they can encourage local and traditional trades, such as basket making.</p> <p>The list above is not a definitive list of systems compliant with BREEAM, but includes those systems that may normally be considered to comply. If the assessor has a justified reason to doubt the credentials/feasibility of the above technologies, where specified for a development they are assessing, they can justifiably withhold the available BREEAM credits. Similarly other technologies may be developed which meet the aims of this credit and as such the assessor should seek advice from BRE when such technologies are proposed</p>
<p>Reuse of the treated wastewater on site</p>	<p>Wastewater treated through the sustainable on-site system may be reused for the flushing WCs, for irrigation purposes or any other processes associated with the activity of the building that require a frequent demand of water.</p>

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First Credit		
1&3	<p>A copy of the feasibility study report.</p> <p>Letter from the appropriate consultant confirming:</p> <ul style="list-style-type: none"> • Compliance with the definition of an appropriate consultant • The timing of the feasibility report within the plan of works. 	<p>Assessor's building/site inspection (or "as built" drawings) and photographic evidence confirming:</p> <ul style="list-style-type: none"> • Installation of the waste water treatment system.
2	<p>Marked-up design plan or specification confirming:</p> <ul style="list-style-type: none"> • Proposed installation of waste water treatment plant. 	
Second credit		
1	<p>Evidence (as outlined above) confirming compliance with the first credit.</p>	<p>Evidence (as outlined above) confirming compliance with the first credit.</p>

2&3	Design team calculations and a copy of specification confirming (where appropriate): <ul style="list-style-type: none"> • Predicted WC/urinal flushing demand • Estimated potential for waste water collection from taps/showers. • Percentage of waste water from the building/development to be treated with the system • Design in accordance with EN 12566 • End use of the treated water 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • The installation of the treatment system. Where changes have occurred since design stage assessment, a revised copy of the technical specification and sizing calculations for the installed system.
4	A letter from the design team confirming: <ul style="list-style-type: none"> • A maintenance and operation guide will be produced and handed over to the building occupier. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • Existence of the maintenance and operation guide in the building's O&M manual/file.

Additional Information

Relevant definitions

Appropriate Consultant: a hydrological, mechanical, civil and/or public health engineer with a minimum of 2 years experience in the design of wastewater treatment systems.

Blackwater: water polluted with food, animal, or human waste

Greywater: Waste water from taps, showers and laundries.

Industry-standard fittings

Where a type of appliance or fitting is not specified, assume the following default fittings:

- Regular taps for wash hand basins (12 litres/minute)
- High flow shower (14 litres/minute)
- WC (6 litre cistern)
- Cistern serving single urinal = 10 litres per use (flush).
- Cistern serving two or more urinals = 7.5 litres per use (flush).
- Urinals with manual flush on each stall or automatic pressure flushing valves = 1.5 litres per use.

Fall: difference in heights needed to make the system work.

Tertiary standards: where these are not defined in the country of assessment, the following default values should be met:

Table 8.1 Guideline values for bacteriological monitoring

Parameter	Guideline values (number/100ml)
Intestinal enterococci	1
Legionella	100
Total coliforms	10

Table 8.2 Guideline values for general system monitoring

Parameter	Guideline values
Dissolved oxygen in stored rainwater	10% saturation or >1 mg/L O ₂ (whichever is least)

Colour	Not objectionable for all uses
Turbidity	<10 NT U for all uses (<1 NT U if UV disinfection is used)
pH	5–9 for all uses
Residual chlorine	<0.5 mg/L for garden watering <2 mg/L for all other uses

9.0 Materials

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
7	7	7	7	Mat 1 - Materials Specification					
					v	v	v	v	v

Aim

To recognise and encourage the use of construction materials with a low environmental impact over the full life cycle of the building.

Assessment Criteria

The course is divided into 5 independent performance areas, where the first 4 qualify for the specified points, while the last performance area is a minimum requirement in order to classify and certify the building. The following demonstrates compliance:

MATERIAL ASSESSMENTS

Performance areas work independently. Number of points can be achieved independently of the other performance areas.

1. Climate gas calculations – one to three credits

Climate gas calculations will be carried out for material usage in the building through life cycle based climate gas calculation tools. It is possible to collect up to three credits by documenting a choice of materials with low climate gas emissions where the raw material extraction, transport of raw materials and production of the material is assessed. The lifespan of the material must also be taken into consideration. The climate gas calculation must include all the new building elements in table 9-2.

Where an independently verified third-party Environmental Product Declaration (EPD) according to ISO 14025/EN-NS15804, covering the same part or the life cycle, is available for a product that forms part of an assessed building element, this can replace the generic value of that element in the climate gas calculation tool. This can be done in the post-construction stage where specific products are chosen.

See compliance notes for approved tools

One credit

The climate gas emissions from new materials in the building comprise 80% of the emissions in a new reference building. (Ref definition)

or

Two credits

The climate gas emissions from new materials in the building comprise 60% of the emissions in a new reference building. (Ref definition)

or

Three credits

The climate gas emissions from new materials in the building comprise 50% of the emissions in a new reference building. (Ref definition)

2. LCA one credit

1. Use of a *nationally recognised* LCA tool to evaluate at least two material options for the building elements as listed in table 9-1.
2. The design team can demonstrate that the outcome has influenced design choices for some of the selection of materials/building elements above as follows;

Table 9.1 Applicable elements to assessment stage

Building Element	Offices, Education & Retail projects		Industrial projects	
	New build & Major Refurbishment	Fit Out	New build & Major Refurbishment	Fit Out
External Walls	✓	N/A	✓	N/A
Windows	✓	N/A	N/A	N/A
Roof	✓	N/A	✓	N/A
Upper Floor Slabs	✓	N/A	N/A	N/A
Internal Walls	N/A	✓	N/A	✓
Floor Finishes / Coverings	N/A	✓	N/A	✓
Exterior hard deck	✓	N/A	N/A	N/A

3. The *nationally recognised* LCA tool used has the following features as a minimum:
 - a. At least 3 environmental indicators including Global Warming Potential (indicators may be weighted to provide an overall score)
 - b. It addresses the whole life of the building, including service life and disposal.
 - c. It is based on LCA principles as set out in the following International Standards:
 - ISO 14040 2006 Environmental Management -LCA- Principles & Framework
 - ISO 14044 2006 Environmental Management - LCA Requirements and guidelines
 - ISO 14025: 2006 Environmental labels and declarations — Type III environmental declarations — Principles and procedures
 - ISO 14024 : 2000 Environmental labels and declarations – Environmental labels type I – Principles and procedures
 - ISO 21930 2006 Building construction - Sustainability in building construction – Environmental declaration of building products

Please refer to the compliance notes table to find a list of compliant LCA tools

Note: These credits are not dependent upon other credits awarded.

PRODUCT ASSESSMENTS

3. EPD – environmental declarations – one credit

EPDs (Environmental Product Declarations according to ISO 14025/NS-EN 15804) have been procured for at least 10 different building products used to a large extent. Increased demand for environmental declarations will stimulate an increasing number of manufacturers to declare their products and thus will lead to increased knowledge concerning the environmental properties of products both among the manufacturers as well as the construction industry in general. An EPD does not say anything about the product's environmental performance. Credits for performance are given under point 4.

The building products must be included in the building elements in table 9-2 and each of the products documented must comprise at least 25% of the building element area, volume or weight in order to be included in the calculations. For example, the documented floor covering must comprise at least 25% of the total floor covering in floor decks or documented indoor paint must comprise at least 25% of the total area of surface treatment on interior walls in order to be included among the 10 that are required. For external hard deck, 80% applies.

An EPD that covers an entire part of a building will count for the number of product groups in table 9-2 that are covered by the EPD. The requirement for 25% also applies here (80% for external hard deck). For example, an EPD for a complete exterior wall element can count as several EPDs if the element is used in at least 25% of the total exterior wall area.

Note: These credits are not dependent upon other credits awarded.

Table 9.2 Relevant product groups distributed by building elements in the assessment phase

Building element	Office, retailing and education projects		Industrial projects	
	New build & Major Refurbishment	Fit Out	New build & Major Refurbishment	Fit Out
	<i>Product groups</i>	<i>Product groups</i>	<i>Product groups</i>	<i>Product groups</i>
External walls	Supporting construction*	Only int. Surface treatment	Structural	Only int. Surface treatment
	External cladding*		Covering	
	Ext. surface treatment		Ext. surface treatment	
	Windbreak		Windbreak	
	Insulation*		Insulation	
	Vapour barrier		Vapour barrier	
	Internal cladding		Interior covering	
	Int. surface treatment		Int. surface treatment	
	Doors			
	Glass/windows			
Roof	Structural	N/A	Structural,	N/A
	Roofing		Roofing	
	Windbreak		Windbreak	
	Insulation		Insulation	
	Vapour barrier		Vapour barrier	
	Glass		Glass	
Floor slabs	Supporting decks*	N/A	N/A	N/A
	Floor covering			

	Acoustic insulation			
	Ceiling			
	Surface treatment			
Internal walls	Structural	Structural	Structural	Structural
	Insulation	Insulation	Insulation	Insulation
	Internal cladding	Internal cladding	Internal cladding	Internal cladding
	Surface treatment	Surface treatment	Surface treatment	Surface treatment
	Doors	Doors	Doors	Doors
	Glass	Glass	Glass	Glass
Foundation/deck	<i>Structural deck/basement</i>	Only floor covering	Structural deck/basement	Only floor covering
	Insulation		Insulation	
	Floor covering		Floor covering	
Carrying construction	Supporting column		Supporting column	
	Girder		Girder	
Stairs and Balconies	Stairs		Stairs	
	Balconies		Balconies	
Hard landscaping and boundary protection	Outdoor hard surfaces	N/A	Outdoor hard surfaces	N/A

4. Performance requirements for building products – one to two credits

One credit

At least 10 products in the product table:

Satisfies the criteria to receive marks 1-6 (green or white) for all the environmental areas* in the ECO product method and/or satisfies the EU flower/Swan label criteria for their product group.

4 of these 10 have to be products used for:

- Supporting walls/supporting construction
- Supporting decks
- External cladding
- Insulation in external walls

(marked with * in table 9-2)

Or

Two credits

At least 15 products in the product table:

Satisfies the criteria to receive marks 1-6 (green or white) for all the environmental areas in the ECO product method and/or satisfies the EU flower/Swan label criteria for their product group.

4 of these 15 have to be products used for:

- Supporting walls/supporting construction
- Supporting decks
- External cladding
- Insulation in external walls

(marked with * in the table 9-2)

Products that must document the performance in order to collect credits under this point must be included in the table above. The 25% requirement for scope, as described under point 3 EPD environmental declarations, also applies here (80% for hard landscaping materials).

*The evaluation of *Indoor* air quality (emissions) in ECOproduct is not relevant for all product groups, and for these product groups a satisfactory mark is required only for the other three environmental topics.

Note: These credits are not dependent upon other credits awarded.

5. Environmental toxins – minimum requirements

The environmental toxin list A20, has been prepared in co-operation with the authorities in order to avoid the use of building materials with environmental toxins. (ref Product Control Act , section 3a and TEK10 § 9.2). Evidence must be presented to show that there are no materials with the specific pollutants listed in the checklist A20 in the building. The absence of the specified materials with the specified substance content on this list must be documented.

In accordance with section 3a of the Product Control Act, exceptions to this requirement may be accepted where it can be shown that it is not possible to use alternative products without encountering unreasonable cost or inconvenience. If no suitable alternatives exist, the NGBC will consider any applications for possible exceptions where adequate justification can be provided.

It is a condition that this criterion be fulfilled in order to achieve all classes and thereby a BREEAM certificate. Because the requirement does not go beyond the minimum requirements of the code of regulations, no credits are given for satisfying the criterion. It is only included as an absolute minimum requirement.

The A20 checklist is introduced by NGBC to meet the Norwegian regulation and is not endorsed by BRE Global.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	For refurbishments, it is only the new materials that will be assessed. The 25% rule under point 3 and 4 will be computed with respect to the newly purchased materials. The emissions should be compared to a new reference building under p.1, counting all materials in table 9-2.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	For Fit-Out, it is only the new materials that will be assessed. Under point 3 and 4, the documentation of 5 products instead of 10 will be able to give credits. The 25% rule under point 3 and 4 will be computed with respect to the newly purchased materials.
Extensions to existing buildings	Any applicable new-build elements, forming part of the new extension, must be assessed as outlined above.
Mixed use developments	Where the assessment covers only some of the floors in the building, the roof must still be assessed as it is protecting the assessed building below. Roof areas not protecting parts of the assessed building/space can be omitted from the assessment.
Floor finishes in operational areas (fit out assessments only)	The floor finishes in the <i>operational areas</i> of industrial buildings/units have special requirements for, for example, the tolerance limits of the floor slabs as regards chemicals, temperature and shocks, which all limit the alternatives that are available for specification. Therefore, only consider floor finishes in non operational areas of the building e.g. office areas when assessing this BREEAM issue for the 25% coverage.
Where integral insulated cold storage units form a part of the building fabric	Please refer to the Additional Information section for guidance on accessing this issue for buildings with integral cold storage units, where the walls, floor and ceiling of that unit form a part of the buildings fabric.
Concerning point 1 Climate gas calculations	

Corresponding climate gas tools	<p>Existing approved climate gas tools is:</p> <ul style="list-style-type: none"> • "Klimagassregnskap.no" from Statsbygg, www.klimagassregnskap.no <p>If the project planning group deems other climate gas tools that are not described here to accord with the requirements that are described above when it concerns the minimum satisfactory characteristics, such may be recognised under the precondition that the tool is approved in advance by NGBC.</p>
--	--

Concerning point 2 LCA	
OPTION 2 only	
Compliant LCA tools	<p>Current compliant LCA tools are listed below</p> <ol style="list-style-type: none"> Envest2® from BRE Green Globes LCA tool - ATHENA® EcoCalculator for Assemblies ATHENA® Impact Estimator for Buildings Eco-Quantum from IVAM Equer from Ecole des Mines <p>If other LCA tools not identified here are deemed by the design team to comply with the requirements set above with regard to minimum adequate features, then these may be recognised subject to prior approval by NGBC.</p>
Positive influence on the design	<p>Positive influence on the design can be demonstrated through a comparative analysis of a typical local building with the building assessed. There are no specific requirements on the contents that have to be covered, however these need to be broad and detailed enough to allow the positive influence to be demonstrated.</p> <p>For instance, where the typical external wall specification in Norway for a same kind of building is an aluminium cladding, the design team should demonstrate how the use of an LCA tool has allowed the specification of other materials with a lower environmental impact over the life cycle of the building.</p>

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1. Climate gas calculations		
All	Print-out of climate gas calculations with results from calculations of reference building and planned building (see definition of Reference building under Relevant definitions).	<p>Print-out from updated climate gas calculations in line with final material types selected. Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> • Element in-situ (where possible) <p>AND</p> <p>As built drawings and, where relevant, written design team confirmation of any changes to materials specification.</p>
2. LCA		
All	<p>Specification confirming:</p> <ul style="list-style-type: none"> • Name of the embodied energy / LCA tool used • A detailed description of how the tool meets the compliance requirements 	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> • Element in-situ (where possible) <p>AND</p>

	<p>Copy of the embodied energy/LCA tool output confirming:</p> <ul style="list-style-type: none"> • Elements considered <p>Examples of how the embodied energy/LCA tool used had a positive influence on the design.</p>	<p>As built drawings and, where relevant, written design team confirmation of any changes to materials specification.</p>
3. EPD with respect to ISO 14025/EN-NS 15804		
All	<p>Construction drawings and/or specification that confirms:</p> <ul style="list-style-type: none"> • Placement of the specified elements and materials/products • Information about the specified materials/products <p>AND</p> <p>A letter from the project planning group that confirms:</p> <ul style="list-style-type: none"> • that documentation in the form of EPDs or general environmental data will be demanded with respect to the same standard for all product groups listed in the table <p>OR</p> <p>If the material /products have been ordered, delivered or the supplier is known:</p> <ul style="list-style-type: none"> • Copy of EPD for specified products. • As alternative a valid letter that confirms that the development of EPDs is underway with a planned end date 	<p>Assessor's inspection report and photographic evidence that confirms:</p> <ul style="list-style-type: none"> • The element at the site (where such is possible) <p>AND</p> <p>Copy of EPD for specified products.</p>
4. Performance requirements for building products		
	<p>Construction drawings and/or specification that confirms:</p> <ul style="list-style-type: none"> • Placement of the specified elements and products • Information about the specified products <p>AND</p> <p>A letter from the project planning group that confirms:</p> <ul style="list-style-type: none"> • that the performance requirements in this point are implemented in the description <p>OR</p> <p>If the material /products have been ordered, delivered or the supplier is known:</p>	<p>Assessor's inspection report and photographic evidence that confirms:</p> <ul style="list-style-type: none"> • The element at the site (where such is possible) <p>AND</p> <ul style="list-style-type: none"> • License number on Swan/EU flower label • Documentation that the criteria in the point has been satisfied for specified products (eg print from the ECOproduct database)

	Documentation that the specified products satisfy the criteria for the Swan/EU flower or specified ECO product criteria.	
5. Environmental toxins		
	A letter from the project planning group that confirms: <ul style="list-style-type: none"> that regard for the Environmental toxin list for building materials A20 (in appendix) has been implemented in the description in this point 	Environmental toxin list for building materials is available completely filled in and signed by the initiative-taker.

Additional Information

Relevant definitions

Life Cycle Analysis (Life Cycle Assessment-LCA): LCA is a method based on international standards (ISO 14040, ISO 14044) to evaluate a system's environmental impact, taking into account the system's entire lifecycle, from cradle to grave. It is taken into account all impacts associated with the production and use of a system, from first to last awhile.

EPD: Environmental Product Declaration. A third-party verified environmental declaration that follows the international standards ISO 14025/NS-EN 15804, ref www.EPD-norge.no
Ref. also the SINTEF "Byggforskserien" on third party declarations: 470.103 Declarations of building materials.

Swan label/EU flower: Environmental label type 1 is a voluntary, third-party verified, LCA and multiple criteria-based level standard that follows the ISO 14024:2000 standard, (www.svanemarket.no). Environmental factors that are assessed in the product's lifecycle are, among other things, climate gas emissions, energy consumption, raw materials consumption and origin, indoor climate, substances hazardous to human health and the environment, resource consumption, waste, water consumption, emissions and functionality. Only products that fulfil the standard can receive the Swan label.

Life time: The building, considered as a whole, has an overall lifetime of 60 years. In the calculation tools used for calculations of climate gas emissions, the different building products have to have different lifetime, based on the materials expected real lifetime

ECO product: ECO product is a method for environmental assessment of building products with a point of departure in an EPD. The method consists of a set of environmental parameters in the environmental areas of:

- indoor climate
- substances hazardous to human health and the environment
- climate gas emissions
- resource consumption

The different areas are given marks and weighted together in an overall mark for each environmental area. A product can be awarded the mark red (poor/unacceptable), white (average) or green (good) within each of the four environmental areas. No summary mark is given for the product. The set of criteria is freely available (www.ngbc.no) and may be used to assess all products that have an EPD with supplemental information concerning their content of substances hazardous to human health and the environment. It is also described in Byggforskserien nr 470.112 (SINTEF). Norsk Byggjeneste (Norwegian service-office run by the Norwegian building material industry) operates a database with pre/evaluated products. This database is available through a subscription arrangement with Norsk Byggjeneste.

Reference building: A similar building, constructed in accordance with current regulations, and with conventional materials. In Klimagassregnskap.no emissions from a reference building is calculated based on information of the building category and area.

Guidance for the assessment of buildings where insulated cold storage units form an integral part of the building fabric

Where the cold storage unit forms part of, or is integral to the external wall element:

As an external wall type the insulated units will be assessed on the basis that it is a normal temperature building without the extra insulation, and a standard thickness of insulation will be considered. As such, the walls of the insulated unit should be treated as part of the external wall element for the assessment of this BREEAM issue.

Where the cold storage unit forms part of, or is integral to a ceiling element:

The roof of the insulated unit will be assessed as a standard construction from the deck upwards, assuming a standard thickness of insulation. As such, the roof of the insulated unit should be treated as part of the ceiling element for the assessment of this BREEAM issue.

Where the cold storage unit forms part of an internal wall element:

The insulated unit will be treated as meeting a very specific Functional Unit. The wall to the insulated unit should therefore be excluded from the assessment of the internal wall element.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust	Educa t.		P	G	VG	E	O
1	1	1	1	Mat 3 - Re-Use of Facade	-	-	-	-	-

Aim

To recognise and encourage the in-situ reuse of existing building façades.

Assessment Criteria

The following demonstrates compliance:

1. At least 50% of the total final building façade (by area) is reused.
2. At least 80% of the reused façade (by mass) comprises in-situ reused material.

Compliance Notes	
New Build	New build schemes with retained façades provide a means of achieving the credit.
Refurbishment	Refurbishment projects are likely to achieve this credit without difficulty.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell only assessments.
Fit Out only	Issue not applicable for Fit Out only assessments
Curtain walling & windows	Where existing windows are being replaced they may be excluded from the calculation of façade area; however, curtain walling counts as façade.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	<p>Drawings detailing:</p> <ul style="list-style-type: none"> The elevations of the existing and the new-build façades. <p>Calculations demonstrating:</p> <ul style="list-style-type: none"> The % of façade comprising in situ material. <p>These calculations should be simply based on the volume of each material and its density, with totals compared for the new and retained parts of the structure.</p>	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> The existence of the reused façade. <p>As built drawings/calculations.</p> <p>Written confirmation from the design team or contractor of any changes to the specification for the façade.</p>

Additional Information

Relevant definitions

Façade: Any exposed building face, not just the front elevation. The definition excludes party walls.

In practice, reusing façades will often require extensive renovation and/or reinforcement, hence the BREEAM requirement for at least 80% by mass of the reused façade to be in situ reused material. Façades with new external cladding or internal lining therefore can gain this credit provided that this criterion is met.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educational		P	G	VG	E	O
1	1	1	1	Mat 4 - Re-Use of Structure	-	-	-	-	-

Aim

To recognise and encourage the reuse of existing structures that previously occupied the site.

Assessment Criteria

The following demonstrates compliance:

1. Where at least 80% by volume of an existing primary structure is reused without significant strengthening or alteration works.
2. Where a project is part refurbishment and part new build, the reused structure comprises at least 50% by volume of the final building, i.e. any new build extension to a building being refurbished should not be larger than the original building to qualify for this credit.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to the assessment of new build projects.
Refurbishment	Refurbishment projects are likely to be the only buildings to achieve this credit.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell only assessments.
Fit Out Only	Issue not applicable for Fit out only assessments

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	Drawings or design team calculations detailing: <ul style="list-style-type: none"> • The sections of the existing structure to be reused. • Any parts of the structure to be demolished and the total new structure. • Where appropriate, calculations confirming any strengthening/alteration are not deemed 'significant' in terms of the assessment criteria for the mass of materials used. 	As built drawings/calculations. Written confirmation from the design team or contractor of any changes to the structural specification.

Additional Information

Relevant definitions

Significant strengthening or alteration: Defined as where the mass of new material is equal to or greater than 50% of the total mass of the reused structure.

Primary structure: Defined as structural floors, columns, beams, load bearing walls and foundations i.e. where required for structural use by the new building.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust	Educa t.		P	G	VG	E	O
2	2	2	2	Mat 5 - Responsible Sourcing of Materials	-	-	-	-	-

Aim

To recognise and encourage the specification of responsibly sourced materials for key building elements.

Assessment Criteria

The following demonstrates compliance:

New Build and Major Refurbishment assessments

1. Up to 2 credits are available where evidence provided demonstrates that 80% of the *applicable materials* (listed below) comprising each of the following building elements are responsibly sourced:
 - a. Structural Frame
 - b. Ground floor
 - c. Upper floors (including separating floors)
 - d. Roof
 - e. External walls
 - f. Internal walls
 - g. Foundation/substructure
 - h. Staircase

Applicable materials

- Brick (including clay tiles and other ceramics)
- Resin-based composites and materials, including GRP and polymeric render
- Concrete (including in-situ and pre-cast concrete, blocks, tiles, mortars, cementious renders etc.)
- Tiles
- Glass
- Plastics and rubbers (including EPDM, TPO, PVC and VET roofing membranes including polymeric renders)
- Metals (steel, aluminium etc.)
- Dressed or building stone including slate
- Timber, timber composite and wood panels (including glulam, plywood, OSB, MDF, chipboard and cement bonded particleboard)
- Plasterboard and plaster
- Insulation Materials
- Bituminous materials, such as roofing membranes and asphalt
- Other mineral-based materials, including fibre cement and calcium silicate
- Products with recycled content

Note: Fixings, adhesives and additives are excluded from the assessment. For any other materials that form a part of an applicable building element, but do not fit into the applicable materials list or the exclusions list, please refer to NGBC who will identify the relevant Key Process and Supply Chain Process or Processes.

2. Each applicable material is assigned to a responsible sourcing tier level based on the level and scope of certification achieved by the material supplier(s)/manufacturer(s) (see *Table 9.3: Tier Levels and Compliance* and *Table 9.4 EMS criteria* in the additional guidance section).
3. Any non-certified timber used in the development comes from a legal source and is not included on the CITES list (see definition for legally sourced timber).

Fit Out-only assessments

1. One credit is available where evidence provided demonstrates that 80% of the applicable materials (listed below) comprising the following fit out elements are responsibly sourced:
 - a. Stairs
 - b. Windows
 - c. External and internal doors
 - d. Skirting
 - e. Panelling
 - f. Furniture
 - g. Any other significant use

Applicable materials

- Brick (including clay tiles and other ceramics, mortar and plaster)
 - Resin-based composites and materials, including GRP and polymeric render
 - Concrete (including in-situ and pre-cast concrete, blocks, tiles, mortars, cementitious renders etc.)
 - Tiles
 - Glass
 - Plastics and rubbers (including EPDM, TPO, PVC and VET roofing membranes including polymeric renders)
 - Metals (steel, aluminium etc.)
 - Dressed or building stone including slate
 - Timber, timber composite and wood panels (including glulam, plywood, OSB, MDF, chipboard and cement bonded particleboard)
 - Plasterboard and plaster
 - Insulation Materials
 - Bituminous materials, such as roofing membranes and asphalt
 - Other mineral-based materials, including fibre cement and calcium silicate
 - Products with recycled content
2. Each applicable material is assigned to a responsible sourcing tier level based on the level and scope of certification achieved by the material supplier(s)/manufacturer(s) (see *Table 9.3: Tier Levels and Compliance* and *Table 9.4 EMS criteria* in the additional guidance section).
 3. Any non-certified timber used in the development comes from a legal source and is not included on the CITES list (see definition for legally sourced timber).

Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue:

1. Where, in addition to the above criteria, 95% of the applicable materials, comprised within the applicable building elements, have been responsibly sourced.

Compliance Notes

New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	In the case of a refurbishment assess the newly specified applicable and reused materials (reused as defined below).
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out-Only	There are no additional or different criteria to those outlined above specific to Fit Out-only assessments.
Building element not present	Where an element is not present in a project (e.g. an assessment of a ground floor of a building only and therefore no roof in the scope of the assessment), the points for this/these element(s) will be redistributed by the Mat 5 calculator to reward only the elements being assessed. For availability of the calculator, please contact NGBC.
Reused in-situ materials	Materials reused in-situ can be excluded from the assessment. The aim of this issue is to focus on the responsible sourcing of new specified materials.
Specified reused Materials	Reused materials specified for the development e.g. recycled aggregates are considered equivalent to materials covered by certification schemes that fall within tier 1 of table9.3..
CITES list	CITES (Convention on International Trade in Endangered Species) Appendices I and II of the CITES list illustrate species of timber that are protected outright. Appendix III of the CITES list illustrates species that are protected in at least one country. If a timber species used in the development is on Appendix III it can be included as part of the assessment as long as the timber is not obtained from the country(ies) seeking to protect this species (see Additional Information for further details).
A Government licence	A Government licence e.g. UK Forestry Commission felling licence certificate, does not comply as a third party timber certification scheme for this credit, but can be used as evidence of legally sourced timber.
Pre or post consumer waste	Where materials being assessed (including timber) are part of a pre- or post-consumer waste stream, the EMS sections of the credit can be applied for; however, using an EMS scheme (ISO, EMAS etc.) for new timber does not demonstrate timber certification and therefore does not qualify for any of these BREEAM credits.
Checklist A5	Checklist A5 is contains information for the BREEAM assessor, including an explanation of what is required for each of the responsible sourcing tiers.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	Design plan and/or specification confirming: <ul style="list-style-type: none"> the location of elements and materials specified Details of the materials specified. 	As built drawings or as built specifications confirming that the building has been constructed in accordance with the design stage drawings/specifications. Copies of purchase orders or receipts or certificate/letter of conformity for all applicable materials, including those recycled or reused

2	<p>A letter of intent from the design team confirming:</p> <ul style="list-style-type: none"> The product shall be sourced from suppliers capable of providing certification to the level required for the particular tier claimed. <p>OR</p> <p>If the material has been ordered, supplied or the supplier is known:</p> <ul style="list-style-type: none"> Purchase order from the supplier including (as appropriate) Chain of Custody (CoC) number and/or EPD numbers and / or EMAS ISO 14001 certification number <p>OR</p> <ul style="list-style-type: none"> A copy of other relevant certification number 	<p>A copy of the Chain of Custody (CoC) and/or EPD and/or EMAS/ISO14001 certificate.</p>
3	<p>Written confirmation from the developer confirming that:</p> <ul style="list-style-type: none"> All timber will come from a 'legal source' and one not on the CITES list*. <p>* Or in the case of Appendix III of the CITES list, it has not been sourced from the country seeking to protect this species as listed in Appendix III.</p>	<p>Where any non-certified timber is used, written confirmation from the supplier(s) confirming that:</p> <ul style="list-style-type: none"> All timber comes from a legal source. All timber species and sources used in the development are not listed on any of the CITES appendices for endangered or threatened species (Appendix I, II, or III*). <p>* Or in the case of Appendix III of the CITES list, it has not been sourced from the country seeking to protect this species as listed in Appendix III.</p>

Additional Information

Calculation Procedure (by using the Mat 5 calculator (not necessary))

- Choose from the list of options in the drop down box of the calculator the appropriate type of assessment and press the select button.
- Choose from the list of options in the drop down box the relevant BREEAM scheme and press the select button (this selection ensures the appropriate 'generic specifications' for the building types are used).
- For each element, select the number of different types of element you wish to enter in the relevant drop down box and press the select button. If the element is not present select '0'. Note: this will adjust the points required benchmarks accordingly.

4. For each element, select the 'data type' from the relevant drop down box. There are two or three options depending on the element type, 'Generic specification', 'Volume' or 'Percentage'. 'Generic specification' is not available for all element types.

Generic Specification

- a. Choose the specification from the relevant drop down box that matches the element specification for the building. If more than one construction specification is present for an element, select additional construction specifications from the list in element type 2, 3, 4 etc. (see point 3 for adding additional types). If no specification matches, then the specification will need to be assessed using one of the 'User Defined' methods.

Based on the specification selected from the drop down list the material types and their percentage will automatically be entered in the relevant cell of the *material type* and *percentage/volume of relevant materials present* columns. The assessor can then enter the percentage of each material that complies with either tier 1, 2, 3 or 4, as appropriate. At least 80% of the materials that make up an element type must comply with one or more of the tiers to achieve any points for that element type.

User Defined - Volume

- a. For all present elements, enter the names of the material types comprising each individual element in the relevant cell of the column *materials types*.
- b. Enter the volume of each individual material type in the relevant cell of the column titled *percentage/volume of relevant materials present*.
- c. Enter the total combined volume of the material types in the cell *total volume of element present*.
- d. Enter the volume of each material that complies with either tier 1, 2, 3 or 4, as appropriate. At least 80% of the total volume must comply with one or more of the tiers to achieve any points for that element type.

User Defined - Percentage

- a. For all present elements, enter the names of the material types comprising each individual element in the relevant cell of the column *materials types*.
- b. Enter the percentage of each individual material type (as a percentage of the whole element type) in the relevant cell of the column titled *percentage/volume of relevant materials present*.
- c. Enter the percentage of each material (as a percentage of the whole element type) that complies with either tier 1, 2, 3 or 4, as appropriate. At least 80% of the materials that make up an element type must comply with one or more of the tiers to achieve any points for that element type.

Combination

- a. A combination of *generic* and *user defined* data can be entered for any of the elements, simply select the number of element types you wish to enter for an element (point 3) and follow the above guidance.
3. Once all data has been entered correctly and in compliance with the criteria, the tool will calculate the total number of points achieved and translate this into the number of credits awarded.

The following scale is used to award credits for new builds and major refurbishment projects:

- | | |
|---------------|-------------------|
| a. ≥10 points | 2 credits awarded |
| b. ≥5 points | 1 credit awarded |

The following scale is used to award credits for fit-out projects:

- | | |
|---------------|-------------------|
| a. ≥10 points | 1 credits awarded |
|---------------|-------------------|

Note: Where not all applicable elements are specified within the development, the number of points required to credits available are re-allocated based on the number of elements that are specified.

Although only 80% of the materials in an element have to be assessed, it may be beneficial to include even small percentages of materials that are in the higher tiers.

Table 9.3 Responsible Sourcing Tier Levels and Criteria

Tier level	Issue assessed	Points available per element	Evidence / measure assessed	Examples of compliant schemes
1	Legality & responsible sourcing	3	Certification scheme EMS (Environmental Management Scheme)	ISO 14001 certified for the Key Process and Supply Chain. Wood: FSC, CSA, SFI with CoC, PEFC.
2	Legality & responsible sourcing	2	Certification scheme/EMS	
3	Legality & responsible sourcing	1.5	Certification scheme/ EMS	Timber: MTCC, Verified**, SGS, TFT
				Other materials: Certified EMS (e.g. ISO 1401/EMAS) for the Key Process and/or <i>Supply Chain</i> .
				Recycled Materials with certified EMS for the <i>Key Process</i>
4	Legality & responsible sourcing	1	Certification scheme/EMS	Certified EMS for key process stage.

Note:

Where any timber is used, it must be legally sourced. Where evidence cannot be provided to demonstrate legal sourcing for any element, no points can be awarded for the Responsible Sourcing Issue.

Where new in situ concrete (not existing concrete) is used, certification of the manufacture of the cement as the primary process, extraction of the aggregate and limestone used to make the cement as well as supply chain processes to be provided.

Tier level 4 may give credit if some part of the production face is certified, even if the whole production face is not certified.

** "Verified" is the name of a scheme produced by SmartWood.

Table 9.4 EMS Criteria

Material	Key Process	Supply chain processes
Brick (including clay tiles and other ceramics)	Product Manufacture	Clay Extraction
Resin-based composites and materials (including GRP and polymeric render but excluding timber based composites)	Composite product manufacture	Glass fibre production (or other principle matrix material) Polymer production
In situ Concrete (including ready mix and cement mortars and renders)	Ready mixed concrete plant	Cement production Aggregate extraction and production
Precast concrete and other concrete products (including blocks, cladding, precast flooring, concrete or cementitious roof tiles)	Concrete product manufacture	Cement production Aggregate extraction and production
Glass	Glass production	Sand extraction Soda Ash production or extraction
Plastics and rubbers (including polymeric renders, EPDM, TPO, PVC and VET roofing membranes)	Plastic/rubber product manufacture	Main polymer production
Metals (steel, aluminium etc)	Metal Product manufacture - e.g. cladding production, steel section production	Metal production: Steel: Electric arc furnace or Basic oxygen furnace process, Aluminium, ingot production, Copper: ingot or cathode production.
Dressed or building stone (including slate)	Stone product manufacture	Stone extraction
Plasterboard and plaster	Plasterboard or plaster manufacture	Gypsum extraction Synthetic gypsum (from flue gas desulphurisation) by default (recycled content)
Virgin timber	Timber from certified sources	Timber from certified sources
Cement Bonded Particle Board	Due to the significant cement content, in addition to requiring timber certification, the key supply chain process must also be considered to obtain the relevant tier: Timber from certified sources	Cement production Timber from certified sources
Wood panel and wood based composite products such as Oriented Strand Board, plywood, HPL, chipboard/particle, glulam, LVL, etc.)	Wood products, including those with recycled content, can only use the Timber Certification route	
Bituminous materials, such as roofing membranes and asphalt	Product manufacture	Bitumen production Aggregate extraction and production
Other mineral-based materials, including fibre cement and calcium silicate	Product manufacture	Cement production lime production other mineral extraction and production
Products with 100% recycled content	Product manufacture	Recycled input by default
Products with lower % of recycled content	Product manufacture	Supply chain process/processes for any virgin material in the relevant product type above. Recycled input by default
Any other product	Key processes is likely to be product manufacture	1 or 2 main inputs with significant production or extraction impacts should be identified
Excluded products: insulation materials, fixings, adhesives, additives	N/A	N/A

Timber and Environmental Management Schemes (EMS)

Where an Environmental management scheme is used to assess products made from recycled timber, 100% of the timber content must be recycled or sourced from one of the recognised timber certification schemes in Table 9.3 Responsible Sourcing Tier Levels and Criteria. A timber product with 50% recycled timber and 50% legally sourced timber will not comply with the criteria and will not be awarded any points.

Using an EMS for new timber does not demonstrate timber certification and therefore does not qualify for points.

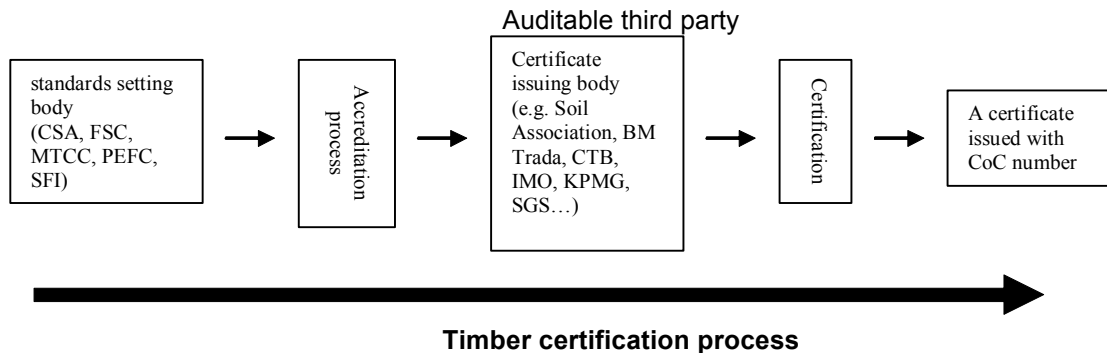
Calculation procedure: Post Construction/Post Fit Out stage

1. Check that the *As Built* construction matches that proposed at design stage (see *Schedule of Evidence*). Where there are any differences in the specification, obtain the relevant volumes and/ or percentages of materials for each element that differs.
2. Obtain the relevant confirmation of tier certification for post construction stage (see *Schedule of Evidence*) for all materials, from all sources/suppliers.
3. Confirm and/or re-assign a tier level to each material based on the level of certification provided (see Table 9.3 Responsible Sourcing Tier Levels and Criteria and *Information Required to Demonstrate Compliance*).

Chain of Custody

This is a process used to maintain and document the chronological history of the evidence/path for products from forests to consumers. Wood must be tracked from the certified forest to the finished product. All the steps, from transporting wood from the forest to a sawmill, until it reaches the customer, must maintain adequate inventory control systems that allow for separation and identification of the certified product. Chain-of-custody certification ensures that a facility has procedures in place to track wood from certified forests and avoid confusing it with non-certified wood. Chain-of-custody is established and audited according to relevant forest certification systems rules.

Third party certification process



CITES - Convention on International Trade in Endangered Species of wild fauna and flora (extract taken from the CITES website)

“CITES works by subjecting international trade in specimens of selected species to certain controls. All import, export, re-export and introduction from the sea of species covered by the Convention has to be authorized through a licensing system. Each Party to the Convention must designate one or more Management Authorities in charge of administering that licensing system and one or more Scientific Authorities to advise them on the effects of trade on the status of the species.

The species covered by CITES are listed in <http://www.cites.org/eng/app/>, according to the degree of protection they need.

1. Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.
2. Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.
3. Appendix III contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.”

Calculation of Timber Volumes

- a. Most of the information on areas, lengths and volumes of timber will be available from the component manufacturers or estimator, who should provide a detailed breakdown of quantities of materials.
- b. In order to calculate the volume of wood in timber frame windows, the total length of frame must be obtained. This can then be converted to a volume by multiplying the length of frame on fixed windows by 0.00653 and the length of frame on opening windows by 0.01089.
- c. In order to calculate the volume of timber in composite timber doors such as a flush door, calculate the total area of all doors summed over the whole building and multiply this by 0.02187 (this factor gives the total volume of timber in the doors and frames).

Relevant Definitions

Composite material: can be defined as an engineered material made from two or more constituent materials with significantly different physical or chemical properties and which remain separate and distinct on a macroscopic level within the finished structure. Resin based composites such as GRP and polymeric render and timber composites such as Chipboard/Particleboard, MDF, OSB, plywood, hardboard, laminated veneered lumber, glulam and cement bonded particleboard are all required to be assessed for responsible sourcing.

Frame: The frame is any of the main structural elements that are not included in the roof, external walls and floors. For example, timber or metal studwork within a plasterboard partition would be included within the internal walls, and timber joists would be included within the floor construction.

Where a concrete or steel frame is used, this would be treated as the Frame as it would not be integral to the internal walls for example.

Key Processes: the final major aspects of processing that are carried out. There may be a single process or multiple processes requiring assessment, depending on the end product. The criteria for each of the assessed materials are detailed in Table 9.4 EMS Criteria.

Legally Sourced Timber: legal timber and wood derived products are those which originate from a forest where the following criteria are met:

1. The forest owner/manager holds legal use rights to the forest.
2. There is compliance by both the forest management organisation and any contractors with local and national legal criteria including those relevant to:
 - a. Forest management
 - b. Environment
 - c. Labour and welfare
 - d. Health & safety
 - e. Other parties' tenure and use rights
3. All relevant royalties and taxes are paid.
4. There is compliance with the criteria of CITES.

Relevant documentation demonstrating the above must be provided or made available on request subject to the availability of such materials in the country concerned. Certification from any of the timber certification schemes identified in tiers 1, 2 and 4 for this credit demonstrate legally sourced timber.

Pre-consumer waste stream: Waste material generated during manufacturing processes. Excluded is reutilisation of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.

Post-consumer waste stream: Waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

Responsible Sourcing: Demonstrated through auditable third party certification schemes.

Reused materials: Materials that can be extracted from the waste stream and used again without further processing, or with only minor processing, that does not alter the nature of the material (e.g. cleaning, cutting, fixing to other materials).

Recycled Material: Materials diverted from the pre-consumer and/or post-consumer waste streams that require significant processing before they can be used again. For further information please see *Calculating and declaring recycled content in construction products, "Rules of Thumb" Guide* (WRAP, 2008) <http://www.wrap.org.uk/>

Supply Chain EMS: covers all of the major aspects of processing and extraction involved in the supply chain for the end product. Note that recycled materials are not required to demonstrate a Supply Chain EMS. If EMS certification is provided for the Key Processes for recycled materials, this is assumed by default.

Small Company: A company is defined as 'small' if it satisfies at least two of the following criteria:

- a. A turnover of not more than €10 million;
- b. 50 employees or fewer.

This is based on the definition stated in the European Directive 2003/361/CE.

Tier levels – a graded scale to reflect the rigour of the certification scheme used to demonstrate responsible sourcing, forming the basis for awarding points (all as detailed in Table 9.3 Responsible Sourcing Tier Levels and Criteria).

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust	Educa t.		P	G	VG	E	O
1	1	1	1	Mat 7 - Designing for Robustness					
					-	-	-	-	-

Aim

To recognise and encourage adequate protection and robustness of exposed parts of the building and landscape, therefore minimising the frequency of use of replacement materials.

Assessment Criteria

The following demonstrates compliance:

1. It has identified the parts of the building that is exposed to moisture damage and specified suitable durability and protection measures to prevent damage caused by moisture. This must include, but are not necessarily limited to:
 - a. protect structural components from rain and other moisture-both in the construction and operation phase
 - b. use of materials that resist high moisture content in the structural parts that are difficult to protect
 - c. conduct life considerations for vulnerable structural components
2. Internal and external areas of the building where vehicular, trolley and pedestrian movement occur have been identified.
3. Suitable durability and protection measures or design features have been specified to prevent damage to the vulnerable parts of these building areas from such traffic. This must include, but is not necessarily limited to:
 - a. Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc).
 - b. Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas.
 - c. Protection against, or prevention from, any potential vehicular collision where vehicular parking and manoeuvring occurs within 1m of the external building façade for all car parking areas and within 2m for all delivery areas.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to the assessment of new build projects.
Refurbishment	Where the assessment is of a refurbished building on an existing site then the criteria apply to the areas that form a part of the works or hard landscape for that building.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell only assessments.

Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out only assessments.
Suitable durability measures- and protective measures	Suitable durability and protection measures to vulnerable parts of the building can include: <ul style="list-style-type: none"> • Eaves of weather resistant materials • Do not wet the exposed materials in facades and other surfaces exposed to driving rain, drips and other weather conditions. • Protection of structural components from moisture during the construction phase • Bollards/barriers/raised kerbs to delivery and vehicle drop-off areas • Robust external wall construction, up to 2m high • Protection rails to walls of corridors • Kick plates/impact protection (from trolleys etc) on doors • Hard-wearing and easily washable floor finishes in heavily used circulation areas (i.e. main entrance, corridors, public areas etc)
Vehicle Impact Protection	Any vehicle impact protection measures specified must be positioned at an adequate distance from the building to protect the fabric from impact from any vehicle with a measurable overhang of the body from the wheel track, in particular for any goods delivery areas. In vehicle movement areas only; where the specification of external robust wall construction is specified to comply with the credit, additional protection must be provided to ensure against potential damage to the robust façade from vehicle movement, i.e. specifying bollards or protection rails.
Public / Common Areas	Consideration should be given to robust materials specification in public/common areas (especially public waiting areas and toilet areas) to provide protection against potential malicious or physical abuse in as far as it is possible
Sales areas	In any sales areas, where customer goods trolleys will be used, protection must be provided to vulnerable parts of the building (such as glass curtain walling etc.) within 1m of trolley movement.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	Design drawings marked up to illustrate: <ul style="list-style-type: none"> • Vulnerable areas/parts of the building. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • Vulnerable areas of the building • The durability measures in-situ and protection measures.
2	Design drawings and/or specification confirming: <ul style="list-style-type: none"> • The durability and protection measures specified. 	

Additional Information

Relevant definitions

None

10.0 Waste

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
3	3	3	3	Wst 1 - Construction Site Waste Management					
					-	-	-	-	-

Aim

To promote resource efficiency via the effective and appropriate management of construction site waste.

Assessment Criteria

The following demonstrates compliance:

First credit

1. Where a Site Waste Management Plan (SWMP) – see definition in the Additional Information section - has been developed and implemented in accordance with Checklist A15a.
2. In addition to the above, sites with existing buildings that will be refurbished or demolished, where demolition forms a part of the principal contractor's works contract, must comply with the following:

Completed a pre-demolition/pre-refurbishment audit of the existing building to determine if, in the case of demolition, refurbishment/re-use is feasible and, if not, to maximise the recovery of material from demolition or refurbishment for subsequent high-grade/value applications. The audit must be referenced in the SWMP and cover:

- i. Identification of the key refurbishment/demolition materials.
- ii. Potential applications and any related issues for the reuse and recycling of the key refurbishment and demolition materials.
- iii. Identification of hazardous wastes and the preparation of environmental description according to TEK 10, § 9-7 of the existing building (is it to be demolished / renovated. Refer to byggmiljø.no and disposal information page "Waste management in the construction business"

Second credit

3. The first credit has been achieved.
4. Targets are set to reduce waste generated on site..These should be reported and justified as part of the SWMP implementation and on completion.
5. At least three key waste groups have been identified for **waste reduction potential** at Design stage (Checklist A15b). These should be reviewed throughout the construction process as part of implementing SWMP, and results reported in the SWMP on completion.

Third credit

6. The first and second credits have been achieved.
7. At least three key waste groups or the minimum required by local regulations plus one, whichever is the most onerous, are identified for **diversion from landfill** in the SWMP at pre-construction stage and Checklist A15b has been completed accordingly.
8. Waste is sorted accordingly, either on site or offsite through a licensed external contractor where separation on the construction site is not feasible.
9. This should be quantified and reviewed during the construction phase and reported in the SWMP upon collection.

Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue.

10. All three credits have been achieved.
11. All key waste groups are identified for **diversion from landfill** at pre-construction stage SWMP.
12. At least five key waste groups have **waste reduction potential** at Design stage (Checklist A15b). These should be reviewed throughout the construction process as part of implementing SWMP, and results reported in the SWMP on completion.
13. At least five key waste groups or the minimum required by local regulations plus three, whichever is the most onerous, are identified for **diversion from landfill** at pre-construction stage SWMP and Checklist A15b has been completed accordingly.
14. More than 90% of waste from construction phase is recycled and / or reused, thus the residual waste thereby constitutes maximum 10 %.

Buildings complying with the exemplary level criteria would therefore achieve four credits for this issue.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	If the building is part refurbishment part new-build extension then the whole building must be used to determine compliance with this issue. For assessments of extensions to existing buildings, where only the extension is being assessed, it is the extension only that must comply.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit-out-only assessments.

Resource efficiency targets	<p>The objective of the second credit is to encourage developers and contractors to minimise the amount of waste arising on site through the definition and regular review of target benchmarks. BRE Global will not advice on the targets as these must be set according to best practice and will depend on the type of waste and the opportunities for reuse on site. Review of the amount of waste arising on previous projects and national best practice guidelines should be used wherever possible.</p> <p>The BREEAM-NOR assessor shall demonstrate in the assessment report how those targets have been set.</p> <p>Please refer to http://www.smartwaste.co.uk/page.jsp?id=37 for further information and indicative benchmarks by project type used in the UK. The following is the best Norwegian reference: "Avfallhpdntering på byggeplass" - http://www.byggemiljo.no/getfile.php/Filter/Avfallsh%E5ndtering%20p%E5%20byggeplass%2017.12.08.pdf</p> <p>Targets for waste minimisation during the construction process can also be set using the Construction Excellence's Environmental performance indicator benchmarks (see www.constructionexcellence.org.uk).</p>
Pre-demolition/pre-refurbishment audit	<p>A pre-demolition/pre-refurbishment audit should be carried out using an appropriate methodology. Norges Miljøvernforbund / GRIP-senter have developed a guidance to environmental demolition, that might be used, in the absence of other relevant tools.</p>
Key waste groups	<p>For the purposes of the second credit, waste groups with a reduction potential should be defined in accordance with the key waste groups defined in the European Waste Catalogue (please see Checklist A15b for the exact list).</p> <p>For the purposes of the third credit however, different types of waste may be grouped together in order to be recovered, e.g. concrete and bricks may be crushed together to produce recycled aggregates where this is supported by national/regional waste management regulation/policy/practice. Therefore, waste groups identified for diversion from landfill might be different to those listed in the European Waste Catalogue. In order for the credit to be awarded, distinct end recovery products should be identified.</p>
Segregation of hazardous waste	<p>Hazardous waste should be segregated on at source, to avoid contaminating non-hazardous waste streams. This is standard practice across Europe and therefore no credit will be awarded for segregating hazardous waste.</p>
Limited site space for segregation and storage	<p>Where space on site is too limited to allow waste materials to be segregated, a waste contractor may be used to separate and process recyclable materials off site. Similarly, manufacturers' take-back schemes could also be used. Where this is the case, sufficient documentary evidence must be produced which demonstrates that segregation of materials is carried out to the agreed levels and that materials are reused/recycled as appropriate.</p>

Diversion from landfill	<p>Any waste management operation that diverts a Construction & Demolition waste material from the waste stream and which results in productive use, will be considered as acceptable for the purposes of the third credit. Acceptable routes are as follows;</p> <ul style="list-style-type: none"> • Reused on site (in-situ or for new applications) • Reused on other sites • Salvaged/reclaimed for reuse • Returned to the supplier via a 'take-back' scheme • Recovered from site by a licensed external contractor and recycled. <p>Recovery routes such as filling disused mines/other underground voids (except where these are required to be carried out to avoid anticipated risks to health and safety, economic activity or the natural environment) or general disposal of waste will not be considered acceptable.</p>
Minor refurb/fit outs	<p>In some cases such as minor refurb/fit outs, it may not be feasible to sort and recycle five of the key waste groups. This may be because the materials are not present or because there is insufficient quantity (e.g. less than 4.5 m³ of materials). In such cases, the third credit may be awarded if all applicable waste groups are being reused/recycled.</p>

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First credit		
1-2	<p>A copy of the compliant Site Waste Management Plan containing the appropriate benchmarks, commitments and procedures.</p> <p>Where relevant, a copy of the pre-demolition/pre-refurbishment audit.</p> <p>OR</p> <p>A copy of the specification clause that:</p> <ul style="list-style-type: none"> • Requires the principal contractor to produce a SWMP in line with the criteria • Contains the detailed criteria with respect to procedures to be included in the SWMP • Where relevant, requires the principal contractor to carry out a pre-demolition/pre-refurbishment audit. <p>OR</p> <p>A letter from the client or their representative containing:</p> <ul style="list-style-type: none"> • Confirmation that the specification will contain a clause on site waste management criteria. • An outline of the detailed criteria that will be included in that specification clause. 	<p>A copy of the SWMP summary datasheets or equivalent monitoring records/report and completed final copy of Checklist A15a if different from design stage confirming:</p> <ul style="list-style-type: none"> • The total waste arising for the development. • Comparison of the total waste arising against the benchmark <p>Where relevant, a copy of the pre-demolition/pre-refurbishment audit.</p>

	AND in all cases A copy of the completed Checklist A15a	
Second credit		
3	Evidence (as outlined above) confirming compliance with the first credit.	Evidence (as outlined above) confirming compliance with the first credit.
4 and 5	<p>A copy of the specification clause or site specific waste policy/procedure confirming:</p> <ul style="list-style-type: none"> • Detail of the key waste groups • Targets for waste minimisation • An outline of the procedures to minimise waste <p>OR</p> <p>A letter from the client or their representative containing:</p> <ul style="list-style-type: none"> • Detailed requirements with respect to waste minimisation target(s) and identification of waste reduction potential. <p>AND in all cases</p> <p>A copy of the completed Checklist A15b</p>	<p>A copy of the SWMP summary datasheets or equivalent monitoring records/report confirming:</p> <ul style="list-style-type: none"> • The total waste arising for the development and for the defined key waste groups, • Comparison of the total waste arising against the benchmark <p>Completed final copy of Checklist A15b if different from design stage</p>
Third credit and exemplary level requirements		
6	Evidence (as outlined above) confirming compliance with the first and second credits.	Evidence (as outlined above) confirming compliance with the first and second credits.
7 - 15	<p>A copy of the specification or procedure confirming:</p> <ul style="list-style-type: none"> • Detail of the key waste groups • Reuse/recycling procedures <p>Where relevant, letter from the licensed external contractor confirming:</p> <ul style="list-style-type: none"> • Segregation of materials is carried out to the correct standards and that materials are reused/recycled as appropriate. <p>OR</p> <p>A letter from the client or their representative containing:</p> <ul style="list-style-type: none"> • Confirmation that the specification will contain a clause on sorting construction waste. • Detailed requirements with respect to recycling benchmarks and target(s) • Reuse/recycling procedures • specification subject and indicates solution for the recovery of more than 90%. 	<p>Monitoring records/report confirming:</p> <ul style="list-style-type: none"> • Quantities of waste by groupings • Amount and proportion of waste arising that was reused, recycled and landfilled • Custody/application/destination of reused/recycled materials. <p>In addition, where there is already a national mandatory requirement to recover all waste, or where the national C&D waste recovery rate is more than 85%:</p>

	•	
--	---	--

Additional Information

Relevant definitions

European Waste Catalogue: list of wastes that has been produced by the EU to standardise the description of waste across Europe and to enable waste to be recorded, monitored and controlled more effectively.

Significant Majority: Defined as meeting at least the percentages required within the issue compliance section of this manual.

Site Waste Management Plan (SWMP): SWMP aims to promote resource efficiency and to prevent illegal waste activities. Resource efficiency includes minimising waste at source and ensuring that clients, designers and principal contractors assess the use, reuse and recycling of materials and products on and off the site. BREEAM does not require targets to be met but is encouraging the process of setting, monitoring and reporting against targets.

The implementation of a Site Waste Management Plan (SWMP) can help manage the site construction waste produced. A SWMP consists of a combination of commitments to:

- a. design out waste
- b. reduce waste generated on site
- c. develop and implement procedures to sort and reuse/recycle construction waste on and off site (as applicable).

A Site Waste Management Plan should typically include the following features;

- Identify who is responsible for producing the SWMP and ensuring that it is followed. They should have sufficient authority to ensure that others comply with the SWMP.
- Identify the types and estimated quantities of waste that will be produced at all stages of the work programme/plan.
- Identify waste management options including reference to the waste hierarchy (reduce, re-use, recycle), on- and off-site options, paying particular attention to arrangements for identifying and managing any hazardous wastes produced.
- Identify waste management sites and contractors for all wastes that require them. Ensure that the contracts are in place, emphasising compliance with any legal responsibilities that may exist.
- Set targets and procedures for monitoring progress.
- Confirmation is required that the site's construction waste is being monitored.
- Measure how much waste and what types of waste are produced. These figures should be recorded on an established system such as SmartWaste

Data obtained from measuring and monitoring site construction waste can then be used to check performance against targets and benchmarks, analyse the effectiveness of any solutions implemented and strive for continual improvement. <http://byggeregler.dibk.no/blanketter>

SMARTWaste Plan (www.smartwaste.co.uk) is a free web-based tool for preparing, implementing and reviewing a SWMP. This tool includes an integrated waste measurement tool which is aligned to defined waste groups. SMARTWaste Plan will manage all aspects of creating SWMPs and measuring waste generated on projects. Templates are available to meet the BREEAM credits and can also be downloaded. The tool includes online waste measurement, industry waste benchmarks. A carbon calculator and economic assessment of waste will also be added.

UK construction waste benchmarks

The following benchmarks used have been derived from BRE's SMARTWaste system and through a DEFRA-funded project for predicting construction waste and are updated annually. The benchmarks

are based on real-life data and have been subject to a number of statistical and logical tests. The benchmarks used apply to actual volume, and standard conversion factors have been used for tonnages from the Environment Agency.

For more information on these benchmarks and to break them down by project type, please go to <http://www.smartwaste.co.uk/page.jsp?id=37>

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Wst 2 - Recycled Aggregates	-	-	-	-	-

Aim

To recognise and encourage the use of recycled and secondary aggregates in construction, thereby reducing the demand for virgin material.

Assessment Criteria

The following demonstrates compliance:

1. Where the amount of recycled and secondary aggregate specified is over 25% (by weight or volume) of the total *high-grade* aggregate uses for the building. Such aggregates can be **EITHER**:
 - a. Obtained on site **OR**
 - b. Obtained from waste processing site(s) within a 30km radius of the site or from a higher distance but transported by rail or water to the construction site; the source will be principally from construction, demolition and excavation waste (CD&E) – this includes road planings **OR**
 - c. Secondary aggregates obtained from a non-construction post-consumer or post-industrial by-product source (see Compliance Notes).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	The credit available for this issue can be awarded automatically where no new aggregate is being used. Potentially the case in most refurbishments.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments. Where the shell and fit-out phases of the building are awarded to two different contractors, only the contractor of the shell and core phase should be assessed.
Fit Out Only	Issue not applicable for Fit-Out-only assessments

Secondary aggregates	<p>Recognised non-construction post-consumer or post-industrial by-products include:</p> <ul style="list-style-type: none"> • China clay waste • Slate overburden • Pulverised Fuel Ash (PFA) • Ground Granulated Blast Furnace Slag (GGBFS) • Air-cooled blast furnace slag • Steel slag • Furnace bottom ash (FBA) • Incinerator bottom ash • Foundry sands • Recycled glass • Recycled plastic • Tyres • Spent oil shale • Colliery spoil • Municipal Solid Waste Treatment Residues <p>By-products should not be in conflict with the EU's Framework Directive on Waste, Article 5, 1d</p>
-----------------------------	---

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	<p>A copy of the relevant specification or contract clause confirming:</p> <ul style="list-style-type: none"> • Recycled and secondary aggregate use criteria for the project. <p>A letter from the design team or main contractor confirming:</p> <ul style="list-style-type: none"> • The source of recycled/secondary aggregates • The amount and quality required can be obtained from this source. 	<p>Structural engineers calculations demonstrating the weight/volume of:</p> <ul style="list-style-type: none"> • Total high grade aggregate used. • Total recycled and secondary aggregates used. <p>Third party documentation as follows:</p> <p>Delivery notes for all recycled and secondary aggregates confirming:</p> <ul style="list-style-type: none"> • Source of recycled/secondary aggregate. <p>AND/OR</p> <p>A letter or email from the aggregate/ concrete supplier confirming that:</p> <ul style="list-style-type: none"> • The aggregate supplied and used was from a recycled/secondary source • Source of recycled/secondary aggregate.

Additional Information

Relevant definitions

High Grade aggregate uses are considered to be:

Bound

- Structural frame;
- Floor slabs including ground floor slabs;
- Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads.

Unbound

- Asphalt-based or similar road surfaces
- Granular fill and capping
- Pipe bedding
- Sub bases/building foundations
- Gravel landscaping.

<http://www.bnl.no/miljoogenergi/> and <http://aggregain.wrap.org.uk/opportunities/index.html> are separate link for building and construction waste. In addition, the National Action Plan for Construction and demolition waste which provides several examples of how recycled and reclaimed aggregates can be used. Crushed masonry used as fillers in regular outdoor struc, is not considered to be high quality. This practice is common at construction sites because of the costs associated with disposal. If the national building regulations restrict the use of recycled aggregates in concrete, this applies to typical use of the bound aggregates as described above. If this also applies to the unfettered use, please contact NGBC for further guidance.

Pre-consumer waste stream: Waste material generated during manufacturing processes. Excluded is reutilisation of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.

Post-consumer waste stream: Waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

Recycled aggregates: are those derived from reprocessing materials previously used in construction, e.g. crushed concrete or masonry from construction and demolition waste material.

Secondary aggregates: By-products of industrial processes that can be processed to produce secondary aggregates. Secondary Aggregates are sub-divided into manufactured and natural, depending on their source.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	2	Wst 3 - Recyclable Waste Storage	-	-	-	1	1

Aim

To recognise the provision of dedicated storage facilities for a building's operational-related recyclable waste streams, so that such waste is diverted from landfill or incineration.

Assessment Criteria

The following demonstrates compliance:

1. A dedicated storage space to cater for recyclable materials generated by the building during occupation, compliant with the following:
 - a. Clearly labelled for recycling
 - b. Placed within accessible reach of the building (see Compliance Notes)
 - c. In a location with good vehicular access to facilitate collections.
2. The size of the space allocated must be adequate to store the likely volume of recyclable materials generated by the building's occupants/operation. Whilst a fixed area cannot always be given, the following must be complied with as a minimum:

OFFICES AND EDUCATION ONLY

- a. At least 2m² per 1000m² of net floor area for buildings <5000m²
- b. A minimum of 10m² for buildings ≥5000 m²
- c. An additional 2m² per 1000m² of net floor area where catering is provided (with an additional minimum of 10m² for buildings ≥5000m²).
- d. The area set aside must be used to sort and store at least 6 different types of recyclable materials in accordance with local requirements for the collection methods for waste:
 - a. Paper
 - b. Cardboard
 - c. Plastic (including plastic)
 - d. Other packaging materials (not listed above)
 - e. Glass
 - f. Metal
 - g. Batteries
 - h. Wood
 - i. Fluorescent
 - j. Plant Oils
 - k. Mineral oils, food waste
 - l. Electronic and electrical waste
 - m. Textiles
 - n. Printers and Toners
 - o. Other recyclable waste that can be treated.

Education can obtain a second credit if:

It is a policy to recycling / recovery and a procedure that is used or will be in use when the building is completed. As a minimum, this cover:

- a. Cover point d. above
- b. Where there is composting facilities, the policy covering the collection of compost unless the compost can be used on site.

INDUSTRIAL ONLY

- a. The space provided should allow a hardstanding area that is adequate to enable the occupier to recycle materials from the operational area(s) effectively **PLUS**
- b. At least 2m² per 1000m² of net office floor area for buildings <5000m²; a minimum of 10m² for buildings ≥5000m²
- c. The dedicated space must cater for the separation and storage of the following types of recyclable materials (where generated by the end user) in accordance with the local waste collection scheme requirements:
 - Paper
 - Cardboard
 - Glass
 - Plastics
 - Packaging
 - Metals
 - Timber
 - Electronic and electrical waste
 - Other process related recyclable waste.

RETAIL ONLY

- a. The space is sized according to the number and area of retail units that it will serve and the predicted volumes of waste that will arise from those areas.
- b. The dedicated space must cater for the separation and storage of a minimum of 6 different types of recyclable materials in accordance with the local waste collection scheme requirements, these may include:
 - Paper
 - Cardboard
 - Plastics (including packaging film)
 - Other packaging materials (not covered above)
 - Glass (segregated into brown, green and clear glass)
 - Metals
 - Batteries
 - Timber
 - Fluorescent lamps
 - Vegetable oils
 - Mineral oils
 - Electronic and electrical waste
 - Textiles
 - Food waste
 - Other process related recyclable waste.

Note: For assessments of building/units for service providers please refer to the Compliance Notes.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Where there are facilities within the existing building, these can be used to assess compliance. The scope of these facilities must be adequate to cater for the total volume of predicted waste from the new and existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	Where the assessment stakeholder is a site-based tenant, who occupies a unit/floor within a larger development and uses central or common storage facilities (provided for by a landlord), then such facilities can be used to assess compliance.
Accessible reach of the building	Typically 'accessible reach' is defined in BREEAM as within 20m of a building entrance. In some circumstances, depending on the size of the building, site restrictions or tenancy arrangements, it may not be possible to meet a 20m requirement. If it is the opinion of the assessor that it is not feasible to meet this 20m requirement then they can use their judgement to determine if the facility is in an easily accessible location for building occupants and vehicle collection and to state their reasons in the assessment report.
Inside storage area	Storage areas for recyclable waste may be located inside the building where there are site restrictions as long as all the BREEAM requirements are met, and in particular the area remains in a location with good vehicular access. This supposes that if collections were to be done at night, access to the building will still be granted.
Industrial buildings with an unknown end occupier	Where the end occupier is not known, the space provided for recyclable waste arising from the operational area cannot be assessed. Therefore, the BREEAM International assessor should check that a hardstanding area for at least one standard 8 cubic yard skip (for units with an operational area of $<1000\text{m}^2$) and two standard 8 cubic yard skips (for units with an operational area $\geq 1000\text{m}^2$) has been provided as a minimum in addition to the space required for the office space.
Industrial buildings - separate storage areas for office and operational areas	The space for storage of recyclable materials from the office and operational areas does not necessarily have to be a combined space. This is of particular importance for larger buildings where a combined storage area may result in that area not meeting the requirement for accessibility from either the office or operational building areas.
Industrial buildings consisting of small units	For a building/unit consisting of a number of small units, each $\leq 200\text{m}^2$ floor area, shared facilities that meet the above criteria for the building as a whole are sufficient to achieve this credit, subject to a minimum of 2m^2 for operational waste per unit.
Shopping centres & retail parks	For shopping centres and retail parks there must be adequate space to cater for each tenant and their potential recyclable waste volumes. Tenants that occupy a large proportion of the centre, i.e. 'Flagship tenants', must have their own dedicated compliant facilities. For smaller non-flagship tenant units, compliant central or common facilities on site or dedicated spaces for individual units will meet the assessment criteria for this BREEAM issue.
Buildings/units for service providers	For service providers, e.g. banks or post offices, the types of recyclable waste streams are likely to be limited, in the main, to paper and packaging. The scope of recyclable materials catered for and size of the space criteria should therefore match the scope of recyclable materials and volume. As a general rule there must be at least 2m^2 per 1000m^2 of net floor area or at least 10m^2 for buildings with net floor area greater than $5,000\text{m}^2$.

Individual Recycling Bins	Individual recycling bins located at convenient locations throughout the building are necessary to maximise recycling rates. On their own, however, these are not sufficient to obtain this credit.
Internal storage areas	Where the facilities are situated internally, vehicular gate heights/widths and manoeuvring and loading space must be sized correctly to ensure ease of access for vehicles collecting recyclable materials.

General waste	The area for recyclable waste storage must be provided in addition to the facilities commonly provided for dealing with general waste and other waste management facilities, e.g. compactors and balers, but do not necessarily need to be in separate locations.
Local waste collection scheme	The types of recyclable materials listed in the BREEAM criteria should be separated wherever possible. However, the local waste collection scheme may set different segregation requirements in line with the waste management company procedures that may conflict with the BREEAM criteria. In that instance, the BREEAM International assessor must provide evidence demonstrating that the separation and storage of waste is in compliance with the local waste collection scheme and that all other BREEAM requirements have been met.
Policy of resirculation	The documentation has to be given by responsible manger, constructor and/or authorized person.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
All	<p>Marked-up building/site plan and/or copy of the specification confirming:</p> <ul style="list-style-type: none"> The location of the dedicated recyclable storage area Storage area for general waste The area (m²) of the storage space(s) Description of the labelling. <p>Where applicable, information from the local waste collection scheme confirming the types of recyclable materials to be separated and stored.</p>	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> The location, size and capacity of the storage provision Labelling of the dedicated facilities.
	<p>Pre-Schools, schools & sixth form only A copy of the school's recycling policy and documentation outlining the recycling procedures.</p> <p>OR</p> <p>A written commitment from the school, or relevant authorising body, to develop and implement a recycling policy and appropriate operational procedures.</p>	<p>Pre-Schools, schools & sixth form only Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> Recycling procedures are operational in accordance with the policy. <p>OR</p> <p>A written commitment from the school to develop and implement a recycling policy and appropriate operational procedures.</p>

Additional Information

Relevant Definitions

Flagship or anchor tenant: The largest and primary tenant within a retail development, typically department store-type retailers.

The following footprint dimensions can act as a guide when determining size and accessibility criteria for the recyclable storage space:

- **Compactor dimensions:** about the size of one car parking bay; 4.8 x 2.4m
- **Skip:** The footprint of an 8 and 12 cubic yard skip measures 3.4m x 1.8m, therefore allow a minimum of 2.0m width and 4.0m length or 8m² area for the storage and access of such containers
- **Wheeled bins:** 360 litre = 0.86m x 0.62 / 660L = 1.2m x 0.7m / 1100L = 1.28m x 0.98m
- **Roll-on-roll-off containers:** allow a minimum of 6.1m x 2.4m.
- **Vehicle access:** The following are dimensions for lorry types that are typically used to collect waste. Therefore gate height/widths should not be smaller than these measurements:
 - **Dustcart:** medium capacity; length = 7.4m Height = 4m width 3.1m
 - **Skip lorry:** length = 7m Height = 3.35m width 3.1m

Consideration must also be given to any other types of vehicle requiring access to this area, e.g. lorries for roll on/off containers.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	-	1	1	Wst 4 - Compactor / Baler					
					-	-	-	-	-

Aim

To recognise and encourage the provision of facilities which enable efficient and hygienic waste sorting and storage.

Assessment Criteria

The following demonstrates compliance (education - Higher Education buildings only):

1. A static waste compactor or baler is installed and situated in a service area or dedicated waste management space.
2. At least one water outlet and necessary water drainage facilities are provided for each waste sorting and/or storing facility.
3. The recyclable waste storage criteria of BREEAM issue WST 3 have been met.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	For speculative developments where the end user is not known, the actual installation of a compactor or baler is not required, but a dedicated space for such an installation must be provided and evident on the site plan. This space must meet the following criteria: <ol style="list-style-type: none"> Provide a suitable concrete standing for installation A three phase power supply Accessible for vehicle collections, but separate from other vehicle manoeuvring areas Provide at least one water outlet
Fit Out only	There are no additional or different criteria to those outlined above specific to fit-out-only assessments.
Shared Facilities	For a building consisting of a number of small units, each $\leq 200\text{m}^2$ floor area, shared facilities that meet the above criteria for the building as a whole are sufficient to achieve this credit.
Limited space or vehicle access	For developments that have limited space for static installations, the credit can be assessed on the basis of the provision of adequate space for a smaller portable compactor or baler.

Education buildings within a campus	Where the higher education building assessed is located on a new or existing campus, a compliant centralised waste compactor/baler common to all buildings on campus can be used towards the achievement on this credit.
Static waste compactor or baler	Typical dimensions for a static compactor are those of a car parking bay, ie. 4.8 x 2.4m.
Scope of Wst 4	This BREEAM issue is applicable only where the assessed development has a dedicated waste management area/facility or is >500m ² . Where it is not applicable the assessor's spreadsheet tool will filter this BREEAM issue from the list of applicable issues.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1 - 2	Marked-up design plan and/or a copy of the specification confirming: <ul style="list-style-type: none"> • Provision of waste compactor/baler • Location and size of space for waste compactor/baler • Water outlet Manufacturer/supplier literature confirming <ul style="list-style-type: none"> • The type of compactor/baler specified. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • The installation of the compactor/baler (or space for installation for speculative developments) • Installation of a water outlet
3	As defined in the schedule of evidence for BREEAM issue WST 3.	As defined in the schedule of evidence for BREEAM issue WST 3.

Additional Information

Relevant definitions

Waste compactor or baler: A machine that is designed to compress waste streams in order to improve storage and transport efficiency.

The requirement to achieve the credit for storage of recyclable materials is set in order to encourage the minimisation of the assessed development's waste streams by encouraging a more integrated approach to the issue of waste management, recycling and disposal. The provision of adequate recycling and waste management facilities helps to ensure that this objective can be achieved.

Compacting dry waste can significantly reduce the volume of waste sent to landfill. Furthermore, whether for recycling or landfill, compacting waste at source will reduce the number of trips required for the collection and delivery of the waste and therefore result in reduced fuel consumption and vehicle emissions. Reduced vehicle movements will also provide social and health & wellbeing benefits to the surrounding community and economic benefits to the building occupier.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Wst 5 - Composting					
					-	-	-	-	-

Aim

To encourage the provision of facilities that help facilitate the reduction in volume of compostable organic waste going directly to landfill during the building's operation.

Assessment Criteria

The following demonstrates compliance (education - Higher Education buildings only):

Option 1

1. A vessel is installed on site for composting suitable food waste resulting from the building's daily operation and use.
2. There is adequate space for storing segregated food waste and composted organic material.
3. At least one water outlet is provided for cleaning in and around the facility.
4. Location of land for composting and ventilation related to this should be planned and designed so that it does not cause nuisance to the general use of the building.

Option 2

1. There is a dedicated segregated space for storing compostable food waste prior to collection and delivery to an alternative composting facility.
2. At least one water outlet is provided for cleaning in and around the facility.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit-out-only assessments.
Fit Out assessments of tenanted units	Where the tenant is a food retailer who occupies a unit within a larger retail development with centralised waste management facilities, then such facilities can and should be used to assess compliance with the assessment criteria.

Storage Capacity	No criteria are defined for the type of vessel or storage capacity required as this will be determined by the end user and predicted volumes of organic compostable waste. The assessor should be satisfied that, within reason, the installation is adequate for the size of development, bearing in mind the likely quantity of organic waste that will be produced by the development.
Higher educational buildings on campus	Where the building for higher education (college og university) is part of a new or existing campus, centralized compost facilities in common for all campus buildings can be assessed to achieve this credit.
Scope of Wst 5	This BREEAM issue is applicable only where the assessed development has a food preparation and/or servery/dining area. Where it is not applicable the assessor's spreadsheet tool will filter this BREEAM issue from the list of applicable issues.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
Option 1		
1-4	<p>Marked-up design plan and/or a copy of the specification confirming (as appropriate):</p> <ul style="list-style-type: none"> • Specification of composting vessel • Location and size of space for vessel and storage of waste/compost • Water outlet. 	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> • The installation of the vessel • The provision of adequate storage space/facilities • Installation of a water outlet
Option 2		
1&2	<p>If appropriate, a letter from the occupier or service provider confirming:</p> <ul style="list-style-type: none"> • Location of the off-site facility where compostable material will be delivered. • The procedure and frequency for collecting the compostable material. <p>Marked-up design plan and/or a copy of the specification confirming (as appropriate):</p> <ul style="list-style-type: none"> • Location and size of space for storing compostable waste • Water outlet. 	<p>If appropriate, a letter from the occupier or service provider confirming:</p> <ul style="list-style-type: none"> • Location of the off-site facility where compostable material will be delivered. • The procedure and frequency for collecting the compostable material. <p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> • The provision of adequate storage space/facilities • Installation of a water outlet

Additional Information

Relevant definitions

None.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
-	1	-	-	Wst 6 - Floor Finishes					
					-	-	-	-	-

Aim

To encourage the specification and fitting of floor finishes selected by the building occupant and therefore avoid unnecessary waste of materials.

Assessment Criteria

The following demonstrates compliance:

1. For tenanted areas (where the future occupant is not known), prior to full fit-out works, carpets and other floor finishes have been installed in a show area only.
2. In a building developed for a specific occupant, that occupant has selected (or agreed to) the specified floor finishes.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	Issue not applicable for Fit Out-only assessments.
Show area	A show area could be either a floor plate or an individual office. However, to award this credit it must be less than 25% of the net lettable floor area.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	<p>Marked-up design plans and a copy of the specification confirming:</p> <ul style="list-style-type: none"> • The type and coverage (m²) of any specified floor finishes. <p>Where the future occupant is known, a letter from the client or design team confirming:</p> <ul style="list-style-type: none"> • That the type and coverage of carpets and other floor finishes have been specified (or agreed to) by the future occupant/client. 	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> • Coverage of floor finishes in line with the specification, or where known, future occupants' wishes.

Additional Information

Relevant definitions

None.

11.0 Land Use and Ecology

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	LE 1 - Reuse of Land	-	-	-	-	-

Aim

To encourage the reuse of land that has been previously developed, and discourage the use of previously undeveloped land for building.

Assessment Criteria

The following demonstrates compliance:

- At least 75% of the proposed development's footprint is on an area of land which has previously been *developed* for use by industrial, commercial or domestic purposes in the last 50 years.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	In the case of refurbishment, the credit can be awarded by default where no new building work or infrastructure is being constructed as part of the refurbishment.
Extensions to existing buildings	Where a refurbishment includes new buildings, hard landscaping, or infrastructure, 75% of the total proposed development footprint (refurbished plus new build and/or hard landscaping and/or infrastructure) must comply with the requirement.
Infill development	New buildings developed within the boundary of existing sites do not automatically comply with the criteria. The land on which at least 75% of the new building will be sited must meet the definition of <i>previously developed</i> .
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	Issue not applicable for Fit Out-only assessments.
Temporary works	Undeveloped areas of the site to be used for temporary works (e.g. temporary offices/parking, material/machinery storage) must be considered as development on undeveloped land and therefore included in the calculations unless they have been defined as 'land of low ecological value' (Ecological Value and Protection issue, LE3).
Developed more than 50 years ago	Where a site has been previously developed (more than 50 years ago) but is now considered undeveloped, the credit may only be awarded on this basis if the site is deemed to be "contaminated" as defined in BREEAM issue LE2.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	<p>Existing site plan, report or site photographs confirming:</p> <ul style="list-style-type: none"> Type and duration of previous land use. Area (m²) of previous land use. Where applicable, date the photograph was taken. <p>Proposed site plan showing;</p> <ul style="list-style-type: none"> Location and footprint (m²) of proposed development and temporary works. 	<p>Assessor's building/site inspection or as built drawings confirming:</p> <ul style="list-style-type: none"> The footprint or orientation of the developed area has not altered from that confirmed in the design stage evidence. Where alteration has occurred the % must be re-calculated using 'as built' plans.

Additional Information

Relevant definitions

Proposed Development: Is defined as the area of any building, hard landscaping, car park and access roads that fall within the boundary of the proposed site.

Previously Developed Land: For the purposes of this issue, BREEAM defines previously developed land as that which is or was occupied by a permanent structure, including the curtilage of the developed land and any associated fixed surface infrastructure.

The definition includes:

- a. Defence buildings

The definition excludes:

- b. Land that is or has been occupied by agricultural or forestry buildings.
- c. Land that has been developed for minerals extraction or waste disposal by landfill purposes where provision for restoration has been made through development control procedures.
- d. Land in built-up areas such as parks, recreation grounds and allotments which, although may feature paths, pavilions and other buildings, have not been previously developed.
- e. Land that was previously developed but where the remains of the permanent structure or fixed surface structure have blended into the landscape in the process of time (to the extent that it can reasonably be considered as part of the natural surroundings).

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	LE 2 - Contaminated Land					
					-	-	-	-	-

Aim

To encourage positive action to use contaminated land that otherwise would not have been remediated and developed.

Assessment Criteria

The following demonstrates compliance:

1. There is a risk of contamination on the site as identified using Checklist A16a and the more onerous of the following have been adopted
 - Nationally recognised strategies for reclamation have been followed;

OR

 - A robust site investigation, risk assessment and appraisal has been carried out by a competent Contaminated Land Specialist covering the requirements of Checklist A16b as a minimum.
2. If the above assessments, risk assessments and evaluations concluded that the site is significantly contaminated, confirming the developer or contractor that the repairs of the site will be conducted according to the above specialist recommended action plan, as described by the specialist and at any time relevant regulations / guidelines . Refer to TEK10 § 9-3. In addition, the use of standard ISO 10381-5 for evaluating the condition of the contaminated masses. It is referred to this standard in pollution regulation kap.2. It is emphasized that the planned excavation and construction issues are local pollution control authority pursuant to Chapter 2 in Regulations relating to pollution control [Pollution regulations] and their supervisors.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	Issue not applicable for Fit out-only assessments.
Prior Decontamination	The credit can only be awarded where remediation has taken place to enable current development of the site for the assessed building, or part of a larger phased development that includes the assessed building (see below). The credit is not achievable for instances where historical remediation and development of the site has occurred outside the scope of the current development proposals.

Large sites split into smaller plots	Where a large site has been decontaminated and is then packaged up into smaller plots of land for individual buildings (possibly as part of a phased development strategy), the credit can be awarded regardless of the plot location of the assessed building. This is on the condition that the whole site could not have been developed without remediation work taking place.
Health and Safety-related decontamination	Contaminated land that has been decontaminated solely for health and safety reasons (rather than for the specific purpose of re-development) does not comply.
Asbestos	Where the only decontamination required is for the removal of asbestos within an existing building fabric, this cannot be classified as contaminated land. However, where asbestos is found to be present in the ground this will be classed as contamination for the purposes of assessing this issue.
Nationally Recognised Strategies	Strategies or systems for the identification, registration and reclamation of contaminated land set out in regulation and or nationally recognised code of practice.
Checklist A16	This checklist provides an indication of the likelihood of there being significant contamination problems on a site for the purposes of a BREEAM assessment only and sets out the scope of any site investigation and remedial strategy. It does not seek to evaluate types, levels or risks of contamination present on the site.
Site investigation and remediation strategy	<p>Where no guidance is available in the country of assessment on how to carry out a site investigation and develop a remediation strategy, Checklist A16 sets out the appropriate scope of such a study and report for the purposes of the BREEAM-NOR assessment only.</p> <p>Further guidance is available from TEK10 § 9-3 and the "Regulations relating to pollution control", kap.2. In addition, the use of standard ISO 10381-5 for evaluating the condition of the contaminated masses. It is referred to this standard in pollution regulation kap.2. For other instructions, see: http://www.klif.no/no/Tema/Forurensset-grunn/</p> <p>Further advice and technical publications are available for download online www.miljostatus.no and www.byggemiljo.no.</p>

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	<p>A completed copy of Checklist A16.</p> <p>Where applicable, a copy of the specialist's land contamination report confirming:</p> <ul style="list-style-type: none"> The degree, type and sources of site contamination. The options for remediating the site. <p>Existing site plan(s) showing:</p> <ul style="list-style-type: none"> Location of areas contaminated and to be remediated in relation to any proposed development. 	The evidence required at the post construction stage is the same as for a design stage assessment.

2	<p>A letter from the main contractor or remediation contractor confirming:</p> <ul style="list-style-type: none"> • The remediation strategy for the site. • Summary details of the implementation plan. <p>If a contractor has not yet been appointed, a letter from the client, or their representative confirming:</p> <ul style="list-style-type: none"> • That the appointed contractor will undertake necessary remediation works to mitigate the risks identified in the specialist report. 	<p>A copy of the verification report (or relevant sections of the report) confirming:</p> <ul style="list-style-type: none"> • Description of remedial works undertaken. • Description of relevant <i>pollution linkages</i> addressed*. <p>* This may not be applicable where the contaminant is a non-native invasive plant species.</p>
---	---	--

Additional Information

The aim of this BREEAM-NOR issue is encourage clients/developers to seek out those sites that would otherwise not be considered for development. By doing this BREEAM is actively encouraging clients/developers to choose alternative sites to greenfield sites and reduce the pressure on virgin land..

Relevant definitions

Brownfield sites: land or premises that have previously been used or developed. They may also be vacant, or derelict. However, brownfield sites can not be assumed to be contaminated as this will depend on previous use.

Contaminant: Is defined as any solid, liquid or gaseous material in, or on the ground to be covered by the building (or in its immediate vicinity), which is classed as a hazard to health and/or the environment and therefore presents an unacceptable risk. Oil refineries, railways, steel works, landfill sites, petrol stations, gas works and industrial/engineering works including accidental industrial spills may have all been sources of contamination in the past. Contamination can also come from historical activities dating back hundreds of years, such as spoil heaps from mining activities, and from naturally occurring substances. The definition also includes land significantly infested by certain *non-native invasive plant species* (see below).

Contaminated land: is land that has been polluted with harmful substances to the point where it now poses a serious risk to human health and the environment.

Contaminated land specialist: an individual achieving all the following items:

1. Holds a degree or equivalent qualification in chemistry, environmental impact assessment or a related subject. Other related subjects that are deemed to be appropriate are:
2. Has a minimum of three years relevant experience (within the last five years) in site investigation, risk assessment and appraisal. Such experience must clearly demonstrate a practical knowledge of site investigation methodologies and understanding of remediation techniques as well as national and European legislation on the subject; including, acting in an advisory capacity to provide recommendations for remediation. Examples of relevant experience are: environmental impact assessments.

Greenfield land: land that has never been built on or used for industrial purposes. Such land may not be assumed to be non-contaminated as ground air or water conditions and agricultural practices can lead to hazardous pollution in certain circumstances.

Significant contamination: For the purposes of this issue, significant contamination is contamination compliant with the above and that, without remediation, development of the site is not possible.

Remediation: Activity undertaken to prevent, minimise, remedy or mitigate the risk caused by contaminated land to human health or the environment.

Non-native invasive plant species: Are non-indigenous species that adversely affect the habitats they invade economically, environmentally or ecologically. In connection with BREEAM-NOR, this includes all species on the Species Data Bank Black and Norwegian species outside their natural range which exhibits the same negative powers (comments such as maple and Norwegian spruce on the west coast). More information about the control and removal, and how this fits with the legislative framework related to such species, may be obtained from www.artsdatabanken.no and www.biodiversity.no,

Pollution Linkages: A relevant pollutant linkage is one that has been identified during the risk assessment stage as representing unacceptable risks to human health or the environment.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	LE 3 - Ecological Value of Site and Protection of Ecological Features					
					-	-	-	-	-

Aim

To encourage development on land that already has limited value to wildlife and to protect existing ecological features from substantial damage during site preparation and completion of construction works.

Assessment Criteria

The following demonstrates compliance:

- Land within the *construction zone* is defined as 'land of low ecological value' using either:
 - BREEAM checklist A4 **OR**
 - A *suitably qualified ecologist* who has identified the land as being of 'low ecological value' within an ecological assessment report, based on a site survey.
- All existing features of ecological value surrounding the construction zone and site boundary area are adequately protected from damage during clearance, site preparation and construction activities as listed below:
 - Trees of over 100 mm trunk diameter, and/or of significant ecological value, are protected by barriers. Barriers must prohibit construction works in the area between itself and the tree trunk. Minimum distance between tree trunk and barriers must be either the distance of branch spread or half tree height, whichever is the greater.
 - In all cases trees must be protected from direct impact and from severance or asphyxiation of the roots.
 - Hedges and natural areas requiring protection must either have barriers erected and be protected, or, when remote from site works or storage areas, be protected with a prohibition of construction activity in their vicinity.
 - Watercourses and wetland areas are to be protected by cut-off ditches and site drainage to prevent run-off to natural watercourses (as this may cause pollution, silting or erosion).
- In all cases, the contractor is required to construct ecological protection prior to any preliminary site construction or preparation works (e.g. clearing of the site or erection of temporary site facilities).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	A refurbishment of a building (with no new construction), must protect any existing ecological features of value. Protection includes clear exclusion procedures for construction traffic/personnel and material storage, as well as physical barriers.
Extensions to existing buildings	Where a refurbishment includes new building work or infrastructure, the land on which the new build area and its associated infrastructure (e.g. roads, pavements, car parks etc) will be situated, must comply with the criteria.

Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	Issue not applicable for Fit out-only assessments.
No features of ecological value	Where the construction zone is defined as 'land of low ecological value' and where the surrounding site contains no features of ecological value, this credit can be awarded.
Use of a suitably qualified ecologist	<p>Where a suitably qualified ecologist is employed and has, using their professional judgement, defined the site as land of low ecological value, this assessment/judgement overrides any assessment determined using checklist A4.</p> <p>The suitably qualified ecologist must base their findings on data collected from a site visit conducted at appropriate time(s) of the year, when different plant and animal species are evident. The content of the Ecology Report is to be representative of the existing site's ecology prior to the commencement of initial site preparation works (i.e. before RIBA stage K, construction to practical completion). Where the ecologist has made no on-site visit, the credit cannot be awarded. See additional guidance for definition of a suitably qualified ecologist.</p>
Features of little or no ecological value	If a suitably qualified ecologist has confirmed that a feature has little or no ecological value, or where a tree is deemed to create a significant danger to the public or occupants by a statutory body or qualified arboriculturalist, then that feature may be exempt from the protection of ecological features requirement of this issue.
Removal of features of ecological value	If features of ecological value have been removed as part of site clearance then the development cannot achieve this credit, even if they are to be replaced as part of a new landscaping strategy.
Site clearance prior to purchase of the site	For sites that have been cleared more than five years ago, the ecological value of the site would be its present ecological value, on the basis that in the intervening five years, ecological features would have started to re-establish themselves and therefore act as an indicator of the site's ecological value. For sites that have been cleared less than five years before assessment, a suitably qualified ecologist should make an estimation of the site's ecological value immediately prior to clearance on the basis of available desktop information (including aerial photography) and the landscape type/area surrounding the site. Where it is not possible for the ecologists to determine that the site was of low ecological value prior to the site clearance then the credit must be withheld.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	<p>A completed copy of checklist A4 signed and dated by the client, their representative or a design team member e.g. architect.</p> <p>AND</p> <p>One of the following:</p> <p>A plan and/or site photographs of the existing site highlighting any ecological features OR</p> <p>A copy of the ecologist's report containing:</p> <ul style="list-style-type: none"> • Confirmation that the land within the construction zone is of low ecological value. • A description of any ecological features within the site or on the site boundary. • Date(s) of site survey(s). <hr/> <p>A completed, signed copy of sections A and B of checklist A6 'Guidance for relating ecology reports to BREEAM' to confirm the ecologist's professional status</p> <p>OR</p> <p>A copy of the ecologist's report containing the information in sections A and B from the above.</p>	The evidence required at the post construction stage is the same as for a design stage assessment.
2&3	<p>A copy of the relevant section of the contract specification confirming:</p> <ul style="list-style-type: none"> • Requirement to protect all identified features of ecological value. • Scope of protection measures required. • Protection measures implemented prior to commencement of site activities. 	<p>Assessor site inspection report OR ecologist's report confirming:</p> <ul style="list-style-type: none"> • The boundary of the site and the construction zone has not been altered. • Where applicable, all existing ecological features still remain.

Additional Information

Relevant definitions

Construction zone: For the purpose of this BREEAM issue the construction zone is defined as any land on the site which is being developed (and therefore disturbed) for buildings, hard standing, landscaping, site access, plus a 3m boundary in either direction around these areas. It also includes any areas used for temporary site storage and buildings.

If it is not known exactly where buildings, hard standing, site access and temporary storage will be located it must be assumed that the construction zone is the entire site.

Suitably qualified ecologist (SQE): An individual achieving all the following items can be considered to be "suitably qualified" for the purposes of a BREEAM assessment:

1. Holds a degree or equivalent qualification in ecology or a related qualification. Other related qualifications will have a significant ecology component but may come from a wide range of areas including but not limited to:
 - Biologists, botanists, entomologists etc
 - Arboriculturalists
 - Nature conservationists
 - Landscape engineers/architects
 - Environmental engineers/scientists
2. Is a practising ecologist, with a minimum of three years relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting ecology in relation to construction and the built environment; including, acting in an advisory capacity to provide recommendations for ecological protection, enhancement and mitigation measures. The relevant experience must relate to the country that the assessment is being carried out in.

Where a suitably qualified ecologist is verifying an Ecology Report produced by another ecologist who does not meet the SQE criteria, they must, as a minimum, have read and reviewed the report and confirm in writing that they have found it to:

- a. represent sound industry practice
- b. report and recommend correctly, truthfully and objectively
- c. be appropriate given the local site conditions and scope of works proposed
- d. avoid invalid, biased and exaggerated statements.

Additionally, written confirmation from the third party verifier that they comply with the definition of a *Suitably Qualified Ecologist* is required.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
5	5	5	5	LE 4 - Mitigating Ecological Impact	-	-	-	-	-

Aim

To minimise the impact of a building development on existing site ecology.

Assessment Criteria

The following demonstrates compliance:

First credit

1. A suitably qualified ecologist (SQE) has been appointed to report on enhancing and protecting the ecology of the site.
 - f. The SQE provides an Ecology Report with appropriate recommendations for protection and enhancement of the site's ecology.
 - g. The report is based on a site visit/survey by the SQE prior to the commencement of initial site preparation works.
2. The general recommendations of the Ecology Report for enhancement and protection of site ecology have been, or will be, implemented.

Second/third/fourth/fifth credit

3. The first credit is achieved.
4. The recommendations of the Ecology Report for enhancement and protection of site ecology have been implemented, and the suitably qualified ecologist confirms that this will result in a change in ecological value of the site (x) according to Table 11.1 below:

Table 11.1 Credits awarded depending on the change in ecological value of site

Number of credits Awarded	Change in Ecological value of site (x)
2	$-9 \leq x < 0$
3	$0 \leq x < 3$
4	$3 \leq x < 6$
5	$x \geq 6$

5. The increase in plant species has been calculated using Ecology calculator 2, using actual species numbers.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings. Refer also to the note below on infill developments.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	Issue not applicable for Fit out-only assessments.
Timing of Ecologist Report	It is recommended that the suitably qualified ecologist is appointed to carry out site surveys of existing site ecology, on which their report is based, or to provide verification where the report is prepared by others, at the feasibility stage in order to facilitate and maximise potential ecological enhancement.
General recommendations	<p>'General' recommendations for enhancing and protecting the ecological value of the site are to include, and go beyond, compliance requirements for all current EU and national legislation relating to protected species and habitats.</p> <p>These 'general' recommendations may include ecological recommendations as detailed in the definitions.</p>
Guidance for ecologists and assessors	Please refer to Checklist A6 – Relating ecology reports to BREEAM, section D for assistance in assessing and interpreting the requirements of this issue.
Native species	Only native floral/plant species and those with a known attraction or benefit to local fauna can be considered for the purpose of increasing the number of species on site, as well as general enhancement.
Number of plant species	BREEAM measures ecological value using the number of plant species.
Assessment of a single development on a larger site	Where the assessment is of a single building that forms part of a larger site development and the landscaping and ecological features form a common part of the whole site, for the purposes of assessing this issue the area of the entire site must be considered.
Site clearance prior to purchase of the site	Refer to the compliance note in LE3 on this issue.
Infill developments on existing occupied site	Where a development is an infill (or new building) on an existing occupied site, then the <i>construction zone</i> for the new building would be the area of site assessed for the purposes of this issue.
No ecological survey completed or construction works have commenced	Where it is not possible to determine 'actual' number of species per vegetation plot type, either because an on-site ecological survey has not been conducted, or, because construction works have already commenced, the first credit only can be achieved.
Green Roofs	The contribution of species from a Green roof can only be incorporated where a suitably qualified ecologist has been appointed.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First Credit		
1	<p>A copy of the ecologist's report containing:</p> <ul style="list-style-type: none"> • Details and scope of the site survey. • Information as outlined in checklist A6 – Relating ecology reports to BREEAM. <p>OR</p> <p>A copy of the ecologist's report containing a completed, signed copy of checklist A6.</p>	<p>The evidence required at the post construction stage is the same as for a design stage assessment.</p>
2	<p>Proposed site plan highlighting implementation of the ecologist enhancement recommendations.</p> <p>AND</p> <p>One of the following:</p> <p>A copy of the relevant section of the specification requiring the main contractor to implement the SQE's recommendations for protection and enhancement</p> <p>OR</p> <p>A letter from the client or design team member confirming:</p> <ul style="list-style-type: none"> • That the specification will require the main contractor to implement the ecologist's recommendations. 	<p>Assessor site inspection report and photographic evidence confirming that the ecologist's recommendations have been implemented.</p> <p>For large mixed-use/multi-building developments, where the whole site has not been completed and ecological enhancements have not been added, or where features are being added at a later date in an appropriate planting season:</p> <ul style="list-style-type: none"> • A copy of the contract/specification or a letter from the main contractor confirming when the planting will be complete. <p>This must be within 18 months from completion of the development.</p>
Second/Third/Fourth and Fifth Credits		
3-5	<p>Evidence as outlined above, confirming compliance with the first credit.</p> <p>A copy of the SQE's report containing the information outlined in checklist A6 – Relating ecology reports to BREEAM.</p> <p>OR</p> <p>A copy of the SQE's report containing a completed, signed copy of checklist A6.</p> <p>AND</p> <p>A completed copy of Ecology Calculator 2 confirming the change in ecological value of the site.</p>	<p>Evidence (as outlined above) confirming compliance with the first credit.</p>

Additional Information

Relevant Definitions

Construction zone: As defined for issue LE3 – Ecological Value of site AND Protection of ecological features

Suitably qualified ecologist (SQE): As defined for issue LE3 – Ecological Value of site AND Protection of ecological features

Ecological recommendations are defined as measures adopted to enhance the ecology of the site, which may include:

- The planting of native species or those with a known attraction or benefit to local wildlife
- The adoption of horticultural good practice (e.g. no, or low, use of residual pesticides)
- The installation of bird, bat and/or insect boxes at appropriate locations on the site
- Development of a full Biodiversity Management Plan including avoiding clearance/works at key times of the year (e.g. breeding seasons)
- The proper integration, design and maintenance of SUDs and Green Roofs, community orchards etc.

Only native floral species or those with a known attraction or benefit to local wildlife can be considered for the purpose of enhancing the ecological value of the site.

Calculating the change and increase in ecological value

BREEAM calculates the change in ecological value by comparing the diversity (number and area) of plant species on the site pre and post construction. The ecological value of the site is expressed as an area-weighted average of plant species for the site's landscape type. This enables BREEAM to use this as an indicator of the proposed development's impact on the site's existing ecological value.

A simple example of the calculation is outlined below.

1. Calculate the ecological value of a previously developed existing site:

A 2065m² existing site consists of the following types of land:

- a. 1865 m² hard landscaping = 0 species
- b. 200m² urban mosaic - infertile grassland = 17.6 species

The ecological value of the existing site is calculated as follows, for each plot type;

- Number of species on plot type x plot type area as % of total area.

Therefore, for our example site:

- a. Hard landscaping: $\{(0 \text{ species} \times (1865\text{m}^2/2065\text{m}^2))\} = 0 \text{ species}$
- b. urban mosaic-infertile grassland: $\{(17.6 \text{ species} \times (200\text{m}^2/2065\text{m}^2))\} = 1.70 \text{ species}$
- c. Ecological value of the existing site = 0 + 1.70 = 1.70 species

2. Calculate the ecological value of the proposed site:

The 2065m² post-construction site consists of the following types of land:

- a. 1375m² of building = 0 species.
- b. 550m² of hard landscaping = 0 species
- c. 140 m² has remained as urban mosaic-infertile grassland = 17.6 species

The ecological value of the proposed site is as follows:

- a. Building: $\{(0 \text{ species} \times (1375\text{m}^2/2065\text{m}^2))\} = 0 \text{ species}$

- b. Hard landscaping: $\{(0 \text{ species} \times (550\text{m}^2/2065\text{m}^2))\} = 0 \text{ species}$
- c. Urban mosaic-infertile grassland: $\{(17.6 \text{ species} \times (140\text{m}^2/2065\text{m}^2))\} = 1.19 \text{ species}$
- d. Ecological value of the proposed site = $0 + 0 + 1.19 = 1.19 \text{ species}$

The ecological impact is the difference between the two ecological values:

$$\text{Change in ecological value: } 1.19 - 1.70 = -0.51 \text{ species}$$

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	2	2	2	LE 6 - Long Term Impact on Biodiversity	P	G	VG	E	O
					-	-	-	-	-

Aim

To minimise the long term impact of the development on the site's, and surrounding area's, biodiversity.

Assessment Criteria

The following demonstrates compliance:

One credit can be awarded where there is a commitment to achieve the mandatory criteria and at least two of the additional criteria (listed below).

Two credits can be awarded where there is a commitment to achieve the mandatory criteria and at least four of the additional criteria (listed below).

Mandatory Criteria

1. A *suitably qualified ecologist* (SQE) has been appointed prior to commencement of activities on site.
2. The *suitably qualified ecologist* confirms that all relevant EU and national legislation relating to protection and enhancement of ecology has been complied with during the design and construction process.
3. A landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion. This is to be handed over to the building occupants and includes:
 - Management of any protected features on site
 - Management of any new, existing or enhanced habitats
 - A reference to the current or future site level or local Biodiversity Action Plan.

Additional Criteria

1. The contractor nominates a 'Biodiversity Champion' with the authority to influence site activities and ensure that detrimental impacts on site biodiversity are minimised in line with the recommendations of a suitably qualified ecologist.
2. The contractor trains the site workforce on how to protect site ecology during the project. Specific training should be carried out for the entire site workforce to ensure they are aware of how to avoid damaging site ecology. Training should be based on the findings and recommendations for protection of ecological features highlighted within a report prepared by a suitably qualified ecologist.
3. The contractor records actions taken to protect biodiversity and monitor their effectiveness throughout key stages of construction. The requirement commits the contractor to make such records available where publicly requested.

4. Where a new ecologically valuable habitat, appropriate to the local area, is created. This includes habitat that supports nationally, regionally or locally important biodiversity, and/or which is nationally, regionally or locally important itself; including any habitat listed in the Local Biodiversity Action Plan (LBAP), those protected within statutory sites, or those within non-statutory sites identified in local plans.
5. Where flora and/or fauna habitats exist on site, the contractor programmes site works to minimise disturbance to wildlife. For example, site preparation, ground works, and landscaping have been, or will be, scheduled at an appropriate time of year to minimise disturbance to wildlife. Timing of works may have a significant impact on, for example, breeding birds, flowering plants, seed germination, amphibians etc. Actions such as phased clearance of vegetation may help to mitigate ecological impacts. This additional requirement will be achieved where a clear plan has been produced detailing how activities will be timed to avoid any impact on site biodiversity in line with the recommendations of a suitably qualified ecologist.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to the assessment of refurbished buildings (unless the building is listed – see below).
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	Issue not applicable for Fit out-only assessments.
Refurbishment of listed buildings	The refurbishment of a listed building may be exempt from the assessment criteria if they conflict with the need to maintain the building's listed features, or are counter to the conservation criteria. Confirmation is required from a suitably qualified ecologist that all possible criteria/enhancements have been achieved before the credit can be awarded (i.e. if no suitably qualified ecologist has been appointed then this credit cannot be awarded).
Biodiversity Champion	A Biodiversity Champion does not have to be an ecologist or ecological expert but must have sufficient authority and time on site to influence activities and ensure that they have minimal detrimental impact on biodiversity.
Local biodiversity expertise	Local biodiversity expertise should be sought at, or before, the design stage to help identify species of local biodiversity importance on site. It is likely that their recommendations will draw on the Local Biodiversity Action Plan (LBAP) where one exists.
The site and surrounding areas	<p>The steps taken in the above criteria will depend on the nature of the site, e.g. urban sites, and the surrounding areas. It is likely that either all, or none, of the optional items will apply. Where the optional items and the mandatory item 3, the management plan, are deemed, in writing, by the appointed suitably qualified ecologist not to be applicable, all credits can be awarded. Mandatory items 1 and 2 must be met in all instances.</p> <p>This is likely to be the case in the majority of assessments in central town/city areas which have a high proportion of surrounding and existing development and no existing external landscaped areas within the boundary of the assessed site.</p>

Sites of no ecological value	Where a site is deemed to have no ecological value, it is still necessary to employ a suitably qualified ecologist to achieve this credit. The ecologist must confirm that all the mandatory items (1), (2) and (3) have been achieved and provide guidance on how to achieve optional item (4). Note that in such cases, mandatory item (1) and additional requirement (4) is likely to be applicable in relation to any ecological enhancements (e.g. green roofs, bird boxes, etc.) adopted in order to enhance the site ecology.																			
Not all additional items are applicable	<p>Where the SQE confirms that not all additional items are applicable to the development, for example it is a city centre refurbishment on a confined site with no external areas, then the credits can be awarded accordingly:</p> <table border="1"> <thead> <tr> <th>No. applicable items</th> <th>No. of BREEAM credits</th> <th>Criteria</th> </tr> </thead> <tbody> <tr> <td>1 item</td> <td>Two credits</td> <td>Meet mandatory reqs. plus applicable item</td> </tr> <tr> <td>2 items</td> <td>Two credits</td> <td>Meet mandatory reqs. plus all applicable items</td> </tr> <tr> <td rowspan="2">3 items</td> <td>One credit</td> <td>Meet mandatory reqs. plus 2 applicable items</td> </tr> <tr> <td>Two credits</td> <td>Meet mandatory reqs. plus all applicable items</td> </tr> <tr> <td rowspan="2">4 items</td> <td>One credit</td> <td>Meet mandatory reqs. plus 3 applicable items</td> </tr> <tr> <td>Two credits</td> <td>Meet mandatory reqs. plus all applicable items</td> </tr> </tbody> </table>	No. applicable items	No. of BREEAM credits	Criteria	1 item	Two credits	Meet mandatory reqs. plus applicable item	2 items	Two credits	Meet mandatory reqs. plus all applicable items	3 items	One credit	Meet mandatory reqs. plus 2 applicable items	Two credits	Meet mandatory reqs. plus all applicable items	4 items	One credit	Meet mandatory reqs. plus 3 applicable items	Two credits	Meet mandatory reqs. plus all applicable items
No. applicable items	No. of BREEAM credits	Criteria																		
1 item	Two credits	Meet mandatory reqs. plus applicable item																		
2 items	Two credits	Meet mandatory reqs. plus all applicable items																		
3 items	One credit	Meet mandatory reqs. plus 2 applicable items																		
	Two credits	Meet mandatory reqs. plus all applicable items																		
4 items	One credit	Meet mandatory reqs. plus 3 applicable items																		
	Two credits	Meet mandatory reqs. plus all applicable items																		

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
Mandatory Criteria		
1&2	<p>The SQE report or letter confirming:</p> <ul style="list-style-type: none"> That they were appointed prior to commencement of activities on site. All relevant EU and national legislation will be complied with. <p>AND</p> <p>A completed, signed copy of checklist A6 – Relating ecology reports to BREEAM</p> <p>OR</p> <p>A copy of ecology report containing the information outlined in checklist A6.</p>	<p>A letter from the SQE confirming:</p> <ul style="list-style-type: none"> That all relevant EU and national legislation relating to protection and enhancement of ecology has been complied with.

3	<p>A copy of the site management plan.</p> <p>OR</p> <p>A copy of the specification requiring the development of plan and outlining the scope of its content.</p> <p>OR</p> <p>Where the timing of assessment does not permit either of the above, a letter from the client confirming:</p> <ul style="list-style-type: none"> • A commitment to produce a management plan • The scope of the management plan 	<p>A copy of the site's landscape and habitat management plan.</p>
Additional Criteria		
1	<p>A letter from the contractor confirming:</p> <ul style="list-style-type: none"> • The appointment of the biodiversity champion and their job title. • Their on site role and responsibilities. <p>OR</p> <p>Where not yet appointed, a copy of the specification clause requiring the appointment of a biodiversity champion.</p>	<p>A copy of the relevant sections of the site log book, highlighting:</p> <ul style="list-style-type: none"> • Details of any action/events taken by the biodiversity champion. <p>If no actions required/taken, this should be confirmed in the log book.</p>
2	<p>Training schedule or letter of confirmation from the contractor committing to provide relevant training.</p> <p>OR</p> <p>Where not yet appointed, a copy of the specification clause requiring the training of the site's workforce.</p>	<p>A record of training undertaken by the site workforce confirming:</p> <ul style="list-style-type: none"> • Who delivered & developed the training • The scope of the training delivered.
3	<p>A letter from the contractor confirming:</p> <ul style="list-style-type: none"> • Monitoring and reporting criteria for the development. • The records will be publicly available if and when requested. <p>OR</p> <p>Where not yet appointed, a copy of the specification clause outlining the contractor's monitoring and reporting criteria.</p>	<p>A copy of the relevant sections of the site log book, highlighting:</p> <ul style="list-style-type: none"> • Records of monitoring and actions taken to protect biodiversity. • Records and outcome of any requests to view such information.
4	<p>A copy of the proposed site plan highlighting the new ecologically valuable habitat.</p> <p>A SQE's report or letter confirming that the habitat supports the relevant biodiversity action plan(s)</p>	<p>Assessor's (or SQE's) site inspection report and photographic evidence confirming the existence of the proposed habitat.</p>

5	<p>The SQE's report or letter confirming:</p> <ul style="list-style-type: none"> • Wildlife on site that needs to be accounted for in programming works. • Actions required with respect to programming site works to minimise disturbance. <p>A copy of the contractor's main programme of works.</p> <p>OR</p> <p>A copy of the relevant section of the main contract confirming:</p> <ul style="list-style-type: none"> • The programme of site works will minimise disturbance to wildlife in accordance with SQE's recommendations. 	<p>A letter from the SQE, or a copy of their report confirming:</p> <ul style="list-style-type: none"> • Site works executed in a manner that minimised disturbance to wildlife in accordance with their recommendations.
---	--	--

Additional Information

Relevant definitions

Biodiversity Champion

A biodiversity Champion is a designated person who holds the responsibility to provide leadership and inspiration and empower those with resources to halt the loss of biodiversity and maximise its gain in relation to the assessed building's locality. The champion should use their position to ensure that biodiversity matters are not overlooked and are addressed appropriately. As part of their role the Champion should ensure that biodiversity is on meeting agendas and that there is proper discussion of issues where a decision is likely to have an impact on biodiversity.

Suitably qualified ecologist (SQE): As defined for Issue LE3 – Ecological Value of site AND Protection of ecological features

Biodiversity: Is defined as the variety of life on earth. It includes all species, animal, plants, fungi, algae, bacteria and the habitats that they depend upon.

Biodiversity Action Plan: A plan which sets specific, measurable, achievable, realistic and time bound conservation targets for species and habitats.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
-	-	-	1	LE 7 - Consultation with Students and Staff	-	-	-	-	-

Aim

To encourage the design team to include pupils and staff in the design of the school grounds.

Assessment Criteria

The following demonstrates compliance:

Pre-Schools, Schools and Sixth Form Colleges only

1. The design team have identified staff and pupil criteria for the school grounds, and consulted and gathered their ideas for the school ground's design.
2. The consultation included holding a number of workshops for separate groups of pupils and staff (or other comparable method) in order to determine:
 - a. How the grounds could best be designed to facilitate learning
 - b. How the grounds could best be designed to provide a range of social spaces appropriate to pupils' and other users' needs.
3. At least four workshops were held: two workshops with staff (including both teaching staff and ground maintenance supervisors), and two with pupils from different age groups. The findings of the workshops must influence the design and therefore must have been held before key and final design decisions were made.
4. The design team have kept pupils and staff informed of how their ideas are being taken into account in the design of the school grounds.

Compliance Notes	
New Build	For new schools where there are no identifiable staff or pupils, consultation with relevant people/groups from the local catchment area and similar schools in the area must be carried out in place of the above.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Fit Out Only	Issue not applicable for Fit out-only assessments.
Further & Higher Education Colleges	This BREEAM issue is not assessed for these building types.

Pre-Schools	Only the staff and not pupils/children need to be consulted and informed for pre-school developments.
--------------------	---

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-4.	<p>A copy of the design team's consultation schedule with pupils and staff confirming:</p> <ul style="list-style-type: none"> • The workshop schedules & framework. • Number and dates of workshops held/proposed. • A list of actual/proposed attendees for each workshop. • Format and reporting method for keeping pupils and staff informed. <p>Where, at the stage of interim assessment, the workshops have been held:</p> <ul style="list-style-type: none"> • Minutes and actions from the workshop(s). • Proposed site plan highlighting any design solutions based on consultation. 	<p>A copy of the minutes and actions from consultation workshops.</p> <p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> • Any facilities designed and constructed within the school grounds, based on the results from the consultation process. <p>Records such as circulars, newsletters, presentations confirming:</p> <ul style="list-style-type: none"> • That the staff and pupils were kept informed of how their ideas were taken into account in the design.

Additional Information

Relevant definitions

None.

Small Working Groups

It is often appropriate for the design team to suggest that the school set up a small working group, which includes both staff and pupils. Members of the group would not only take part in consultation, but would play a key role in the ongoing use, management and development of the school grounds, encouraging feelings of ownership.

Design Options

Design options may include allocating areas for pupils to design and plant themselves, perhaps taking a long-term view so that pupils might gain from planning new initiatives and from the anticipation of potential changes in successive years

12.0 Pollution

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Pol 1 - Refrigerant GWP – Building Services	-	-	-	-	-

Aim

To reduce the contribution to climate change from refrigerants with a high global warming potential.

Assessment Criteria

The following demonstrates compliance:

1. The building has no refrigerants **OR**
2. The refrigerants used within the building services have an ODP of zero and a GWP less than 5.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	If the extended and existing building share the same building services, then these services must be assessed against the criteria regardless of whether the existing building forms a part of the assessment or not. If the extension is served by independent services, only these need be assessed against the Assessment Criteria.

Shell Only	<p>If the building is designed to be fully naturally ventilated, and therefore no refrigerant using building services will be specified for the fit out, then this credit can be awarded. If the building is not designed to be naturally ventilated and the refrigerant type cannot be confirmed, because its specification is the responsibility of a future tenant as part of their fit out works, then compliance with this BREEAM issue can only be demonstrated via one of the following means in shell only buildings/areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM (Shell and Core / Speculative Assessments)</i> for further description of the above options.</p>
Fit Out Only	<p>The criteria apply to both new systems specified as part of a fit out and the refrigerants used in any existing systems that will remain post fit out.</p> <p>Any existing systems that use refrigerants with an ozone depleting potential or a global warming potential of more than 5 must have been converted to use a refrigerant with a zero ODP and GWP less than 5. Where this is not possible such systems will need to be replaced to meet the assessment criteria.</p>
Industrial units without offices & with untreated operational areas	<p>This issue will be filtered from the scope of assessment for industrial units designed without offices and where the operational area will be untreated, i.e. not designed to be air conditioned.</p>
Solid refrigerant	<p>The credit can be awarded by default where a solid refrigerant is used.</p>
Refrigerant charge less than 5kg	<p>The credit can be awarded where the total refrigerant charge used in the building services is less than 5kg (e.g. heat pumps etc).</p>
Multiple split units	<p>In the case of multiple split units, through-the-wall or other packaged units, the credit can be awarded where the total collective refrigerant charge is less than 5kg. If the total collective refrigerant charge in such systems is greater than 5kg, then the refrigerant(s) must comply with the BREEAM criteria.</p>
Office server and comms rooms	<p>Refrigerants used in services for typical office server and comms rooms cannot be excluded from the assessment.</p> <p>Where air conditioning equipment is provided, the equipment may not be able to achieve this credit as smaller systems often require refrigerants with a GWP > 5. In this instance the credit cannot be awarded by default as there are alternatives for designers to consider. These alternatives include revisiting the design and the room conditions specification to see if the cooling equipment is necessary. In addition, whilst a manufacturer or supplier may specify a narrow temperature band for server equipment, acceptable limits detailed in ASHRAE guidance may allow a greater temperature range without adverse effect and thus the cooling equipment may not be necessary.</p>
GWP data not available	<p>Where GWP data for the specified refrigerant is not available, the credit cannot be awarded on a default basis.</p>

Cold stores	Refrigerants specified in plant used for integral cold storage purposes should not be assessed under this issue. There is a separate BREEAM issue for such systems.
--------------------	---

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	<p>A copy of the specification clause confirming either:</p> <ul style="list-style-type: none"> Absence of refrigerant in the development OR Type(s) of refrigerant to be used. <p>AND</p> <p>Manufacturer's information confirming:</p> <ul style="list-style-type: none"> ODP and GWP of each refrigerant. 	<p>Assessor's building/site inspection and as built drawings confirming:</p> <ul style="list-style-type: none"> Presence or absence of any refrigeration plant. <p>OR</p> <p>A letter from the design team/developer confirming:</p> <ul style="list-style-type: none"> The refrigerant type specified remained unchanged. <p>OR</p> <p>Where a change has occurred, written confirmation from the design team confirming:</p> <ul style="list-style-type: none"> Type of refrigerant(s) used. <p>AND</p> <p>Manufacturer's information confirming:</p> <ul style="list-style-type: none"> ODP and GWP of each refrigerant.

Additional Information

Global Warming Potential: GWP is defined as the potential for global warming that a chemical has relative to 1 unit of carbon dioxide, the primary greenhouse gas. In determining the GWP of the blowing agent, the Intergovernmental Panel on Climate Change (IPCC) methodology using a 100-year Integrated Time Horizon (or ITH) should be applied.

Ozone Depleting Potential: ODP is the ratio of the relative amount of degradation to the ozone layer caused by a particular substance relative to the calculated depletion for the reference gas CFC 11 (ODP = 1.0). The ODP of the refrigerants is not assessed under this issue and there is no link between GWP and ODP.

Refrigerant: there are three main make-ups of refrigerants:

- Hydrogenated Fluorocarbon Refrigerants (HFCs) are made up of hydrogen, fluorine, and carbon. Because they do not use a chlorine atom (which is used in most refrigerants) they are known to be one of the least damaging to our ozone.
- Hydrogenated Chlorofluorocarbon Refrigerants (HCFCs) are made up of hydrogen, chlorine, fluorine, and carbon. These refrigerants contain minimal amounts of chlorine; they are not as detrimental to the environment as some other refrigerants.
- Chlorofluorocarbon Refrigerants (CFCs) contain chlorine, fluorine and carbon. These refrigerants carry high amounts of chlorine so they are known for being the most hazardous to the ozone layer.

Table of refrigerants and their Global Warming Potentials: the table below includes available substances which are capable of acting as refrigerants. Many are not currently used as such and some have been phased out and withdrawn from the market.

Table 12.1 Refrigerant GWP

Refrigerant type	GWP	Refrigerant type	GWP
R11 (CFC-11) *	4000	R32 (HCFC-32) *	580
R12 (CFC-12) *	8500	R407C (HFC-407)	1600
R113 (CFC-113) *	5000	R152a (HFC-152a)	140
R114 (CFC-114) *	9300	R404A (HFC blend)	3800
R115 (CFC-115)*	9300	R410A (HFC blend)	1900
R125 (HFC-125)	3200	R413A (HFC blend)	1770
Halon-1211	N/A	R417A (HFC blend)	1950
Halon-1301	5600	R500 (CFC/HFC) *	6300
Halon-2402	N/A	R502 (HCFC/CFC) *	5600
Ammonia	0	R507 (HFC azeotrope)	3800
R22 (HCFC-22) *	1700	R290 (HC290 propane)	3
R123 (HCFC-123) *	93	R600 (HC600 butane)	3
R134a(HFC-134a)	1300	R600a (HC600a isobutane)	3
R124 (HCFC-124) *	480	R290/R170(HC290/HC170)	3
R141b (HCFC-141b) *	630	R1270 (HC1270 propene)	3
R142b (HCFC-142b) *	2000	R143a (HFC-143a)	4400

N/A Indicates that there is insufficient data available to give a GWP value.

- Global warming potential (GWP) values are based on best available data at the time of writing and are based on a 100-year time horizon. Other published data may be based on different time horizons.
- All CFC/HCFC refrigerants (marked *) have an ODP > 0 and as such are illegal for new installations. Existing equipment may continue to use them at present. The use of CFCs and HCFCs as refrigerants has been addressed under the Montreal protocols. Phase out programmes have been agreed resulting in these substances no longer being used as refrigerants in all new build and most existing situations. The industry's favoured replacements are currently HFCs which are often potent global warming contributors.
- Hydrocarbons and ammonia-based refrigerants have low or zero GWP and are therefore preferred long-term options. These are now widely available and are valid alternatives to HFCs in all buildings, provided health and safety issues are fully addressed.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
2	2	1	1	Pol 2 - Preventing Refrigerant Leaks	P	G	VG	E	O
					-	-	-	-	-

Aim

To reduce the emissions of refrigerants to the atmosphere arising from leakages in cooling plant.

Assessment Criteria

The following demonstrates compliance:

1. The building has no refrigerants **OR**

Refrigerant leak detection

2. Systems using refrigerants are contained in a moderately air tight enclosure (or a mechanically ventilated plant room), and a refrigerant leak detection system is installed covering high-risk parts of the plant. **OR**
3. An automatic permanent refrigerant leak detection system is specified, which is NOT based on the principle of detecting or measuring the concentration of refrigerant in air.

Refrigerant recovery system

4. The automatic shutdown and pump down of refrigerant occurs on the detection of high concentrations of refrigerant in the plant room/enclosure. For the majority of cases only systems in mechanically ventilated/moderately air tight plant rooms (or enclosures) comply.
5. Automatic pump-down to either a separate storage tank or into the heat exchanger is acceptable but only where automatic isolation valves are fitted to contain the refrigerant once fully pumped down.
6. The alarm threshold that triggers automatic pump down is set to a maximum of 2000ppm (0.2%), but lower levels can be set. The credit cannot be awarded for manual systems.

Note: For retail and office buildings, compliance with the refrigerant leak detection requirements will allow the first credit to be awarded. Compliance with the refrigerant recovery system requirements will give the second credit. The first credit must be achieved in order to award the second credit.

Note: For industrial buildings, the credit can be awarded where both a refrigerant leak detection AND a refrigerant recovery system are specified in compliance with the above requirements.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.

Extensions to existing buildings	Where an existing building is being extended and it has existing building services plant and systems that will be common to both the new extension and existing building, the existing plant must be assessed against the criteria of this issue. If the extension is served by independent services, only these need be assessed against the Assessment Criteria.
Shell Only	<p>If the building is designed to be fully naturally ventilated, and therefore no refrigerant using building services will be specified for the fit out, then this credit can be awarded. If the building is not designed to be naturally ventilated and the refrigerant leak detection/recovery cannot be confirmed, because its specification is the responsibility of a future tenant as part of their fit out works, then compliance with this BREEAM issue can only be demonstrated via one of the following means in shell only buildings/areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out Only	The criteria apply to any existing cooling plant and new plant specified as part of the fit out.
Industrial units without offices and untreated operational areas	This issue will be filtered from the scope of assessment for industrial units designed without offices and an untreated operational area, i.e. not designed to be air conditioned.
Type of refrigerant	This issue is applied in instances where any type of refrigerant is present, i.e. even if the ozone depleting potential (ODP) of the refrigerant is zero and the global warming potential (GWP) is less than 5.
Solid refrigerant	The credit can be awarded by default where a solid refrigerant is used.
CO₂ as a refrigerant	<p>When CO₂ is used as a refrigerant, the refrigerant recovery system credit can be awarded by default. Ref:</p> <ul style="list-style-type: none"> • EN 378-1:2008 + A1: 2010 (Refrigerating systems and heat pumps - Safety and environmental requirements - Part 1: Basic requirements, definitions, classification and evaluation criteria) and NS-EN 378-2:2008 + A1: 2009 (Refrigerating systems and heat pumps - Safety and environmental requirements - Part 2: Design, construction, testing, marking and documentation). • Events can also be NS-EN 378-3:2008 (Refrigerating systems and heat pumps - Safety and environmental requirements - Part 3: Location and Privacy Statement)
Ammonia as a refrigerant	<p>Where ammonia is used as a refrigerant, the credit can be provided if the engineering team confirms that the system / installation requirements according to:</p> <ul style="list-style-type: none"> • EN 378-1:2008 + A1: 2010 (Refrigeration system and heat pumps - Safety and environmental requirements - Part 1: Basic requirements, definitions, classification and evaluation criteria) • NS-EN 378-2:2008 + A1: 2009 (Refrigerating systems and heat pumps - Safety and environmental requirements - Part 2: Design, construction, testing, marking and documentation)

Total refrigerant charge less than 5 kg	The credit can be awarded by default where the total refrigerant charge used in the building is less than 5kg.
Multiple split systems	For installations of small multiple hermetic systems only, where the refrigerant charge in each unit is less than 5kg but the total refrigerant charge in the building is greater than 5kg, the credit can be awarded by default. This is on the basis that the risk of a large refrigerant leak is minimised and individual leaks from each system will be small i.e. <5kg.
High-risk parts	High-risk parts of refrigeration plant typically include the pipe work and compressor. Evaporator or condenser coils can be omitted from the coverage of the system.
Manual refrigerant recovery system	The provision of any manual system, including manual storage cylinders on site, does not comply with the criteria of this issue.
Cold food storage	The criteria of this issue apply to cold food storage refrigeration equipment (where the charge is $\geq 5\text{kg}$), i.e. cold rooms and/or centralised equipment serving a group of cold storage cabinets. Cabinets and refrigerated bottle shelves with integral refrigeration plant on average have a charge of 0.3kg; therefore in most circumstances, individual or small-scale multiple installations will not fall within the scope of this issue. However, the assessor should ask the design team to confirm that the charge is $\leq 5\text{kg}$.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	A copy of the specification clause or design plan confirming: <ul style="list-style-type: none"> Absence of refrigerants in the development. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> Absence of refrigeration plant.
2&3	A copy of the specification clause or letter from the M&E engineer confirming: <ul style="list-style-type: none"> Type of leak detection system(s). Scope of the system(s) Where relevant, containment strategy for such equipment. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> Installation of leak detection system(s) Installation of automatic refrigerant recovery equipment Pre-set threshold level for automatic pump down.
4,5&6	A copy of the specification clause or letter from the M&E engineer confirming: <ul style="list-style-type: none"> Type, scope and operation of automatic refrigerant recovery equipment Details of the plant room enclosure where the refrigeration plant is installed Alarm threshold for triggering automatic pump down. 	

Additional Information

Relevant definitions

Moderately airtight enclosure: this can be defined as an enclosure that does not produce a draught or significant fresh air ingress that would dilute any leaked refrigerant gas (dilution may prevent detection).

Refrigerant Leak Detection: a permanently installed multi-point sensing system; this may be aspirated or have multiple sensor heads linked to a central alarm unit or BMS. Various sensor types are available

including infra-red, semi-conductor or electro-chemical. Please see below for further guidance on the coverage of refrigerant leak detection systems.

Refrigerant Recovery: The process of removing refrigerant from a system and storing it in an airtight container.

Leak detection systems/devices

- Handheld detectors (which include semi-conductor and corona discharge types) do not comply with BREEAM criteria.
- Corona discharge detectors are not suitable where flammable refrigerants are used, or in potentially explosive atmospheres.
- Indicator dyes: these consist of fluorescent or coloured dyes added to the refrigerant to show leakage sites. The use of the dye should be approved by the compressor manufacturer. Some compressor manufacturers do not approve the use of indicator dyes, in which case either an alternative type of equipment should be used, or an alternative type of leak detection specified.
- Halide torch detectors: this type of detection is only appropriate for chlorine-based substances such as CFCs and HCFCs, and should not be used in areas where naked flames are prohibited. Compounds which do not contain chlorine, e.g. HFCs, cannot be detected by this method. When awarding this credit in instances where these detectors are in use, the assessor should confirm that the refrigerant is chlorine based.
- Electronic leak detectors: these must be designed to detect a certain type of, or multiple types of, refrigerant, i.e. CFC, HFC, HCFC, etc.
- Standing hold test: systems based on monitoring pressure drops within the pipe work are not necessarily compliant with the BREEAM criteria. There are natural fluctuations to the pressure of the refrigerant due to changes in volume and temperature of the system, and to the ambient temperature of the surroundings. Low pressure and high pressure switches, which are standard equipment on refrigerant plant, are therefore not sufficient to award the credit. Other methods exist, such as pressurising the system with a high pressure, dry nitrogen gas for a period of time and then identify whether or not the pressure drops during this time. However, this requires systems to be shut down for a period of time (usually overnight or longer).
- Systems NOT based on the principle of detecting or measuring the concentration of refrigerant in air: Such systems (for example based on sensing the presence of refrigerant vapour in liquid-carrying pipes or based on detecting whether a system is low on charge) are now commercially available.

Refrigerant pump down

The specification of automatic refrigerant pump down can further limit potential losses and damage to the environment and have subsequent economic benefits to the building owner. Regulations on ozone depleting substances (Chapter 3 and 4) provides guidance on sales, use and disposal of CFCs and HCFCs media in Norway in the refrigerant and cooling oil.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	-	1	1	Pol 3 - Refrigerant GWP – Cold Storage	P	G	VG	E	O
					-	-	-	-	-

Aim

To reduce the contribution to climate change from refrigerants with a high global warming potential.

Assessment Criteria

The following demonstrates compliance:

1. All refrigerant types used in cold storage systems have a zero Ozone Depleting Potential (ODP) and a global warming potential (GWP) of less than 5.
2. The requirement applies to refrigerants used in systems integral to the building, including where specified:
 - a. Cold storage enclosures.
 - b. Cold store services including: Chilled water pipework, refrigerant pipework and ductwork etc
 - c. Fixed cold or chilled storage cabinets
 - d. Fixed cold drink coolers.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	It is assumed that systems integral to the building will not be installed as part of the shell and core works, as cold storage facilities are unlikely to be installed in a speculative development. Where this is not the case the credit cannot be awarded where the refrigerant GWP of the cold storage that has or will be installed is not confirmed.
Fit Out Only	<p>The criteria apply to new and replaced storage systems specified as part of a fit out and the refrigerants used in any existing systems that will remain post fit out.</p> <p>Any existing system that use refrigerants with an ozone depleting potential or a global warming potential of more than 5 must have been converted to use a refrigerant with a zero ODP and GWP less than 5. Where this is not possible, such systems will need to be replaced to meet the assessment criteria.</p>

Domestic-scale refrigeration equipment & small plug-in chillers	The scope of this BREEAM issue excludes domestic-scale refrigeration equipment and small 'plug-in' chillers and therefore plant not integral to the building.
GWP data not available	Where GWP data is not available, the credit cannot be awarded by default.
No cold food storage	For developments where the tenant or end use function is known and cold food storage is not required, then this issue does not need to be assessed.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	<p>A marked-up design plan highlighting the cold food storage areas/plant in the building.</p> <p>A copy of the specification clause confirming either:</p> <ul style="list-style-type: none"> Type(s) of refrigerant to be used. <p>AND</p> <p>Manufacturer's information confirming:</p> <ul style="list-style-type: none"> ODP and GWP of each refrigerant. 	<p>A letter from the design team/developer confirming:</p> <ul style="list-style-type: none"> The refrigerant type specified remained unchanged. <p>OR</p> <p>Where a change occurred, written confirmation from the design team confirming:</p> <ul style="list-style-type: none"> Type of refrigerant(s) used. <p>AND</p> <p>Manufacturer's information confirming:</p> <ul style="list-style-type: none"> ODP and GWP of each refrigerant.

Additional Information

Relevant definitions

Please refer to BREEAM issue Pol 1.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
3	3	2	3	Pol 4 - NO _x emissions from heating source	-	-	-	-	-

Aim

To encourage the supply of heat from a system that minimises NO_x emissions, and therefore reduces pollution of the local environment.

Assessment Criteria

The following demonstrates compliance:

1. Where manufacturer's details demonstrate that the plant installed to meet the building's space heating demand has dry NO_x emission levels at 0% excess O₂ as follows:

Offices, education and retail only

Table 12.2 Dry NO_x emissions level depending on nominal heat input – offices & retail

Credits	Nominal heat input < 70kW		Nominal heat input > 70kW	
	Dry NO _x level (mg/kWh)	Boiler class (EN 297:1994)	Dry NO _x level (mg/kWh)	Boiler class (EN 676:2003)
1	100	4	120	2
2	70	5	80	3
3	40	-	50	-

Industrial only

Table 12.3 Dry NO_x emissions level depending on nominal heat input - industrial

Credits	Nominal heat input < 70kW		Nominal heat input > 70kW	
	Dry NO _x level (mg/kWh)	Boiler class (EN 297:1994)	Dry NO _x level (mg/kWh)	Boiler class (EN 676:2003)
1 (office and associated areas)	70	5	80	3
1 (operational area(s))	70	5	80	3

The emissions should be estimated under normal operating conditions (not standby).

Exemplary level criteria

The following outlines the exemplary level criteria to achieve an *innovation credit* for this BREEAM issue.

1. An exemplary credit can be awarded where manufacturer's details demonstrate that the plant installed to meet the building's space heating demand has zero dry NO_x emission levels at 0% excess O₂.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	If the heating demand for the refurbished building is being met by an existing system, then the NO _x emission level for the existing system must be assessed against the criteria of this issue.
Extensions to existing buildings	The rule above for refurbishment projects also applies to new build extensions to existing buildings.
Shell Only	<p>Where the specification and installation of heating systems within tenanted units/areas will be the responsibility of the future tenant, compliance with this BREEAM issue can only be demonstrated via one of the following means in shell only buildings/areas:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out Only	The criteria apply to any existing or new heating plant specified as part of the fit out. For fit outs of tenant units/floors where heating is provided and managed centrally by a third party, i.e. landlord; the central system must be assessed against the criteria for this issue. If the NO _x emission level for this system cannot be confirmed the credits must be withheld.
Building designed to be unheated	Where the building is designed to be ultimately unheated and no boilers are installed (as it might be the case in some Mediterranean locations), then the issue is not applicable and will be automatically filtered out by the spreadsheet.
Industrial buildings with no office space	Where the assessed building is designed without an office area or where the office area is designed to be unheated, the first credit does not apply. This issue will be automatically filtered from the assessment by the assessor's spreadsheet tool.
Industrial buildings with an unheated operational area	Where the operational area of the assessed building is designed to be unheated, the second credit does not apply. This issue will be automatically filtered from the assessment by the assessor's BREEAM spreadsheet tool.
Highly insulated building	Where the heating load for a highly insulated/exemplar environmental building is less than or equal to 7% of the heat load for a Building Regulations-compliant building of the same size and type, 1 credit can be awarded regardless of the primary fuel used. Figures used for calculations of the percentage of total heat demand must be based on the output from an <i>appropriate energy modelling software</i> .

NO_x data provided in different units	Where data is provided in different units, or at a level of excess oxygen greater than zero, the manufacturer/supplier should be asked to convert this to comply with the BREEAM criteria. Alternatively, the assessor may correct these using the correction factors provided in the Additional Information section.
Grid electricity	Where some of the building's space heating is fuelled by electricity from the National Grid, please refer to Checklist A9 to find the average NO _x emissions of grid electricity in the country of assessment.
Low NO_x grid electricity	Where the project assessed is located in a country where the NO _x emissions level of the national grid electricity is less than the levels required by BREEAM, then the credits can be awarded accordingly. In particular, where the NO _x emissions level is already less than 40mg/kWh, all three credits can be awarded by default. However, the additional innovation credit will not be available.

Electricity from a renewable source	Where electricity used by the heating system is sourced from a zero emission renewable source such as PVs, wind etc, there are no resulting emissions. This source of heating can therefore be counted as having zero NO _x emissions.
Heat pumps	Heat pumps powered by grid electricity indirectly produce emission rates higher than those required by BREEAM and may therefore be unable to achieve any credits under Pol 4. However, the energy saved by using certain types of heat pumps is recognised in BREEAM issue Ene 1 and the reduced emissions are recognised under BREEAM issue Ene 5. Refer to the additional guidance section for guidance on calculating NO _x emission levels for heat pumps.
District heating	District heating systems that incinerate waste or biomass usually have NO _x emission rates higher than the levels set to achieve any BREEAM credits. However, district heating systems combined with a cogeneration plant may have lower NO _x emissions. Evidence will need to be provided as per the schedule of evidence to demonstrate compliance with the BREEAM requirements. Where the local authority requires district heating to be used for the project, one point can be awarded by default where the project has achieved at least 8 points under Ene 1.
Heat recovery	Heat recovery can be considered as having zero NO _x emissions for the purpose of this issue.
Combined Heat & Power	Refer to the additional guidance section for guidance on calculating NO _x emission levels from CHP.
Biomass	Whilst Biomass systems are recognised as low carbon systems, they can produce a significant amount of NO _x and so may not achieve this credit; however they can score highly in the Energy section of BREEAM. Biomass systems are also recognised as reducing the impact of fossil fuel depletion by employing a renewable combustion fuel source.
More than one heating system	Refer to the additional guidance section for guidance on calculating NO _x emission levels where heat is provided by more than one system.

Green Tariff	Commitments to use a Green tariff to supply electricity to heat the building or power heat pumps are not recognised in this issue due to the uncertainty that this electricity will be zero emission.
Point of use heaters	Where specified, point of use heaters must be included in the assessment regardless of whether or not they are integral to the building structure.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	<p>A copy of the specification clause confirming:</p> <ul style="list-style-type: none"> Type of heating system(s) installed. <p>For each system specified, a letter, email or literature from the manufacturer(s) confirming:</p> <ul style="list-style-type: none"> Dry NO_x emissions rate in mg/kWh. <p>If more than one system is providing heat, design team calculations confirming:</p> <ul style="list-style-type: none"> The average NO_x emission rate. 	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> Heating system(s) installed. <p>OR</p> <p>A letter from the design team or main contractor confirming:</p> <ul style="list-style-type: none"> No changes to the specification.

Additional Information

Relevant definitions

Appropriate energy modelling software: Refer to BREEAM issue Ene 1 for a definition.

NO_x emissions: are pollutant gases produced by the combustion of fossil fuels. NO_x reacts with heat and sunlight to produce ozone that can cause serious respiratory problems. It also reacts with water to produce acid rain which has a detrimental effect on ecosystems.

Dry NO_x Levels: the NO_x emissions (mg/kWh) resulting from the combustion of a fuel at 0% excess oxygen levels.

Calculating NO_x emission levels from fossil energy fired boilers:

For fossil fuel boilers, the NO_x-emission rate for heat production can either be directly obtained from manufacturers data or calculated from measurements. It is only possible to measure NO_x-emissions in mg/m³ combustion air. Please find conversion rates below.

Calculating NO_x emission levels from Combined Heat & Power (CHP) systems

Where CHP systems are present or specified, only the heat-related emissions are considered for the assessment of this issue. For a combined heat and power production unit, it is not possible to clearly charge NO_x emissions to either heat or electricity, as both are produced at the same time with a certain NO_x emission. Therefore it is necessary to use a reference NO_x-emission for the produced electricity in the country of assessment, subtract it from the total NO_x -emission produced by the plant

and then allocate the remaining NO_x emissions to the heat output. The following formula should be used to determine this:

$$m_{\text{Heat}} = \frac{M - W_{\text{el}} \times m_{\text{el,ref.}}}{W_{\text{Heat}}}$$

Where:

- m_{Heat} = NO_x emissions per unit of heat generated in mg/kWh_{heat}
- M = total NO_x emissions generated by plant in mg
- W_{el} = total quantity of electricity produced in kWh_{el}
- $m_{\text{el,ref}}$ = country-specific electricity reference NO_x-emissions in mg/kWh_{el} – please refer to Checklist A9 to find the relevant information
- W_{Heat} = total quantity of electricity produced in kWh_{Heat}

The above methodology determines the net NO_x emissions from CHP-generated electricity compared with central generation of electricity and allocates this amount to the heat production. Where m_{Heat} is calculated to be negative, it should be assumed to be zero.

Calculation example:

The manufacturer states that the CHP systems emits 50 tonnes of NO_x emissions per year and produces 55,000 MWh of heat and 50,000 MWh of electricity. The project is located in Denmark. The specific heat-related NO_x emissions of the plant are as follows;

$M = 50$ tonnes

$W_{\text{el}} = 50,000$ MWh_{el}

$m_{\text{el,ref}} = 570$ mg/kWh (taken from Checklist A9)

$W_{\text{Heat}} = 55,000$ MWh_{Heat}

$m_{\text{Heat}} = (50 \times 10^9 \text{ mg} - 50 \times 10^6 \text{ kWh}_{\text{el}} \times 570 \text{ mg/kWh}_{\text{el}}) / (55 \times 10^6 \text{ kWh}_{\text{Heat}}) = 390.9 \text{ mg/kWh}$ (No credits are awarded).

If the same project was assessed in Czech Republic, the specific heat-related NO_x emissions of the plant would now be:

$W_{\text{el,ref}} = 1315$ mg/kWh (taken from Checklist A9)

$m_{\text{Heat}} = (50 \times 10^9 \text{ mg} - 50 \times 10^6 \text{ kWh}_{\text{el}} \times 1315 \text{ mg/kWh}_{\text{el}}) / (55 \times 10^6 \text{ kWh}_{\text{Heat}}) = -286.4 \text{ mg/kWh}$ (Three credits are awarded).

Calculating NO_x emission levels for heat pump systems

Heat pumps use electrical energy to produce heating energy. Therefore the reference emission of electricity should be multiplied by the used electricity and allocated to the heat output.

$$m_{\text{Heat}} = \frac{m_{\text{el,ref.}} \cdot W_{\text{el}}}{W_{\text{Heat}}}$$

Where:

- m_{Heat} = NO_x-emissions per unit of heat generated in mg/kWh_{heat}
- W_{el} = total quantity of electricity produced in kWh_{el}
- $m_{\text{el,ref}}$ = country-specific electricity reference NO_x-emissions in mg/kWh_{el} – please refer to Checklist A9 to find the relevant information
- W_{Heat} = total quantity of electricity produced in kWh_{Heat}

The equation can easily be transformed using the Energy Efficiency Ratio EER or the Coefficient of Performance COP that can usually be found in manufacturers' data:

$$EER = \frac{W_{Heat}}{W_{el.}}$$

$$m_{Heat} = m_{el.ref.} \cdot \frac{W_{el.}}{W_{Heat}} = \frac{m_{el.ref.}}{EER}$$

Calculation example:

A heat pump has an EER of 3.8. It is located in Spain with a reference emission of 1205 mg/kWh:

$$m_{Heat} = 1205/3.8 = 317 \text{ mg/kWh (no credits are awarded).}$$

The same heat pump located in Austria with a reference emission of 140:

$$m_{Heat} = 140/3.8 = 36.8 \text{ mg/kWh (3 credits can be awarded).}$$

Calculating the average NO_x emission level where heat is provided by more than one system

Where heat is provided by more than one system, an average NO_x emission rate should be used based on the ratio of power outputs from each source, i.e. multiply the emissions of each boiler by the percentage of heat demand it supplies and total these values. This is likely to be the case where a CHP system has been sized on the base power demand rather than the heat demand and therefore a secondary heating system is required. The following formula can be used:

$$\text{Average NO}_x \text{ Emission Rate} = (N_1 \times (H_1/H_T)) + (N_2 \times (H_2/H_T)) \dots\dots + (N_n \times (H_n/H_T))$$

Where:

N₁ = NO_x emissions rate for source 1

N₂ = NO_x emissions rate for source 2

N_n = NO_x emissions rate for source n

H_T = Total heat output from all sources

H₁ = Heat output from source 1

H₂ = Heat output from source 2

H_n = Heat output from source n

Where different boiler sizes have been specified, the assessment criteria levels should be averaged using the same formula. For instance, for one credit, N_n should be replaced by 100 mg/kWh for boilers with a nominal heat input < 70 kW, and 120 mg/kWh for boilers with a nominal heat input > 70 kW. The average NO_x emission rate criteria should then be compared to the actual average NO_x emission rate specified in the building to award the credits.

Conversion factors

Manufacturers should be asked to supply dry NO_x emissions data in mg/kWh. Where this is not possible the assessor may use the following conversion factors to convert figures in ppm, mg/MJ, mg/m³ or wet NO_x. It should be noted that these conversion factors assume worst case efficiencies and are likely to give conservative answers. This could have the effect of lowering the number of credits achieved.

- Figures in mg/m³ should be multiplied by 0.857 in order to gain emissions in mg/kWh. A conversion may also be necessary for data not calculated at 0% excess oxygen (see below).
- Figures in parts per million (ppm) should be multiplied by 1.76 in order to obtain mg/kWh. A conversion may also be necessary for data not calculated at 0% excess oxygen. (see below)
- Figures in mg/MJ should be divided by 3.6 in order to show emissions in mg/kWh (1 kWh = 3.6 MJ). A conversion may also be necessary for data not calculated at 0% excess oxygen (below).

- This Issue's criteria are based on *dry NO_x* values – almost all manufacturers will quote emissions in *dry NO_x*. However if wet NO_x figures are supplied, these should be converted to *dry NO_x*. This can be done by multiplying the wet NO_x figure by 1.75.

Excess Oxygen Correction: If a NO_x emission rate is quoted by the manufacturer in mg/m³ or ppm, then it should be established at what % excess oxygen this emission was measured. The greater the amount of excess oxygen in the flue gases at the time of measurement, the more “diluted” the NO_x. It is therefore important to convert any emission rate back to 0% excess oxygen. For the purpose of BREEAM, the following conversion factors can be used for the most frequently used rates supplied by manufacturers:

% Excess O ₂	Conversion (c)
3 %	x 1.17
6%	x 1.40
15%	x 3.54

Conversion factor $c = 20.9 / (20.9 - x)$

Where x = % excess O₂ (NOT excess air) and 20.9 is the percentage of O₂ in the air.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
3	3	3	3	Pol 5 - Flood Risk	P	G	VG	E	O
					-	-	-	-	-

Aim

To encourage development in low flood risk areas or to take measures to reduce the impact of flooding on buildings in areas with a medium or high risk of flooding.

Assessment Criteria

The following demonstrates compliance:

Two credits

1. If the assessed development is located in an area of safety class F2 (flood risk <1:200 years) according to Norwegian Technical Regulations (TEK 10, § 7-2, two credits are awarded by default.
2. This is confirmed by a flood map developed by the Norwegian Water Resources and Energy Directorate. Where no flood maps are available, this is to be confirmed by a flood risk assessment of the site conducted by the *relevant local authority*. Confirmation must be based on historical AND geological data (e.g altitude) and take all sources of flooding into consideration.

One credit

1. Where the assessed development is situated in a flood zone that is defined as having a *medium or high annual probability of flooding (Klasse F1 i TEK 10,§7-2)*. Please refer to the appropriate compliance note for a definition of risk.
2. This is confirmed by a flood map developed by the *relevant national water authority*, or where no flood maps are available, by a flood risk assessment of the site conducted by the *relevant local authority*. Confirmation must be based on historical AND geological data (e.g altitude) and take all sources of flooding into consideration.
3. The development is appropriately flood resilient and resistant from all sources of flooding to the satisfaction of the local authority and statutory body.
4. The ground level of the building, and access to it 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 Compliance Note for further description).

Additional credit for attenuation measures

1. Where on-site attenuation measures are specified to ensure that:
 - a. 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 for all events up to the 100-year return period.

- b. The **additional** predicted volume of rainwater discharge caused by the new development, for a 1 in 100 year event is entirely reduced using infiltration AND / OR is made available for use in the building as a replacement for potable water use in non-potable applications such as WC flushing.
2. Those measures must be designed using dynamic wave methods and in accordance with EN 752:2008 and EN 12056-3:2000.
 3. The capacity of the attenuation measures must include an allowance for climate change.
 4. Any residual additional rainwater volume that cannot be prevented from being discharged (reasons must be provided with supporting evidence), the peak discharge rate from the site should be reduced to:
 - a. The pre-development site's estimated mean annual flood flow rate (Qbar); or
 - b. A minimum flow rate (litres per second), based on good practice guidelines to prevent easy blockage, by ensuring the outlet throttle is not too small;

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	Refurbishment projects, where no new building or hard landscaping areas are developed, are likely to achieve the credit for attenuation of surface water run-off. In such instances, as a minimum, a Flood Risk Assessment must have been carried out and any identified opportunities to reduce surface water run-off as a result of the refurbishment works must be implemented.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	This issue is not assessed in Fit Out-only assessments.
Definition of risk	<p>Definitions of flood zones and risk is defined in the PBL (Norwegian regulations) and its regulations, as well as the guidelines issued by NVE.</p> <p>For planning and development in hazardous areas, see the guidelines: http://nve.no/Global/Publikasjoner/Publikasjoner%202008/Retningslinjer%202008/Retningslinjer%2001-08.pdf?epslanguage=no</p> <p>In Norway, the following definitions: Security Class F1: 1/ 20 years Security Class F2: 1/ 200 years,</p> <ul style="list-style-type: none"> • Safety class F3: : <1 in 1000 years

Flood maps	<p>Where flood maps or equivalent are available in the area of assessment, the BREEAM International assessor should get confirmation that the definition of risk is at least as onerous as the default definition above, and that flood maps have been developed based on historical AND geological data (e.g altitude) and take all sources of flooding into consideration, including whether the land is on a functional floodplain. Where this is not the case, the relevant local authority should further confirm the flood risk at the location taking that additional information into account in order for the credits to be awarded.</p> <p>If there are no available flood risk maps for the area under development and the local authority does not have or can not confirm the safety class, a <i>hydrological consultant</i> can conduct a flood risk assessment of the site and confirm the sites safety class (Norwegian regulation, TEK 10 , § 7-2).</p> <p>The documentation from the consultant must be based on historical AND geological data (e.g. altitude) and take all sources of flooding into consideration</p>
Sources of flooding	<p>The following sources (where applicable) should be considered when defining the risk of flooding at any location:</p> <ul style="list-style-type: none"> • Fluvial (rivers) • Tidal (including sea level rise risk) • Surface water: sheet run-off from adjacent land (urban or rural) • Groundwater: most common in low-lying areas underlain by permeable rock (aquifers) • Sewers: combined, foul or surface water sewers.
Functional flood plain	<p>The BREEAM credit for locating in a flood zone of 'high annual probability' cannot be awarded where the building is located in the functional flood plain ie a 'zone that comprises land where water has to flow or be stored in times of flood'. If the building assessed is or has been defined as 'water-compatible development', please refer to the BREEAM office for guidance on assessing this BREEAM issue.</p>

--	--

Pre-existing flood defences	<p>In an area protected by existing flood defences (designed to withstand a certain magnitude of flooding) the appropriate number of credits can be awarded where the defences reduce the risk to 'low' and the following conditions are met:</p> <ol style="list-style-type: none"> 1. The development is not located in an area where new flood defences have to be, or have been, constructed to minimise the risk of flooding to the site and its locality purely for the purpose of the development and/or its wider master plan 2. The development is located on a previously developed land (as defined by the criteria in BREEAM issue LE1 Re-use of land) and the appropriate statutory body confirm that, as a result of the existing defences, the risk of a flood event occurring is reduced to low (as appropriate to the credit levels set in BREEAM). If firm confirmation is not provided then the credit cannot be awarded 3. The relevant agency confirms that, as a result of such defences, the risk of a flood event occurring is reduced to low risk. <p>A statutory body's local/regional office may be able to provide more information on existing defences in the area in which the assessed development is located.</p>
600mm threshold	<p>It is accepted that, for buildings located in a high flood zone, areas of the car park and site access may be allowed to flood and therefore fall below the 600mm threshold. In such cases the credit is still achievable provided safe access to the site and the ground floor of the building can be maintained (i.e. they are 600mm above the design flood level) to ensure the building/site does not become an 'island' in the event of a flood.</p> <p>Where the development has been permitted and the ground levels of the topography/infrastructure immediately adjacent to the site fall below the 600mm threshold, the credit can still be awarded, provided there are no other practical solutions for access to the site above this level and the assessed building, and access to it, meets the assessment criteria. As much of the external site area as possible (or as required by an appropriate statutory body) should be designed at or above the threshold.</p>
Third-party defences	<p>There are many defences, owned by third parties, which due to their location act as a flood defence by default e.g. motorway, railway embankments, walls etc. It can be assumed that embankments will remain in place for the lifetime of the development, unless the assessor or project team have reason to believe otherwise. For walls, assurance must be sought that the wall is likely to remain for the design life of the building.</p>
Effectiveness of the water run-off attenuation measures	<p>To ensure effective operation of the water run-off attenuation measures, the facilities must discharge half their volume within 24-48 hours (unless advised otherwise by a statutory body) of the storm event in readiness for any subsequent storm inflow.</p>
Calculating peak rate of run-off	<p>The assessor is not required to perform any calculation as this should be provided by the design team to demonstrate that they have sized the attenuation facilities to store the relevant volume of storm water necessary to achieve the credit.</p>
Residual additional rainwater volume	<p>Where rainwater is being discharged to a public sewer or adopted surface water sewer, and there is a specific minimum requirement defined by the Sewerage Undertaker that conflicts with the BREEAM requirement, then the BREEAM requirement can be discounted as long as supporting evidence has been provided to justify it.</p>

Rainfall	Local figures for rainfall should be used wherever possible. Please refer to the relevant country appendix sheet to find country specific sources of information. Where local rainfall figures are not available, rainfall data for major cities in each country can be found from the World Meteorological Office http://www.worldweather.org . Data for the closest city from the location of assessment should be used.
-----------------	--

Discharge to the sea or estuaries	If all run-off is discharged directly from the site to either the sea, the foreshore, estuaries covered by a shoreline management plan or designated wildlife areas (as part of habitat management) then the credit can be awarded without the need to specify additional attenuation measures.
More stringent criteria	Where the local authority (or other statutory body) requires a greater attenuation than the percentages above, and/or a more onerous design flooding frequency than that recommended in EN 752: 2008, then the higher criteria must be met in order to achieve the credit.
Recommendations from an appropriate statutory body	None of the credits can be awarded where the assessed development has proceeded against the recommendation of the statutory body on the basis that the flooding implications are too great.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
First & Second Credit		
1&2	<p>A copy of a flood map or a letter from the relevant local authority confirming:</p> <ul style="list-style-type: none"> Flood zone or annual probability of flooding in the site location. Sources of flooding considered <p>Where appropriate, correspondence from the appropriate statutory body confirming:</p> <ul style="list-style-type: none"> Reduced annual probability of flooding due to existing flood defences. <p>OR</p> <p>Where there is no available flood risk maps for the area under development and/or no flood risk evaluation are available from the local authority</p> <ul style="list-style-type: none"> <i>Copy of the hydrological consultant's flood risk assessment report</i> 	As design stage, no further evidence is needed.
3	<p>Site plans/sections confirming:</p> <ul style="list-style-type: none"> The design flood level for the site The design ground level(s) for all developed areas of the site. Safe access and escape routes 	'As built' site plans/sections.

Additional Credit for attenuation measures		
All	<p>Confirmation of the appointment of an appropriately qualified engineer or consultant to carry out the calculations and provide design criteria for all relevant elements.</p> <p>Copy of the consultant's or engineer's report confirming the following:</p> <ul style="list-style-type: none"> • Type and storage volume (l) of the water run-off attenuation measures • Total area of hard surfaces (m²) • Peak flow rate (l/s) for the design storm event • Use of dynamic wave methods • Design in compliance with EN 752:2008 and EN 12056-3:2000. • Additional allowance for climate change designed in to the system <p>Copies of any drawings, site plans and specification text necessary to support the claims made.</p>	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> • Installation of water run-off attenuation measures • No changes to the evidence provided at the interim 'design' assessment stage. <p>A letter from the design team or main contractor confirming:</p> <ul style="list-style-type: none"> • No changes to the specification. <p>Where changes have occurred, copies of as-built designs and calculations must be provided.</p>

Additional Information

Relevant definitions

Appropriate Consultant: a hydrological consultant or engineer with a minimum of 2 years experience in surface water run-off calculations and design of flood prevention measures. Where complex flooding calculations and prevention measures are required, this must be a specialist hydrological engineer.

Catchment: the area contributing surface water flow to a point on a drainage or water course. It can be divided into sub-catchments.

Design flood level: the maximum estimated water level during the design storm event. The design flood level for a site can be determined through either known historical data or modelled for the specific site.

Design flood event: an historic or notional flood event of a given annual flood probability, against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.

Design storm event: historic or notional weather conditions of a given annual probability, against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.

Flood defences: Flood defences do not completely remove the risk of flooding, but they do reduce it. Building in areas where flood defences are present (and appropriately designed to withstand a certain magnitude of flooding) is therefore preferable to those built in medium/high risk areas without defences. However, for the purpose of this issue, it is still preferable to build in areas of low risk than encourage development of new flood defences in areas with a higher risk of flooding purely for the sake of new development. Localised flood defence schemes may simply create a problem further downstream

Flood event: A flooding incident characterised by its peak level or flow, or by its level or flow hydrograph.

Flood probability: The estimated probability of a flood of given magnitude occurring or being exceeded in any specified time period. For example, a 100-year flood has a 1% chance of occurring in any given year.

Flood risk: the combination of the flood probability and the magnitude of the potential consequences of the flood event.

Flood risk assessment: a study to assess the risk of a site flooding, and to assess the impact that any changes or development on the site will have on *flood risk* on the site and elsewhere. A Flood Risk Assessment should be prepared according to good practice guidance as outlined in Development and Flood Risk: A practice guide companion to PPS 25, available from www.communities.gov.uk.

Flood storage: The temporary storage of excess run-off or river flow in ponds, basins, reservoirs or on the flood plain during a flood event.

Flood zone: please refer to the relevant country reference sheet to find the definition of flood zones in the country of assessment where these are defined.

Greenfield: a site which has either never been built on, or one which has remained undisturbed for five years or more.

Greenfield run-off rate: the rate of run-off that would occur from the site in its undeveloped and therefore undisturbed state.

Hard surfaces: these include roofs, car parks, access roads, pavements, delivery/service yards and external hard landscaping. Footpaths less than 1.5m wide which have free drainage to soft landscaped areas on both sides may be excluded.

Infiltration: the passage of water into a permeable surface, such as soil, permeable paving, soakaways and so on.

Natural watercourses: any natural channel that conveys surface water.

Peak run-off rate (referred to as Q_p [m^3/sec]): this is the highest rate of flow from a defined catchment area assuming that rainfall is uniformly distributed over the drainage area, considering the entire drainage area as a single unit and estimation of flow at the most downstream point only.

Pre-development: the state of the site under assessment immediately prior to purchase of the site by the client/developer (or, where the client has owned/occupied the site for a number of years, its current state).

Relevant local authority/national water authority: refers to the body responsible for setting the flood risk such as the local water authority or local sewage utility company. Please refer to the relevant country reference sheet for further guidance.

Run-off: this is usually rainwater, but can also be groundwater or overspill from sewers and other sources.

Run-off rate: the rate of discharge of water from a surface.

Run-off attenuation measures: this covers the range of construction and equipment which can be employed to attenuate run-off from hard surfaces and roofs. Measures include: underground storage, oversized pipes, holding ponds, swales, reed beds, permeable paving, green roofs, local or centralised soakaways etc.

Peak flow rate: the peak rate of discharge of water from hard surfaces. For the purpose of calculating the peak flow rate volume, a 60 min duration of the design storm event should be used (unless a different duration is required by a statutory body).

Sewerage undertaker: this is a water company with statutory responsibility for sewerage and sewerage disposal and also surface water from roofs and yards of premises.

Shoreline Management Plan: SMPs provide a large-scale assessment of the risks associated with coastal processes and present a policy framework to reduce these risks to people and the developed, historic and natural environment in a sustainable manner.

SUDS - sustainable drainage systems or sustainable (urban) drainage systems: a sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques. SUDS devices include:

- Holding ponds
- Swales
- Reed beds
- Permeable paving - in areas where local geological and hydrological conditions allow this to function, e.g. block paved surface on permeable sub-base over gravel bed to store the water and allow it to seep into the soil. For less permeable soils, the gravel layer might be deeper and the water taken to a soakaway although this is not an option in some areas.
- Local or centralised soakaways either as full systems or as 'overflow' or 'holding' systems, in areas where local geological and hydrological conditions allow them to function.
- Run-off from roofs collected as a part of a rainwater harvesting system.
- Run-off from roofs directed to a local soakaway or other holding facility such as tanks, ponds, swales etc.
- Green roofs.

Surface Water Run-off: water flow over the ground surface to a drainage system. This occurs if the ground is impermeable, is saturated or if the rainfall is particularly intense.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Pol 6 - Minimising Watercourse Pollution	P	G	VG	E	O
					-	-	-	-	-

Aim

To reduce the potential for silt, heavy metals, chemicals or oil pollution to natural watercourses from surface water run-off from buildings and hard surfaces.

Assessment Criteria

The following demonstrates compliance:

1. Where run-off drains are in areas with a relatively **low risk** source of watercourse pollution, specification of Sustainable Drainage Systems (SUDs) or source control systems such as permeable surfaces or infiltration trenches
2. Where there is a **high risk** of contamination or spillage of substances such as petrol and oil, specification of oil/petrol separators (or equivalent system) in surface water drainage systems (see Compliance Notes for a list of areas).
3. Confirmation from the *appropriate statutory body* that they are content with the proposals.
4. A comprehensive and up-to-date drainage plan of the site will be made available for the building/site occupiers.

In addition, where the building has chemical/liquid gas storage areas the following must also be achieved:

5. Shut-off valves fitted to the site drainage system to prevent the escape of chemicals to natural watercourses (in the event of a spillage or bunding failure).

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	Please refer to the compliance note below regarding ' <i>infill building on an existing site</i> '.
Shell Only	There are no additional or different criteria to those outlined above specific to shell only assessments.
Fit Out Only	The criteria apply to any existing or new facilities that fall within the scope of the fit out works.

Areas that are a source of pollution	For the purpose of assessing this issue an area that presents a risk of watercourse pollution includes vehicle manoeuvring areas, car parks, waste disposal facilities, delivery and storage facilities or plant areas.
Areas where oil separators are required	The following site areas (where present) require oil separators in surface water drainage systems: <ul style="list-style-type: none"> • Car parks larger than 800m² or with 50 or more parking spaces • Smaller car parks discharging to a sensitive environment • Areas where goods vehicles are parked or manoeuvred • Vehicle maintenance areas • Roads • Industrial sites where oil is stored or used • Refuelling facilities
SUDS and oil interception	In some instances, where the risk of contamination is infrequent and potential spills will be small, oil interceptors may not be required if appropriately designed Sustainable Urban Drainage systems are specified.
Infill building on existing site	Where the assessment is of an individual building on an existing site, i.e. infill development, the requirements apply to areas within the construction zone that present a risk of pollution, as well as any areas external to the construction zone that are affected by the new works i.e. drainage onto or from the proposed development.
Suitable level of treatment	In all cases the assessor should determine the operational use of the site in order to determine if the proposed surface water run-off strategy is suitable.
Rainwater run-off	This issue is not intended to cover the treatment of rainwater run-off except where there is a risk of significant pollution arising.
Underground/covered areas	Where it can be demonstrated that there will be no drainage or wash down facilities that may lead water from inside the underground or covered area to natural watercourses, then such areas comply with the assessment criteria by default.
Roof plant	Roof top plant space must be considered where there is a risk from substances such as petrol or oil. Refrigerants are not assessed under this issue, as the only risk of pollution is to air and not the watercourse.
No areas at risk from pollution	Where it can be demonstrated that there are no external areas that present a pollution risk, e.g. parking, delivery, manoeuvring or servicing facilities (including individual parking spaces), external waste storage space or other hard standing areas AND there is no plant supported on the roof, then this credit can be awarded by default.
Permeable paving system	Where it can be demonstrated that a permeable paving system designed to retain silts and degrade oils has been used, then this will meet the assessment criteria of this issue for car parks and access roads.
Drainage plan	A comprehensive and up-to-date drainage plan of the site, which accurately identifies all drains, must be produced and handed over to the new occupier. If there is no in-house expertise to do this, a reputable drainage company should be used.
Workshop areas in retail buildings	Where workshop areas are specified, they should be assessed against the above criteria. This is due to circumstances where there may be some form of vehicle servicing as part of a car showroom or other type of retail space.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	Marked-up proposed site plan highlighting: <ul style="list-style-type: none"> • Low and high risk areas of the site. A copy of the specification or design plan confirming: <ul style="list-style-type: none"> • Type of pollution control systems specified. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • Installation of pollution control system(s).
3	A letter from the appropriate statutory body confirming that they are content with the proposals.	A letter from the design team or main contractor confirming: <ul style="list-style-type: none"> • No changes to the evidence provided at the interim 'design' stage assessment.
4	A letter from the design team confirming: <ul style="list-style-type: none"> • A copy of the drainage plan will be produced and handed over to the building occupier. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • Existence of the drainage plan in the building's O&M manual/file.
5	A copy of the specification or site plan confirming: <ul style="list-style-type: none"> • Installation of shut-off valves and system type. 	Assessor's building/site inspection and photographic evidence confirming: <ul style="list-style-type: none"> • Installation of shut-off valves.

Additional Information

Relevant definitions

Appropriate statutory body: This refers to the body responsible for giving permissions and setting the conditions for the discharge of roof- and surface water to watercourse.

Low risk areas: Low risk areas can be defined as areas where the risk of contamination or spillage of substances such as petrol and oil is reduced. For the purpose of this credit, roofs and small car parks may be considered as low risk areas.

Soakaways: A sub-surface structure designed to promote the infiltration of surface water in to the ground. As a general point, soakaways may be shallow and broad – as in a blanket under permeable paving, or deeper structures. Deeper, point source soakaways should be avoided for road and car-park drainage, but shallow structures providing infiltration in an extensive way (infiltration trenches and permeable paving) do not need oil separators. See Pollution Prevention Guideline (PPG) 3 "*Use and design of oil separators in surface water drainage systems*", Environment Agency/SEPA/Environment & Heritage Service, 2006 for further guidance.

Norwegian guide: NORVAR-rapport: Veileder for oljeutskilleranlegg

Types of Oil Separator

- **Class 1 Separators:** These are designed to achieve a concentration of less than 5mg/l oil under standard test conditions. They should be used when the separator is required to remove very small oil droplets, such as those arising from car park run-off.
- **Class 2 Separators:** These are designed to achieve a concentration of less than 100mg/l oil under standard test conditions. They are suitable for dealing with discharges where a lower quality requirement applies and/or for trapping large spillages.

Both classes can be produced as 'full retention' or 'by pass' separators:

- **Full retention separators** treat the flow that can be delivered by the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 50mm/hr.
- **Bypass separators** fully treat all flows generated by rainfall rates of up to 5mm/hr. Flows above this rate are allowed to bypass the separator. These separators are used when it is an acceptable risk not to provide full treatment for high flows.

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Pol 7 - Reduction of Night Time Light Pollution	P	G	VG	E	O
					-	-	-	-	-

Aim

To ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimised, reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties.

Assessment Criteria

The following demonstrates compliance:

1. The external lighting strategy has been designed in compliance with the limits set for light technical parameters in section 2.7 of CIE 150-2003 and table 2 of CIE 126-1997.
2. *Illuminated advertisements*, where specified, must meet the following criteria:
 - a. The uniformity of illuminance must comply with the following:

Table 12.4 Recommendations for the uniformity of illuminance

Type of illumination	Illuminated Area	Uniformity of illuminance
External	Over 1.5m ²	10:1
External	Up to 1.5m ²	6:1
Internal	Above and between the light sources	1.5:1

- b. The maximum luminance (CD/m²) must comply with the following (please refer to the Additional Information section for a definition of the different zones).

Table 12.5 Recommendations for Maximum Luminance (CD/m²)

Illuminated Area (m ²)	Zone E1	Zone E2	Zone E3	Zone E4
Up to 10.00	100	600	800	1000
Over 10.00	n/a	300	600	600

3. All external lighting (except for safety and security lighting as well as illuminated advertisements) can be automatically switched off between 2300hrs and 0700hrs. This can be achieved by providing a timer for all external lighting set to the appropriate hours. Illuminated advertisements must comply with the criteria under point 2 above except in Zone E1 the maximum luminance value shall be zero post-curfew.
 4. If safety or security lighting is provided and will be used between 2300hrs and 0700hrs, this part of the lighting system complies with the lower levels of lighting recommended during these hours in CIE 150-2003 and CIE 126-1997, for example by using an automatic switch to reduce the lighting levels at 2300 or earlier.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	For refurbishment projects, in addition to any new external lighting specified, any existing lighting that will remain post development must be assessed against the criteria of this issue.
Extensions to existing buildings	If the scope of the assessment covers the new extension only, then it is only new lighting specified as part of that extended works that must be assessed against the criteria for this issue. If the new and existing building is being assessed as one, then the rule for refurbishments (above) applies to the existing building.
Shell Only	There are no additional or different criteria to those outlined above specific to shell-only assessments.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
Individual building on existing site	Where the assessment is of an individual building on an existing site then only those areas affected by the works i.e. within the construction zone, must be assessed.
No external lighting	If there is no external lighting on or around the assessed development the credit can be awarded by default.
Safety lights	Flush stud lights used for safety purposes in vehicle manoeuvring areas may be excluded from the assessment.
Floodlighting, signage lighting	The CIE guidance recommends the setting of a curfew. This will normally include floodlighting, signage and all lighting that is not required for safety or security. Illuminated advertisements may be excluded from this requirement, but will need to comply with different levels of maximum luminance depending on the surrounding and background environment as per requirement 4.
Essential lighting between 2300 and 0700	Where essential lighting is provided between 2300 and 0700, i.e. for 24-hour operating buildings, the system is able to automatically switch to the lower levels of lighting recommended in the CIE 150-2003 and CIE 126-1997 for lighting during these hours (or provide these lower levels at all times). The more restrictive values, applying after the curfew hour, are predicated on the maintenance of amenity and environmental integrity being the dominant considerations. The need for the proposed lighting and its use during curfew hours should be considered in the first instance.
Different curfew time	Where a different curfew time applies for other reasons (e.g. noise control), consideration should be given to the co-ordination of the curfews, i.e. allowing sufficient time of operation for the lighting after the conclusion of the activity to facilitate crowd dispersal, particularly where large numbers of spectators are involved.
Specific security criteria	Any light fittings in the areas outlined above that are specified to comply with specific security criteria/standards, and where those criteria and the BREEAM assessment criteria are not complementary, can be excluded from the assessment of this issue. In these circumstances the assessor must obtain evidence confirming that such criteria are applicable to the assessed development.

Maximum luminance	When considering the zone in which the advertising sign is, or is intended to be, sited, the contrast with the surrounding or background should be taken into account (e.g. the surrounding could be unlit when viewed from the road or a residential window) and the zone adjusted accordingly. Where an illuminated sign lies on the boundary of two zones or can be observed from another zone, the illumination level used should be that applicable to the most rigorous zone.
--------------------------	---

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1-3	<p>A marked-up copy of the site plan showing:</p> <ul style="list-style-type: none"> • Areas of the building and site that will be externally lit • Any nearby properties. <p>A copy of the specification clause requiring, or external lighting design confirming:</p> <ul style="list-style-type: none"> • The external lighting design in compliance with CIE Guidance • Controls for all external lighting. • Design of any illuminated advertisements <p>In the case of the external lighting design, the M&E engineer or lighting designer must provide indicative examples of where and how the strategy complies with the assessment criteria.</p>	<p>Assessor's building/site inspection and photographic evidence confirming:</p> <ul style="list-style-type: none"> • Cut-off luminaires, if provided, have been angled to limit spill light to potentially obtrusive directions. • External lighting controls <p>A letter from the design team or main contractor confirming:</p> <ul style="list-style-type: none"> • Installation of systems in accordance with compliant design. • No changes to the evidence provided at the interim 'design' stage assessment.

Additional Information

Relevant definitions

Advertisements: any word, letter, model, sign, placard, board, notice, awning, blind, device or representation, in the nature of, and employed wholly or partly for the purposes of advertisement or announcement. This also includes any hoarding or similar structure used, or designed or adapted for use for the display of advertisements.

Construction zone: For the purpose of this credit the construction zone is defined as the site which is being developed for the BREEAM assessed building and its external site areas i.e. the scope of the new works.

Compliance checking of the design should be carried out against the Commission Internationale D'éclairage guidance. This gives four sets of recommendations;

1. Limits to the average upward light ratio of the luminaires, to restrict sky glow.
2. Limiting illuminance at the windows of nearby properties for which light trespass might be an issue.
3. Limiting the intensity of each light source in potentially obtrusive directions beyond the site boundaries.
4. Limiting the average luminance of the building, if it is floodlit.

In each case the limiting values depend on the location of the site of the building (for example rural, urban or city centre). A calculation of illuminance (b) or intensity (c) is not required if all luminaires are cut-off types and angled so that light in potentially obtrusive directions is blocked.

Illuminated advertisements: an advertisement which is designed or adapted to be illuminated by artificial lighting, directly or by reflection, and which is so illuminated.

Illuminance uniformity: ratio of the maximum luminance to the minimum luminance,

Lighting zones: the contrast with the surrounding or background and therefore the lighting environment of the building change the perception of luminance. The maximum luminance of the advertisement needs therefore to be adapted depending on the lighting environment. Four lighting zones can be defined as follows;

Table 12.6 Environmental lighting zone

Zone	Surrounding	Lighting Environment	Examples
E1	Natural	Intrinsically dark	National parks or protected sites
E2	Rural	Low district brightness	Industrial or residential rural areas
E3	Suburban	Medium district brightness	Industrial or residential suburbs
E4	Urban	High district brightness	Town centres and commercial

No. of credits available				Issue Title	Minimum Standards				
Retail	Office	Indust.	Educat.		P	G	VG	E	O
1	1	1	1	Pol 8 - Noise Attenuation					
					-	-	-	-	-

Aim

To reduce the likelihood of noise from the new development affecting nearby noise-sensitive buildings.

Assessment Criteria

The following demonstrates compliance:

1. There are, or will be, existing *noise-sensitive areas or buildings* within 800m radius of the assessed development.

Where there are or will be no *noise-sensitive areas or buildings* in the locality of the assessed development, the credit can be awarded by default.

2. A noise impact assessment in compliance with ISO 1996 has been carried out and the following noise levels measured/determined:
 - a. 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.
 - b. The rating noise level resulting from the proposed noise-source. This can be based upon reference to similar installations or sites, or determined by calculation.

The noise impact assessment must be carried out by a *suitably qualified acoustic consultant* holding a recognised acoustic qualification. (see relevant definitions).

3. Where the specific noise level of the noise source(s) from the site/building is +5dB during the day (0700hrs to 2200hrs) and +3dB at night (2200hrs to 0700hrs) compared to the background noise level, the credit can be awarded.

Education only: If the specific noise level from the noise source (s) from the site / building is equal to or less than the background noise level, the point is awarded

4. Where the rating level of the noise source(s) from the site/building is greater than the background noise level, measures have been installed to attenuate the noise at its source to a level where it will comply with requirement 3.

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.

Shell Only	<p>Where the specification and installation of building services systems within the building/tenanted areas will be the responsibility of the future tenant, the acoustician will need to make an assumption for the worst case noise rating level. This can be based upon reference to servicing strategy/installations and sites similar to that of the assessed building or on a maximum design fit out specification.</p> <p>Alternatively, compliance with this BREEAM issue can be demonstrated via one of the following means:</p> <ul style="list-style-type: none"> • Option 1 – Use of a tenancy lease agreement between the developer and tenant/s (full value of available credits) • Option 2 – A Green Building Guide for tenant fit outs (half the value of the available credits) • Option 3 – Developer/Tenant collaboration (full value of available credits) <p>Where compliance with the assessment criteria cannot be demonstrated the available credits must be withheld (option 4).</p> <p>Refer to the <i>Scope</i> section 2.2 <i>Types of project that can be assessed using BREEAM</i> (Shell and Core / Speculative Assessments) for further description of the above options.</p>
Fit Out Only	<p>The criteria for fit out assessment are the same as those outlined above, subject to the following:</p> <ol style="list-style-type: none"> 1. If the fit out includes the replacement of building servicing plant or changes to site layout/access that are likely to result in the creation of a specific noise that will raise the ambient noise level, then an assessment must be carried out. 2. The credit can be awarded where it can be demonstrated that the creation of a specific noise is unlikely to raise the ambient noise above the existing background level. This may be the case where the BREEAM-assessed unit forms part of a larger development and as a result, specific attenuation measures specified for the building/unit would have little or no effect on the overall ambient noise level. 3. If the fit out results in no new specific noise source then the credit can be awarded.
Part of a larger mixed-use development	<p>If the development forms part of a larger mixed-use development, where noise sensitive buildings exist or will be developed, then the noise assessment must be carried out to ensure noise from the assessed building will not create a future problem.</p>
Assessed building is defined as <i>noise sensitive</i>	<p>If the assessed building is itself defined as a <i>noise sensitive building</i> then a noise impact assessment must be carried out regardless of the assessed buildings locality to other <i>noise sensitive areas or buildings</i>.</p>
Scope of the noise impact assessment	<p>For the purposes of BREEAM the noise impact assessment relates only to building services plant; additional process-related noise does not have to be considered. Stand-by generating plant should also not be included.</p>
Standard not appropriate / not applicable	<p>Where a suitably qualified acoustician confirms that ISO 1996 is not an appropriate standard of assessment for the proposed building/site, their assessment of the likelihood of complaint from noise impact can be accepted for the purpose of assessing this issue.</p>
Industrial buildings with an untreated operational area and no office	<p>Where the industrial unit has no office space and an untreated operational area, this issue will be filtered from the list of applicable credits.</p>

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	<p>Site plan highlighting:</p> <ul style="list-style-type: none"> All existing and proposed noise-sensitive buildings local to, and within, the site boundary Proposed sources of noise from the new development Distance (m) from these buildings to the assessed development. 	<p>Assessor's building/site inspection report and photographic evidence confirming:</p> <ul style="list-style-type: none"> All noise-sensitive buildings local to, and within, the site boundary Proposed noise sources within the development Distances (m) from these buildings to the assessed development.
2&3	<p>A copy of the acoustician's report.</p> <p>The acoustician's qualifications and professional status.</p> <p>OR</p> <p>A copy of the specification clause requiring:</p> <ul style="list-style-type: none"> A noise assessment in compliance with ISO 1996 by a suitably qualified acoustician. <p>OR</p> <p>A formal letter from the client or design team confirming that they will appoint an acoustician to carry out a noise assessment in compliance with ISO 1996.</p>	<p>A copy of the acoustician's report with measurements based on installed and operating plant.</p>
4	<p>Acoustician's report with recommendations for noise attenuation measures.</p> <p>AND</p> <p>A marked-up design plan highlighting the specification of the acoustician's attenuation measures</p> <p>OR</p> <p>A formal letter from the client or design team confirming that:</p> <ul style="list-style-type: none"> If relevant, attenuation measures recommended by an appointed suitably qualified acoustician will be installed. 	<p>Assessor's building/site inspection report and photographic evidence confirming:</p> <ul style="list-style-type: none"> The existence of the specified noise attenuation measures. <p>OR</p> <p>A formal letter from the acoustician confirming that all specified attenuation measures have been installed to the required standard.</p>

Additional Information

Relevant definitions

Suitably qualified acoustician: Refer to BREEAM issue Hea 13 for the relevant definition.

Ambient noise: totally encompassing sound in a given situation and given time usually composed of sounds from sources near and far.

Background noise level: the A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval.

Noise sensitive area: landscapes or buildings where the occupiers are likely to be sensitive to noise created by the new plant installed in the assessed building, including:

- Residential areas
- Hospitals, health centres, care homes, doctor's surgeries etc.
- Schools, colleges and other teaching establishments.
- Libraries
- Places of worship
- Wildlife areas, historic landscapes, parks and gardens.
- Located in an area of Outstanding natural beauty or near a Site of Special Scientific Interest (SSSI).
- Any other development that can be considered noise sensitive.

Rating noise level: the specific noise level plus any adjustments for characteristics features of the noise (typically 5dB).

Residual noise: the ambient noise remaining at a given position in a given situation when the specific noise source is suppressed to a degree such that it does not contribute to the ambient noise.

Specific noise level: the equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval.

Specific noise source: the noise source under investigation for assessing the likelihood of complaints.

13.0 Innovation

Issue ID	Issue Title	No. of credits available	Minimum standards
Inn 1	Innovation	10	No

Aim

To provide additional recognition for a procurement strategy, design feature, management process or technological development that innovates in the field of sustainability, above and beyond the level that is currently recognised and rewarded within standard BREEAM issues.

Assessment Criteria

The following demonstrates compliance:

Up to 10 credits are available by meeting Exemplary Performance for existing BREEAM issues

1. Exemplary performance is demonstrated by meeting Exemplary Performance criteria for existing BREEAM Issues. Please refer to the table below for a list of BREEAM issues with defined exemplary performance criteria (this is also found in section 3.0 of the manual, *Scoring and Weighting*). For the specific Assessment Criteria please refer to the section of the technical guidance containing the relevant BREEAM issue.

Table 13.1 BREEAM issues with exemplary level criteria

Man 3 - Construction Site Impacts
Hea 1 - Daylighting
Hea 9 - Volatile Organic Compounds
Hea 14 - Office Space (BREEAM Retail & Industrial Schemes only)
Ene 5 - Low or Zero Carbon Technologies
Tra 3 - Alternative modes of transport
Wat 2 - Water Meter
Mat 5 - Responsible Sourcing of Materials
Wst 1 - Construction Site Waste Management
Pol 4 - NOx emissions of heating source

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new-build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Shell Only	There are no additional or different criteria to those outlined above specific to shell only projects.
Fit Out only	There are no additional or different criteria to those outlined above specific to fit-out only projects.
Credit limit for Innovation section	A maximum of ten credits may be sought in the Innovation section.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1	As defined within existing BREEAM Issues	As defined within existing BREEAM Issues

Additional Information

Relevant definitions

None.

14.0 Technical Checklists

14.1 Technical Checklist A2: Man 2 Constructors' Environmental and Social Code of Conduct

1 Safe and adequate access

This section is intended to demonstrate that the constructor operates the site in a manner that guarantees a safe and appropriate access to, around and on the site.

The following items demonstrate compliance with this section:

REF	Criteria	√	Evidence/reference required	Validation/Justification
a	<p>Appropriate and safe access to the site is provided. This must include as a minimum:</p> <ul style="list-style-type: none"> • Provision of parking on or near site OR a public transport node with an average frequency under 30minutes within 500m OR a dedicated transport service to a major public transport node provided by the contractor. • Good lighting AND Adequate barriers AND uniform surfaces ie no trip hazards outside the site boundary • All accesses to be clean and mud free • Hoarding or scaffolding to be well lit at night AND scaffold netting is in place and well maintained 		<p>See copy of parking plan & check transport / dedicated service timetables.</p> <p>View on site.</p> <p>View on site.</p> <p>View on site.</p>	
b	<p>Appropriate and safe access on site is provided. This must include as a minimum:</p> <ul style="list-style-type: none"> • Footpaths marked with ramps and signs • Walkways are wide enough for wheelchairs (1,2 – 1,4 m) • Accessibility of all areas by visually or hearing impaired visitors • All site hazards advertised at the site entrance 		<p>View on site and check that list of hazards is complete</p>	
c	<p>Site entrances and exits are clearly marked for visitors and delivery drivers to see.</p>		<p>View on site</p>	
d	<p>Site reception is clearly signposted OR all visitors are escorted to the reception</p>		<p>Check on arrival for the signs OR see a copy of the induction</p>	

			procedure.	
e	The post box has been placed on the pavement to avoid the postman from entering the site.		View on site	
f	Where there are minority communities speaking a different language in the area or working onsite, notices are printed in the common local language		Check the area and the staffs register for a minority culture community. Where this is present on- or off-site, check for signs in the communities language.	
g	All road signs / names can be seen OR when a road sign / name is obstructed a replacement has been erected		View on site	
h	Where a site with severe congestion has a delivery point remote from a site, deliveries can then be made in smaller vehicles at times to cause the least inconvenience.		View procedures on site.	

2 Good Neighbour

This section is intended to demonstrate that the constructor operates the site in a manner that is considerate to the surrounding neighbours. The following items demonstrate compliance with this section:

REF	Criteria	√	Evidence/reference required	Validation/Justification
a	Introductory letters have been / will be sent to all neighbours AND there is a commitment to write and thank neighbours at the end of the contract for their forbearance AND provide feedback form		See copies of letters with list of addresses. A copy of this commitment should be provided or a copy of a standard letter that is always sent at the end of a project. A copy of the feedback form must be provided along a procedure to monitor the results and implement changes for future work.	

b	<p>Site hours and noisy work restrictions are appropriate to the area, in particular when the site is located near:</p> <ul style="list-style-type: none"> • Houses • Schools • Hospitals • Industrial Units • Major public Transport Nodes • City centres • Shopping facilities 		Copy of statement of intent, policy, agreement etc to be provided	
c	<p>The site boundary is clearly and safely marked and appropriate to the environment:</p> <ul style="list-style-type: none"> • The colour of the hoarding has been considered in terms of the surrounding environment. • Pedestrians have a suitable, safe and protected passage around the site boundary • There are well lit warning signs for the benefit of the pedestrian and road user • The site's surroundings are seen by the public as tidy and clean 		<p>Ask site manager if any thought was given to the hoarding and the location of the site. Is the hoarding clearly /safely marked, clean, neat and well maintained? Ensure that there are no complaints about the site being untidy or that if there were this was quickly rectified and not repeated.</p>	
d	There is a complaints book available AND evidence that complaints are being dealt with immediately		Inspect the complaints book and check responses for timeliness	
e	<p>Local people are appropriately informed by the use of a notice board:</p> <ul style="list-style-type: none"> • Of the site progress • Of the company contact details (telephone number / web site / email address) 		View on site	
f	Light is shielded from the neighbours		Copy of the temporary works indicating light shielding or the site manager must demonstrate how the light shielding works or is not applicable.	
g	<p>Site personnel are discouraged from using local facilities in their site clothes. Examples of how this might be achieved include :</p> <ul style="list-style-type: none"> • A canteen • Staggered breaks for different gangs. • Provision of showers / wash rooms. • Provision of lockers. • A request to leave PPE on site. 		<p>View on site. Check procedures with the Site Manager.</p>	

h	There is a volume restriction on radio use or there is a radio ban	Check if restriction / ban is in place and how this is enforced	
---	--	---	--

3 Environmentally Aware

This section is intended to demonstrate that the constructor has considered the impact of the site on the environment and has implemented measures to mitigate this impact. The following items demonstrate compliance with this section:

REF	Criteria	√	Evidence/reference	Validation/Justification
a	There are restrictions on the effects of light pollution and all lights are directional and non-polluting. If there is a site specific environmental policy which sets restrictions on lighting, this point can be awarded.		View on site.	
b	Energy saving measures are implemented on site. Examples of this include: <ul style="list-style-type: none"> • Low energy lighting • Switching off equipment when not in use • Installing thermostats • Installing timers • Choosing energy efficient equipment If there is a site specific environmental policy which defines energy saving measures, this point can be awarded.		View on site.	
c	An impact minimisation strategy review is in place for the site. The review should consider the impact of the site in environmental terms and how any adverse effects are being minimised.		View impact minimisation strategy.	
d	Water saving measures are implemented on site and monitored. If there is a site specific environmental policy which indicates how water saving measures are managed and monitored on site, this point can be awarded.		View procedures on site.	
e	Alternative energy sources have been considered.		View on site.	
f	Fuel oil spillage equipment is available.		View on site. Ensure the spillage equipment is located where spillages may occur to ensure a rapid response time.	
g	Sumps are provided in cases of heavy water run off. If there is a site specific environmental policy which indicates how heavy water run off will be minimised and dealt with on site, this point can be awarded.		View on site.	

h	Materials and equipment are tidily stacked and protected / covered where necessary AND there is adequate space for new materials to be stored in secured covered areas to avoid damage, theft and to protect from weather.		View on site. Ensure that where the space has been provided, it is being used correctly	
---	--	--	---	--

4 Safe and considerate working environment

This section is intended to demonstrate that the constructor is operating the site in a clean and safe manner in order to ensure the wellbeing of its workers and to minimise the risk to their health and safety. The following items demonstrate compliance with this section:

REF	Criteria	√	Evidence/reference	Validation/Justification
a	Adequate facilities are provided on-site for workers and visitors. These must include as a minimum: <ul style="list-style-type: none"> • Separate male, female and disabled toilets • Working usable showers AND suitable changing areas e • Lockers in the drying room • Dedicated smoking area 		View on site	
b	Site facilities are well maintained and clean. This must cover as a minimum: <ul style="list-style-type: none"> • Areas around the canteen, offices and skips • Site welfare facilities • Dedicated smoking area 		View on site.	
c	Private or visually-impacting areas are screened. These must include as a minimum: <ul style="list-style-type: none"> • Areas around the canteen, offices and skips where necessary. • Toilets • Dedicated smoking area 		View on site.	
d	Clean PPE is available for use by visitors		Check company policy and procedure and if it is being implemented on site	
e	Health and Safety procedures are in place for the following issues: <ul style="list-style-type: none"> • Appropriate training of all staff including non native operatives to understand H&S best practices and information displayed on site • Operatives' exposure to the sun • Operatives' identification; all operatives to be provided with a photo ID clip card 		Check company policy and procedures and how these are enforced Check first aid book in particular for minor accidents. Check the first aiders list and their	

	<ul style="list-style-type: none"> Reporting of all incidents (minor and serious) and near misses Ensuring that an appropriate number of first aiders and first aid equipment are available for the site. 		<p>qualifications (must be less than 3 years old). Check that each first aiders have a box with basic equipment and that they have access to more equipment if necessary and that they know where to find it.</p>	
f	<p>There is posted material indicating nearest police Station and Hospital (with Accident & Emergency facilities) in the following areas as a minimum:</p> <ul style="list-style-type: none"> Site reception Site canteen Main site office 		<p>Spot check managers, operatives, reception staff to check they know this information or at least where they would find it. Check induction talk.</p>	
g	<p>An inspection has been carried out by a Health and Safety inspector or equivalent.</p>		<p>View on site.</p>	
h	<p>Emergency escape routes well identified and clear emergency evacuation procedure AND drills carried out.</p>		<p>View on site. Written proof of fire drill procedure.</p>	

Signed by:

BREEAM Assessor _____

Site representative _____

14.2 Technical Checklist A3: Man 3 Construction Site Impacts

a. Monitor, report and set targets for CO₂ production of energy use arising from site activities		
Compliance requirement	Tick	Evidence/Reference
Monthly measurements of energy use will be/has been recorded and displayed on site.		
Appropriate target levels* of energy consumption will be/were set and displayed (targets could be annual, monthly, or project targets). These should be based on the actual consumption figures from previous projects and should be appropriate to each construction stage.		
As a minimum, monitoring will/did include checking the meters and displaying some form of graphical analysis in the site office to show consumption over the project duration and how actual consumption compares to the targets set.		
The design/site management team will/did nominate an individual who will be responsible for the monitoring and collection of data.		
<p>* Notes:</p> <ul style="list-style-type: none"> Targets for energy consumption during the construction process should be set using Constructing Excellence' Environmental KPI benchmarks. These documents do not specify targets but facilitate projects in setting appropriate targets. www.constructingexcellence.org.uk/zones/kpizone/default.jsp or http://www.ccinw.com/sites/kpi_pages.html?site_id=5&section_id=171 BREEAM does not require targets to be met but is encouraging the process of setting, monitoring and reporting against targets. 		
b. Monitor and report CO₂ or energy arising from commercial transport to and from the site		
Compliance requirement	Tick	Evidence/Reference
A site monitoring system will be/was in place to monitor and record deliveries*. This system will/did record: <ul style="list-style-type: none"> The number of deliveries The mode of transport The km/miles travelled for all deliveries 		
The design/site management team will/did nominate an individual responsible for the monitoring and collection of data.		

<p>Notes:</p> <ul style="list-style-type: none"> Where the delivery is specifically for the site, a figure of total distance travelled should be used, i.e. a round trip (from the point of origin, to the site and back to the point of origin). Where the delivery to the site is part of a multiple delivery route, the recorded figure for distance travelled should be the distance travelled to the site (from the previous delivery), plus the distance to the next delivery or return. This information can then be used to estimate a total figure for kg of CO₂ for the project. BREEAM does not require this information to be converted to CO₂ but the information must be made available to the senior project and site management staff/suppliers to establish benchmarks and aid future decision-making towards improving site and transport efficiency. If the project team wishes to convert this information into CO₂ emissions there are tables provided at the end of this checklist which can be used to do this. 		
c. Monitor, report and set targets for water consumption arising from site activities		
Compliance requirement	Tick	Evidence/Reference
Monthly measurements of water consumption will be/were recorded and displayed on site.		
Appropriate target* levels of water consumption will be/were set and displayed (targets could be annual, monthly or project targets). These should be based on the actual consumption figures from previous projects and should be appropriate to each construction stage.		
As a minimum, monitoring will/did include checking the meters and displaying some form of graphical analysis in the site office to show consumption over the project duration and how actual consumption compares to targets set.		
The design/site management team will/did nominate an individual responsible for the monitoring and collection of data.		
<p>Notes:</p> <ul style="list-style-type: none"> Targets for water consumption during the construction process should be set using Constructing Excellence' Environmental KPI benchmarks. These documents do not specify targets but facilitate projects in setting appropriate targets. www.constructingexcellence.org.uk/zones/kpizone/default.jsp or http://www.ccinw.com/sites/kpi_pages.html?site_id=5&section_id=171 BREEAM does not require targets to be met but is encouraging the process of setting, monitoring and reporting targets. 		
d. Adopt best practice policies in respect of air (dust) pollution arising from site activities		
Compliance requirement	Tick	Evidence/Reference
<p>The site will/did adopt best practice procedures in relation to minimising air/dust pollution. This should include:</p> <ul style="list-style-type: none"> 'dust sheets' regular proposals to damp down the site in dry weather covers to skips etc. 		
This information will be/was disseminated to site operatives.		

Notes:
<ul style="list-style-type: none"> For more information, see guidelines “Rent Tørt Bygg” published by RIF and also described in SINTEF B. Further information can be obtained from BRE/EA publications ‘Control of Dust from Construction and Demolition Activities’ and Pollution Control Guide Parts 1-5 provide good practice guidelines on construction related pollution. Building Detail 501.107 Clean, dry and tidy building process.

e. Adopt best practice policies in respect of water (ground and surface) pollution occurring on the site

Compliance requirement	Tick	Evidence/Reference
The site will/did adopt best practice procedures in relation to minimising impact, as outlined in the following documents. Where these do not exist, compliance should be demonstrated in accordance with: PPG 1 - General guide to the prevention of pollution. Environment Agency PPG 5 - Works in, near or liable to affect watercourses. Environment Agency PPG 6 - Working at demolition and construction sites. Environment Agency		
This information will be/was disseminated to site operatives.		

f. A main contractor with an environmental materials policy

Compliance requirement	Tick	Evidence/Reference
The main contractor operates an environmental materials policy, used for sourcing of construction materials to be utilised on site. The policy should cover/promote the following: <ul style="list-style-type: none"> Use of local materials (where possible) Use of responsibly sourced materials Re use of materials Use of materials with a high recycled content Waste minimisation and recycling Use of non-toxic materials & refrigerants with a low global warming potential Use of materials with a low embodied impact Use of durable materials 		

<p>Post construction: indicative examples have been provided to demonstrate the policy in action.</p>		
<p>g. A main contractor that operates an Environmental Management System*</p>		
<p>Compliance requirement</p>	<p>Tick</p>	<p>Evidence/Reference</p>
<p>The main contractor operates an Environmental Management System covering their main operations. The EMS must be third party certified, to ISO14001/EMAS or equivalent standard (e.g national EMS for small and medium enterprises).</p>		

h. 80% of site timber is reclaimed, re-used or responsibly sourced		
Compliance requirement	Tick	Evidence/Reference
80% of timber used during construction, including formwork, site hoardings and other temporary site timber used for the purpose of facilitating construction, will be/was procured from sustainably managed sources, independently certified by one of the top two levels as set out in the Responsible Sourcing of Materials Issues (BREEAM issue Mat 5) in the Materials section of this document.		
Additionally 100% of all site timber will be/was legally sourced.		
Notes: <ul style="list-style-type: none"> • Re-used timber from off site can be counted as equivalent but re-usable formwork only complies if it meets the above criteria. • This credit can be awarded where all the timber used is reclaimed timber. 		

Existing building fit out assessment only items

Adopt best practice policies in respect of air (dust) pollution arising from site activities		
Compliance requirement	Tick	Evidence/Reference
The site will/did adopt best practice procedures in relation to minimising air/dust pollution. This should include: <ul style="list-style-type: none"> • 'dust sheets' • regular proposals to damp down the site in dry weather • covers to skips etc. 		
This information will be/was disseminated to site operatives.		
Notes: <ul style="list-style-type: none"> • Further information can be obtained from BRE/EA publications 'Control of Dust from Construction and Demolition Activities' and Pollution Control Guide Parts 1-5 provide good practice guidelines on construction related pollution. 		

Appointment of a fit out contractor who has an environmental materials policy		
Compliance requirement	Tick	Evidence/Reference
<p>The fit out contractor operates an environmental materials policy, used for sourcing of construction materials to be utilised on site. The policy should cover/promote the following:</p> <ul style="list-style-type: none"> • Use of local materials (where possible) • Use of responsibly sourced materials • Re use of materials • Use of materials with a high recycled content • Waste minimisation and recycling • Use of non-toxic materials & refrigerants with a high global warming potential • Use of materials with a low embodied impact • Use of durable materials 		
<p>Post construction: indicative examples have been provided to demonstrate the policy in action.</p>		
Appointment of a fit contractor who operates an Environmental Management System		
Compliance requirement	Tick	Evidence/Reference
<p>The fit out contractor operates an Environmental Management System covering their main operations. The EMS must be third party certified, to ISO14001/EMAS or equivalent standard.</p>		

Assessor Information

Monitoring Site Transport CO₂

The following tables are taken from the DEFRA 'Guidelines for Company Reporting on Greenhouse Gas Emissions' and COPERT II emission factors, and can be used to convert the information gathered from monitoring deliveries into total kg CO₂.

Table 14.1 Standard road transport fuel conversion factors					
Fuel used	Total units used	Units	x	kg CO₂ per unit	Total kg CO₂
Petrol		litres	x	2.30	
Diesel (inc. Low Sulphur)		litres	x	2.63	
Compressed Natural Gas		kg	x	2.65	
Liquid Petroleum Gas		litres	x	1.49	

Source: National Atmospheric Emissions Inventory for 2003 developed by Netcen (2005). UK Greenhouse Gas Inventory for 2003 developed by Netcen (2005), Digest of UK Energy Statistics DTI 2004 and carbon factors for fuels from UKPIA (2004)

Table 14.2 Standard road transport fuel conversion factors					
Size of car and distance units	Total units travelled	Units	x	kg CO₂ per unit	Total kg CO₂
Small petrol car max. 1.4 litre engine		miles	x	0.26	
		km	x	0.16	
Medium petrol car max. 1.4-2.1 litre engine		miles	x	0.30	
		km	x	0.19	
Large petrol car above 2.1 litres		miles	x	0.35	
		km	x	0.22	
Average petrol car		miles	x	0.29	
		km	x	0.18	

Source: NAEI (Netcen, 2005) based on data from DfT combined with factors from TRL as functions of average speed of vehicle derived from test data under real world testing cycles

Table 14.3 Standard Road Transport Fuel Conversion Factors

Size of car and distance units	Total units travelled	Units	x	kg CO ₂ per unit	Total kg CO ₂
Small Diesel car 2.0 litres engine and under		miles	x	0.26	
		km	x	0.16	
Large Diesel car over 2.0 litres - 2.1 litre engine		miles	x	0.31	
		km	x	0.19	
Average Diesel car		miles	x	0.27	
		km	x	0.17	

Source: NAEI (Netcen, 2005) based on data from DfT combined with factors from TRL as functions of average speed of vehicle derived from test data under real world testing cycles.

Table 14.4 Freight road mileage conversion factors

Type of lorry	Total km travelled	x	Litre Fuel per km	x	Fuel Type	Fuel Conversion Factor	Total kg CO ₂
Articulated		x	0.35	x	Petrol	2.30	
					Diesel	2.63	
					LPG	1.49	
Rigid		x	0.40	x	Petrol	2.30	
					Diesel	2.63	
					LPG	1.49	

Source: Guidelines for Company Reporting on Greenhouse Gas Emissions, DEFRA. Continuing Survey of Road Goods Transport 2001.

14.3 Technical Checklist A4: LE3 Land of Low Ecological Value

Section 1: Ecological features of the site		
Instruction: criteria 1.1-1.5 can be used to determine the presence of existing ecological features across the total site. However, if YES is recorded against any question in Section 1 for the <i>construction zone</i> , then it cannot be defined as <i>land of low ecological value</i> and the credit cannot be awarded. If the <i>construction zone</i> records a NO against all the questions in Section 1 then proceed to Section 2.		
1.1	Does the site contain any trees or hedges above 1m high or with a trunk diameter greater than 100mm?	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.2	Are there any ponds, streams or rivers on, or running through the site?	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.3	Is there any marsh or other wetland present on the site?	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.4	Are there any meadows or species-rich grassland present on the site?	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.5	Is there any heath land such as heather present on site?	YES <input type="checkbox"/> NO <input type="checkbox"/>
Section 2: Type of land to be used for the new building		
Instruction: in addition to answering NO to all the questions in Section 1, if YES is recorded against one or more of the questions in Section 2 then the <i>construction zone</i> can be defined as <i>land of low ecological value</i> . This credit can then be awarded, as long as all features of ecological value (as defined in Section 1) in the surrounding site and boundary area are adequately protected from damage.		
2.1	Does the <i>construction zone</i> consist of land which is entirely within the footprint of existing building(s) or building(s) demolished within the past 2 years?	YES <input type="checkbox"/> NO <input type="checkbox"/>
2.2	Does the <i>construction zone</i> consist of land which is entirely covered by other construction such as hard surfaces, car parking or such constructions which have been demolished within the past two years?	YES <input type="checkbox"/> NO <input type="checkbox"/>
2.3	Does the <i>construction zone</i> consist of land which is contaminated by industrial or other waste to the extent that it would need decontamination to facilitate development?	YES <input type="checkbox"/> NO <input type="checkbox"/>
2.4	Does the <i>construction zone</i> consist of land which is a mixture of either existing building(s), hard surfaces and/or contaminated land?	YES <input type="checkbox"/> NO <input type="checkbox"/>
2.5	Does 80% of the land within the <i>construction zone</i> comply with statements 2.1, 2.2 or 2.3 and the remaining 20% of the footprint of the <i>construction zone</i> extend into land which has been either: a. Used for single-crop arable farming for at least 5 years, OR b. Consists of regularly cut lawns and sports fields	YES <input type="checkbox"/> NO <input type="checkbox"/>

14.5 Technical Checklist A5: Mat 5 Responsible Sourcing of Materials

Table 1 Checklist of criteria for Tiers 1-4

Tier	Criteria	Examples of compliant schemes	Checklist of documentation required
1	<p>Third party certification scheme with CoC and rigorous stakeholder consultation (at both standard setting and during implementation)</p> <p>Scheme must have developed standards which meet the criteria outlined in Table 39 below.</p>	<p>FSC CSA SFI with CoC PEFC Reused materials, Schemes compliant with BES6001:2008 (or similar) Excellent* and Very Good* Performance Ratings (Note; the EMS required to achieve these ratings must be independently certified)</p>	<p>Design One of the following indicating that the material will comply with the relevant certification scheme.</p> <ul style="list-style-type: none"> ○ Letter of intent from supplier OR ○ Purchase order from the supplier including CoC number (if the material has been ordered) or BES6001:2008 Certificate number OR ○ Chain of Custody (CoC) or BES6001 certificate (if material has already been supplied) <p>Post Construction</p> <ul style="list-style-type: none"> • A copy of the CoC certificate and/or BES6001:2008 certificate for all appropriate materials/elements. AND • Delivery notes for all appropriate materials/elements.
2	<p>Third party certification scheme with CoC and stakeholder consultation.</p> <p>Scheme must have developed standards which meet the criteria outlined in Table 39 below.</p>	<p>Schemes compliant with BES6001:2008 (or similar) Good* and Pass* Performance Ratings (Note; the EMS required to achieve these ratings must be independently certified)</p>	<p>As above.</p>

Tier	Criteria	Examples of compliant schemes	Checklist of documentation required
3	Certification Scheme for timber Environmental Management System at extraction & process stages - see Table 38 below for description of stages.	ISO 14001 EMAS Evidence of BS8555 (for SME's) MTCC Verified** SGS TFT	<p>Design</p> <p><u>Timber</u></p> <p>One of the following indicating that the material will comply with the relevant certification scheme.</p> <ul style="list-style-type: none"> ○ Letter of intent from supplier OR ○ Purchase order from the supplier including CoC number (if the material has been ordered) OR ○ Chain of Custody (CoC) certificate (if timber has already been supplied) <p><u>Non timber materials</u></p> <p>One of the following indicating that the material will comply with the relevant EMS standards (see issue for further information).</p> <ul style="list-style-type: none"> • EMS (or equivalent) certificate from the manufacturers at the process and extraction stages OR • Signed letter from the manufacturers at the process and extraction stages confirming EMS (or equivalent) certification details OR • Letter of intent from the developer to use a manufacturer at the process and extraction stages, who has an EMS (or equivalent), if supplier is not yet appointed.

Tier	Criteria	Examples of compliant schemes	Checklist of documentation required
3			<p>Post Construction</p> <ul style="list-style-type: none"> • Delivery notes for all appropriate elements <p><u>Timber</u></p> <ul style="list-style-type: none"> • CoC certificate for all appropriate elements <p><u>Non timber materials</u></p> <p>One of the following indicating that the material will comply with the relevant EMS standards (see issue for further information).</p> <ul style="list-style-type: none"> • EMS certificate (or equivalent) from the manufacturers at the process and extraction stages OR • Signed letter from the manufacturers at the process and extraction stages confirming EMS (or equivalent) certification details <p>In addition:</p> <ul style="list-style-type: none"> • Delivery notes for all appropriate elements
4	Environmental Management System at process stages for other materials - see Table 38 below for description of stages.	EMAS ISO 14001	<p>Design</p> <p>One of the following indicating that the material will comply with the relevant EMS standards (see issue for further information).</p> <ul style="list-style-type: none"> • EMS (or equivalent) certificate from the manufacturers at the process stage OR • Signed letter from the manufacturers at the process stage confirming EMS (or equivalent) certification details OR • Letter of intent from the developer to use a manufacturer at the process stage, who has an EMS (or equivalent), if supplier is not yet appointed.

Tier	Criteria	Examples of compliant schemes	Checklist of documentation required
			<p>Post Construction</p> <p>One of the following indicating that the material will comply with the relevant EMS standards (see issue for further information).</p> <ul style="list-style-type: none"> • EMS certificate (or equivalent) from the manufacturers at the process stage OR • Signed letter from the manufacturers at the process stage confirming EMS (or equivalent) certification details.

* Performance ratings for schemes compliant with BES6001:2008 (or similar) can only be used to demonstrate compliance with the criteria of this issue where certification covers the key process and supply chain processes for the material being assessed.



** 'Verified' is the name of a scheme

To view a list of products approved to BES6001:2008 (including copies of their certificates) visit: www.greenbooklive.com/page.jsp?id=169

Where ANY non certified timber is used (even if only a small quantity) the following must also be provided in ALL cases:

- Written confirmation from the timber supplier(s) (or at the design stage of assessment, the developer where a supplier is not yet appointed) confirming that all timber species and sources used in the development are not listed on any of the CITES appendices for endangered and threatened species (see issue for further information).
- Written confirmation from the timber supplier(s) (or at the design stage of assessment the developer where a supplier is not yet appointed) confirming that all timber is to be legally sourced (see issue for further information).

Table 2 Diagram of how the required EMS relates to the process and extract

Stage of production process	Extraction	Process
Materials	Stone Aggregate (sand, limestone etc.) Hematite Bauxite Clay Raw materials - other	Bricks Cement or alternative Glass Metals Other materials (plastic etc) Pre-cast concrete
<p>Points available</p> <p style="text-align: right;">  1 point </p> <p style="text-align: center;">  1.5 points </p>		

As this issue is looking at responsible sourcing, currently the manufacture stage is n

NOTE TO ASSESSORS

This list is included for information, you are not expected to evaluate whether a scheme complies with this criteria. All new schemes claiming to meet the criteria listed below will be evaluated by BRE, and will be included in the list of compliant schemes where appropriate.

Features of a top tier (1) comparable certification scheme: Standard setting

When setting standards for a materials certification scheme the following should be addressed in order to be considered comparable to Tier 1/2 of this issue.

- The scheme must include a third party chain of custody certification scheme covering all stages of the product throughout the supply chain
- The scheme must verify that all local and national legislative criteria are met.
- The process for policy and standards development is transparent, clear and accessible.
- The scheme is independent and standards are developed in a way which balances the interests of all stakeholders. This should be done through a rigorous consultation process which makes best use of the stakeholder knowledge, methodically and comprehensively considering all feedback and after such consideration, aims to implement all feasible stakeholder suggestions
- The scheme is inclusive, striving to involve all interested people and groups in the development of the scheme's policies and standards.
- Monitoring and assessment must be integral to the scheme and conducted appropriate to the scale and intensity of the industry/ materials assessed by the scheme. This requirement is likely to be fulfilled by the incorporation of an EMS such as ISO14001 for SME's.
- The scheme should contain principles by which the scheme should be governed. These should be specific to industry/materials but should also be composed of the fundamental issues related to the environment. These issues should focus on specific practices associated with sourcing virgin and other materials.
- The scheme should assess that initiatives are in place to ensure continuous performance and environmental improvement.
- The scheme should provide for small to medium sized business as well as larger businesses. SME's grouping together to achieve group certification should be an option. This could, for example, take place on a regional or other relevant basis.
- The scheme should include a mechanism to revise the standard within a defined, suitable time frame to ensure that the current knowledge or upcoming robust scientific or other professional evidence can be incorporated (in good time) into the standard as an update. It should ensure that all updates are well adapted to the local/regional and/or global conditions.
- The scheme should also aim to consider social and economic aspects widening the scope to sustainability under the umbrella of a Corporate Social Responsibility (CSR). This is in line with the future aims of BREEAM and could be assessed within this issue in the future.

NOTE: The scheme may be generic for the materials industries or specific for individual materials sectors.

Differences between Tier 1&2

Tiers 1 and 2 follow the standard setting process outline above, however there are differences in the rigour of the two schemes which is why they fall into two different categories. These are outlined below:

1. The top tier category schemes comprehensively address a consultation process with local community. This is done at source via a management company, as the focus is on sustainable project management at source.
2. The top tier category must have no reservations/uncertainty/pending charge or indictment identified by any professional bodies in the relevant materials sectors.

14.6 Technical Checklist A6: Guidance for relating ecologist's report to BREEAM

Before completing this form please read the following:

1. This guidance document is to be used for BREEAM Europe 2009 assessments, where an ecologist has been appointed and produced an ecology report as part of a proposed development.
 2. As an ecologist may have been appointed to carry out ecological site surveys and produced an ecology report without being aware that a BREEAM assessment has been, or is to be conducted, the purpose of this document is to help assist assessors relate the contents of such a report to the land use and ecology criteria of BREEAM.
 3. The assessor is to request that the appointed ecologist complete all sections of this guidance and return it to the BREEAM assessor along with all relevant documentation required to demonstrate compliance with the BREEAM criteria.
 4. The assessor is to use this completed document in conjunction with the latest version of the relevant BREEAM technical guidance manual and information provided by the developer / client to carry out the assessment of the land use and ecology BREEAM issues.
- There are 6 sections (sections A - F) in this document.
 - Section A requires contact details for the ecologist and developer / client.
 - Section B1 determines whether the appointed ecologist is '*suitably qualified*' (under BREEAM); and if not, section B2 determines whether the report has been verified by an ecologist who is '*suitably qualified*'.
 - Section C determines whether the findings of the report have been based on data collected from site surveys conducted at appropriate times of the year to determine whether different species are evident.
 - **If 'no' is recorded for either Section B or C then the contents of the ecology report cannot be used to determine compliance with the BREEAM criteria.**
 - Section D provides the BREEAM assessor with the necessary information to complete the assessment of the ecology related BREEAM issues.
 - Section E provides details of the documentation / information required by BREEAM as evidence of compliance.
 - Section F requires the signature of the appointed ecologist who has completed this document.

Please note: it is only the appointed qualified and licensed BREEAM assessor who can award or withhold a credit for all BREEAM assessments.

Section A: Contact Details

Ecologist's Details

Company name:

Company address:

Contact name:

Contact telephone number:

Ecology report reference:

Developer / Client Details

Company name:

Company address:

Contact name:

Contact telephone number:

Section B1: Ecologist’s Qualifications

1. Do you hold a degree (or equivalent qualification) in ecology or related subject?

Yes No

If yes, please provide details.....
.....
.....

2. Are you a practising ecologist with a minimum of 3 years relevant experience within the last 5 years? *Relevant experience must clearly demonstrate a practical understanding of factors affecting ecology in relation to construction and the built environment and will include acting in an advisory capacity to provide recommendations for ecological protection, enhancement and mitigation measures, e.g. ecological impact assessments.*

Yes No

If yes, please provide details.....
.....
.....
.....
.....
.....
.....

If ‘no’ has been answered for any question in Section B1 then the BREEAM requirement for a ‘suitably qualified ecologist’ has not been met. The ecology report CANNOT be used to assess the BREEAM Ecology issues unless it is verified by an individual who is ‘suitably qualified’ (see section B2 below).

Section B2: Report Verification

Details on verifying an ecology report for a BREEAM assessment:

1. The individual verifying the report must provide written confirmation that they comply with the definition of a '*suitably qualified ecologist*' (as detailed in Section B1 above).
2. The verifier of the report must confirm in writing they have read and reviewed the report and found it to:
 - represent sound industry practice
 - report and recommend correctly, truthfully, and objectively
 - be appropriate given the local site conditions and scope of works proposed
 - avoid invalid, biased, and exaggerated statements.

Written confirmation from the third party verifier on all the points detailed under 1 and 2 above (for section B2) must be included in an appendix to this guidance (see section E).

If the appointed ecologist does not meet the criteria of a '*suitably qualified ecologist*' and the report has not been verified by an individual who does meet these criteria, then the report CANNOT be used as evidence of compliance with the ecology related BREEAM.

Section C: Site Survey

1. Have the findings of the ecology report been based on data collected from a site survey(s)? *The site visit(s) and survey(s) must be conducted at appropriate times of the year when it is possible to determine the presence, or evidence of the presence, of different plant and animal species.*

Yes

No

If yes, please provide details to justify this (e.g. date(s) and scope of site survey(s))

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

If 'no' has been answered to question 1 of Section C then the ecology report CANNOT be used to determine compliance with the criteria of the relevant BREEAM ecology issues.

Note to suitably qualified ecologist and BREEAM assessor: the contents of the ecology report must be representative of the site's existing ecology prior to the commencement of initial site preparation works.

Section D: Site Survey Details

LE3 Ecological value of land and protection of ecological features

- 1. Is the land within the 'construction zone' deemed by the *suitably qualified ecologist* to be of low ecological value?

The construction zone is defined as any land on the site which is being developed (and therefore disturbed) for buildings, hard standing, landscaping, site access, plus a 3m boundary in either direction around these areas. It also includes any areas used for temporary site storage and buildings.

Yes No

If yes, please provide a brief statement explaining how it has been deemed to be of low ecological value:

.....

.....

.....

.....

.....

.....

.....

- 2. Are there any features / areas of ecological value that fall within the site, but outside the *construction zone*?

If you have deemed this area to be of low ecological value then there will be no features of ecological value to protect. However, if there is a feature(s) or area(s) of low ecological value you wish to advise be retained and enhanced, e.g. a species-poor hedgerow to a species-rich hedgerow, then full details of the protection and enhancement advice should be entered under LE4 Impact on site ecology.

Yes No

p.t.o

If yes, please provide a brief statement outlining the advice / recommendations given for protecting **all** existing features and areas of ecological value:

.....
.....
.....
.....
.....
.....
.....
.....
.....

LE4 Impact on site ecology

3. Are you able to provide the following information for before and after construction:

- habitat types
- An estimate of the number of floral species present per habitat type (based on appropriate census techniques and confirmed planting regimes)?

Yes

No

a. If yes a brief description of the landscapes and habitats surrounding the development site

.....
.....
.....
.....
.....
.....
.....

b. The total site area (in m²). *This will be the same before and after development.*

.....

p.t.o

c. Please fill in the table below with site details before development¹:

Habitat Type*	Area of type (m ₂)	No. of plant species per habitat type

d. Please fill in the table below with site details after development¹:

Habitat Type*	Area of type (m ₂)	No. of plant species per habitat type

* Habitat types will include natural areas, e.g. various grasslands and woodlands; as well as areas of the built environment, e.g. buildings, hard landscaping. The area of each habitat type when added together must always equal the total area of the development site.

¹ Note to assessor (and ecologist where requested to carry our calculations); the information contained in tables c. and d. above can be used to calculate both LE4 Impact on site ecology.

4. Has the client / developer required you to provide advice and make recommendations for enhancing site ecology?

Note: these are to include, and go beyond, compliance criteria for all current EU and UK legislation relating to protected species and habitats.

Yes No

If yes, please provide a brief statement outlining the advice / recommendations given on enhancing and protecting the ecological value of the site:

.....

.....

.....

.....

.....

.....

5. Has the client / developer requested you to carry out the calculation for LE4 Impact on site ecology (where relevant)?

The calculations must be carried out in line with the methodology provided in the current version of the relevant BREEAM scheme's technical guidance manual.

Yes No

If yes, please provide all stages of calculations and state what the total change in ecological value is:

a. Calculation of *ecological value* before development:

.....

.....

.....

.....

.....

b. Calculation of *ecological value* after development:

.....

.....

.....

.....

.....

c. Change in *ecological value* (c = b – a):

.....

.....

.....

.....

.....

LE6 Long term impact on biodiversity

6. Were you appointed prior to commencement of development work activities on site?

Yes No Don't know

7. Has the client / developer given you the responsibility to confirm whether all current EU and UK legislation relating to protection and enhancement of ecology has been (or will be) complied with during the design and construction process?

Yes No

If yes, please provide details on all current EU and UK legislation that relates to the site:

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

8. Has the developer / client appointed you to produce an appropriate landscape/site ecology management plan covering at least the first 5 years after project completion?

Yes No

EITHER:

a. If yes, and the management plan has already been produced does it include the following:

- management of any protected features on site
- management of any new, existing, or enhanced habitats
- a reference to the current or future site level Biodiversity Action Plan?

Yes No

OR

b. If yes, but the management plan is still to be produced (due to it being too early in the design/construction phase), have you provided the following information to the developer / client:

- scope of management plan
- key responsibilities, and with whom these responsibilities lie, e.g. owner, landlord, occupier?

Yes No

If you have answered 'yes' to either question 8a or 8b please provide a brief explanation outlining the details

.....

.....

.....

.....

.....

9. Has the client / developer required you, as part of your responsibilities, to provide recommendations and advice to minimise detrimental impacts on site biodiversity?

Yes No N/A

If yes, or not applicable, please briefly explain your reasoning:

.....

.....

.....

.....

.....

10. Do your responsibilities to the client / developer include providing advice and recommendations for the protection of ecological features?

Yes No N/A

If yes, or not applicable, please briefly explain your reasoning:

.....

.....

.....

.....

.....
.....
.....

11. Do your responsibilities to the client / developer include providing advice on the creation of a new ecologically valuable habitat, which is appropriate to the local area and is either nationally, regionally, or locally important, or supports nationally, regionally, or locally important biodiversity?

Yes No N/A

If yes, or not applicable, please briefly explain your reasoning:

.....
.....
.....
.....
.....
.....
.....
.....

12. Do your responsibilities to the client / developer include providing advice and recommendations on when site works are to be avoided so as to minimise the disturbance to wildlife?

Yes No N/A

If yes, or not applicable, please briefly explain your reasoning

.....
.....
.....

.....

.....

.....

Section E: Schedule of Evidence

Copies of the following documentation are required to support the above statements and act as evidence of compliance with the BREEAM ecology criteria:

- The *suitably qualified ecologists* site/project specific report
- Written confirmation from the verifier of the ecology report (where necessary)
- Any supplementary documentation e.g. maps, plans, drawings, letters / emails of correspondence, etc.

Please include these details along with the appropriate reference to each document in the table below:

Document	Reference

Section F: Statement of Verification

I confirm the information provided on this document is truthful and accurate at the time of completion.

Name of ecologist:

Signature of ecologist:

Date:

14.7 Technical Checklist A9: NOx emissions grid electricity

Country	Average NOx emissions (mg/kWh) grid electricity
Austria	140
Belarus	2720
Belgium	295
Bulgaria	2100
Croatia	535
Czech Republic	1315
Denmark	570
Estonia	1510
Finland	405
France	355
Germany	435
Greece	2570
Hungary	675
Iceland	10
Ireland	1045
Italy	220
Latvia	295
Liechtenstein	Same as Switzerland
Lithuania	545
Luxembourg	No data available yet. Please refer to the Luxembourg reference sheet for further guidance.
Monaco	Same as France
Netherlands	255
Norway	10
Poland	1550
Portugal	855
Romania	2430
Russian Federation	2300
Slovakia	345
Slovenia	860
Spain	1205
Sweden	70
Switzerland	300
Turkey	1320
Ukraine	2040
UK	1050

Source:

- *Common Reporting Format for the provision of inventory information by Annex I Parties to the UNFCCC 2007*, available at http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php
- *Eurostat - Energy yearly statistics 2007*, available at http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-PC-09-001/EN/KS-PC-09-001-EN.PDF

14.9 Technical Checklist A15: Site Waste Management Plan

Checklist A15a - SWMP procedures for monitoring site waste and target setting to promote resource efficiency		
Criteria	Evidence demonstrating how criteria will be met	Reference
SWMP implementation of design phase decision(s) taken to minimise on-site waste produced.		
Identification of individual responsible for planning and preparing the SWMP and ensuring that it is followed. This must either be the client or the principal contractor, according to the stage of the project.		
Identification of the waste groups (according to Checklist A15b) and estimated quantities of waste expected at every stages of the work programme/plan.		
Identification of waste management options, for each waste group, including reference to the waste hierarchy (reduce, re-use, recycle), on and off-site options. Highlight arrangements to identify and manage any hazardous waste.		
Identify and record waste management sites, transactions and contractors for all wastes that require them. Ensure that the contracts are in place and that wastes are handled efficiently, in compliance with legal requirements such as the Duty of Care.		
Set targets and procedures for monitoring progress.		
Provide suitable site induction, information and training both for in-house and sub-contracted staff, guaranteeing that everyone knows the requirements of the SWMP and what it is expected of them.		
Confirmation that the site construction waste is being monitored.		
Measure and record the amount of waste per type produced on a weekly basis. Where possible, use of an established system such as SMARTWaste.		
Continuously update the SWMP during the construction phase (according to best practice).		
After the project completion, revise the SWMP, noting all deviations from initial targets, including resource and estimate cost changes.		

Checklist A15b – Construction waste groups					
EWC Codes	Key Group	Examples	Materials to be monitored (as per Checklist A15a)	As specified in the SMWP	
				Materials to be reduced (2nd credit)	Materials to be diverted from landfill (3rd credit)
170102	Bricks	Bricks			
170101	Concrete	Pipes, kerb stones, paving slabs, concrete rubble, precast and in situ			
170604	Insulation	Glass fibre, mineral wool, foamed plastic			
15018	Packaging	Paint pots, pallets, cardboard, cable drums, wrapping bands, polythene sheets			
170201	Timber	Softwood, hardwood, boards products such as plywood, chipboard, medium density fibreboard (MDF)			
1602	Electrical and electronic equipment	Electrical & electronic TVs, fridges, air-conditioning units, lamps equipment			
200301	Canteen/office	Office waste, canteen waste, vegetation			
1301	Oils	Hydraulic oil, engine oil, lubricating oil			
1703	Asphalt and tar	Bitumen, coal tars, asphalt			
170103	Tiles and ceramics	Ceramic tiles, clay roof tiles, ceramic, sanitaryware			
1705	Inert	Mixed rubble/excavation material, glass			
1704	Metals	Radiators, cables, wires, bars, sheet			
170802	Gypsum	Plasterboard, render, plaster, cement, fibre cement sheets, mortar			
170203	Plastics	Pipes, cladding, frames, non-packaging sheet			
200307	Furniture	Tables, chairs, desks, sofas			
1705	Soils	Soils, clays, sand; gravel, natural stone			
	Liquids	Non-hazardous paints, thinners, timber treatments			
	Hazardous	Defined in the Hazardous Waste List (HWL) of the European Waste Catalogue (EWC)			
	Floor coverings (soft)	Carpets, vinyl flooring			
	Architectural Features	Roof tiles, reclaimed bricks, fireplaces			
170904 (Mixed)	Mixed/ other	Efforts should be made to categorise waste into the			

		above categories wherever possible			
--	--	------------------------------------	--	--	--

Note: where national/regional waste management regulation/policy/practice specify key waste groups to be grouped together for the purposes of being recovered (e.g concrete and bricks), please highlight this into your report, and check that the adequate number of waste groups as defined by the issue requirements have been identified for diversion from landfill with distinct end recovery products.

14.10 Technical Checklist A16: Contaminated land

NOTE: This checklist provides an indication of the likelihood of there being significant contamination problems on a site for the purposes of a BREEAM assessment only and sets out the scope of any site investigation and remedial strategy. It does not seek to evaluate types, levels or risks of contamination present on the site.

Checklist A16a: Likelihood of significant contamination on site		
<p>Instruction: criteria 1-5 can be used to determine the likelihood of significant contamination to be present in or on the ground across the total site for the purposes of a rapid evaluation against the BREEAM LUE2 credit requirements in BREEAM Europe.</p> <ol style="list-style-type: none"> 1. If the <i>construction zone</i> records a YES against any of the questions then nationally recognised strategies for investigation of contamination should be followed, or where such strategies do not exist, a robust site investigation, risk assessment and appraisal should be carried out by a competent Contaminated Land Specialist covering the requirements of Checklist A16b as a minimum.. 2. If NO is recorded against all questions for the <i>construction zone</i>, then the site may be defined as not <i>significantly contaminated without further review</i> and in such a case the credit cannot be awarded. This checklist is a simple review and in such instances the option remains for a site investigation, risk assessment and appraisal to be carried out as defined in Checklist A16b where the client wishes to do so 		
1	Is the site registered by the local authority or any other appropriate national land body as contaminated?	YES <input type="checkbox"/> NO <input type="checkbox"/>
2	Does the site have any previous uses that fall in the table 40 below? Where this cannot be answered because of a lack of information available, the worst case scenario should be assumed.	YES <input type="checkbox"/> NO <input type="checkbox"/>
3	Is the site within 250m of landfill?	YES <input type="checkbox"/> NO <input type="checkbox"/>
4	Is the site known or suspected to be contaminated (e.g. have studies already been undertaken on the site)?	YES <input type="checkbox"/> NO <input type="checkbox"/>
5	Does the local authority possess any information on the site that may give suspicions of contamination? Where this cannot be answered because of a lack of information available, the worst case scenario should be assumed.	YES <input type="checkbox"/> NO <input type="checkbox"/>

Checklist A16b: Scope of site investigation, risk assessment and appraisal report

Section 1: Desk top study

Instruction: Historical research and review of available information from sources such as archives, plans and records from regulatory authorities to discover the past and current activities at a site and in the surrounding area to determine the potential for the presence of contamination. If the initial desktop study investigation gives cause to believe there maybe a problem with contamination

then further more detailed investigations will be required (section 2 & 3). If not, then the site will not be considered contaminated for the purposes of this BREEAM issue, and the credit cannot be awarded. The study must be carried out by a Contaminated Land Specialist as defined in the Technical Guidance Document and should cover the following as a minimum:

1.1	Purpose and aim of study	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.2	Site location and layout plans	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.3	Appraisal of site history	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.4	Assessment of environmental setting, covering: <ul style="list-style-type: none"> • Geology, hydrogeology, hydrology • Industrial activity • Location of controlled waters (canals, estuaries, lakes, ponds, rivers, springs, aquifers) • Pollution incidents, landfill sites within 250m etc. 	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.5	Assessment of current/proposed site use and surrounding land uses	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.6	Review of any previous site contamination studies (desk-based or intrusive) or remediation works	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.7	Preliminary (qualitative) assessment of risks: <ul style="list-style-type: none"> • Appraisal of potential contaminant sources, pathways and receptors • Conceptual site model • Identification of <i>significant pollution linkages</i> 	YES <input type="checkbox"/> NO <input type="checkbox"/>
1.8	Recommendations for intrusive contamination investigation if necessary	YES <input type="checkbox"/> NO <input type="checkbox"/>

Section 2: Site investigation report

Instruction: The report must investigate each aspect highlighted by the desk study, this comprises exploratory holes constructed using the most appropriate method for the site to investigate the local subsurface strata. The report must cover the following as a minimum:

2.1	Site investigation methodology <ul style="list-style-type: none"> • Methods of investigation (see BS 10175: 2001 for further info) • Plan showing exploration locations • Justification of exploration locations • Sampling and analytical strategies 	YES <input type="checkbox"/> NO <input type="checkbox"/>
2.2	Results and findings of investigation: <ul style="list-style-type: none"> • Ground conditions (soil and groundwater) • Discussion of soil/groundwater/surface water contamination 	YES <input type="checkbox"/> NO <input type="checkbox"/>
2.3	Risk assessment: <ul style="list-style-type: none"> • As a minimum, based on contaminant pathway receptor model • Takes account of severity of consequences and likelihood of occurrence. 	YES <input type="checkbox"/> NO <input type="checkbox"/>

2.4	Where applicable, recommendations for remediation based on: <ul style="list-style-type: none"> • Proposed site use • Risk assessment findings • Technical and financial appraisal. 	YES <input type="checkbox"/> NO <input type="checkbox"/>
Section 3: Options for remediation		
Instruction: If remediation is deemed necessary following the site investigation, then a site specific remediation methodology must be produced. Consultation with the regulatory authorities may be required to ensure satisfactory design and implementation of the remediation programme. The report must cover the following as a minimum:		
3.1	Detailed outline of the works to be carried out <ul style="list-style-type: none"> • Type, form and scale of contamination to be remediated • Remediation methodology • Site plans/drawings • Phasing of works and approximate timescales 	YES <input type="checkbox"/> NO <input type="checkbox"/>
3.2	Consents, agreements and licences (discharge consents, waste management licence etc)	YES <input type="checkbox"/> NO <input type="checkbox"/>
3.3	Site management procedures to protect site neighbours, environment and amenity during works: <ul style="list-style-type: none"> • Health and Safety procedures • Dust, noise and odour controls • Control of surface run-off 	YES <input type="checkbox"/> NO <input type="checkbox"/>
3.4	Details of how the works will be validated to ensure the remediation objectives have been met; <ul style="list-style-type: none"> • Sampling strategy • Use of on-site observations, visual/olfactory evidence • Chemical analysis • Proposed clean-up standards (i.e. contaminant concentrations) 	YES <input type="checkbox"/> NO <input type="checkbox"/>

List of Site Uses
<p><i>Chemicals are extensively used in industrial, domestic and agricultural applications. They may be introduced to the land during their manufacture, use or disposal and may be deposited from the atmosphere, accidental spills, migration, leaks and legal or illegal disposal. There are also natural sources of contamination, whereby concentrations of certain substances in the soil are elevated and may pose a threat to people or the environment. There is a risk of significant contamination where land has been used for activities including but not limited to:</i></p> <ul style="list-style-type: none"> • Agricultural uses • Chemical works • Energy Industry - Power stations • Engineering and manufacturing processes • Extractive Industry & Mineral processing • Food processing industry • Gas works • Glass making and ceramics • Hospitals & Cemeteries • Infrastructure • Laboratories • Landfill • Manufacturing of asbestos • Metal processing

- Mills
- Oil refineries
- Paper, pulp and printing industries
- Petrol stations
- Premises for dry cleaning
- Production of metal
- Production of non-metals and their products
- Railway Land
- Road Vehicle maintenance
- Rubber industry
- Sewerage treatment
- Textile industry
- Timber and timber products industry
- Use as a scrap metal store
- Waste Disposal
- Waste management facility
- Wood preserving yards
- Works non-specified
- Demolition of buildings for any of the above uses
- Mining
- Waste management

14.12 Technical Checklist A20: Miljøgiftslisten

Checklist A 20

PRODUCT GROUP	CHEMICALS TO BE AVOIDED	ARE SWAN-LABELLED PRODUCTS AVAILABLE? (pr okt-11, can easily be substituted, www.ecolabel.no)	DOCUMENTATION (to be filled in for each project) (When using products labelled with the Swan or the EU –flower, no other documentation is necessary to confirm that requirements are met)
Building materials			
Boards	Arsenic, Lead, Brominated flame retardants (HBCD, TBBPA), Phthalates DEHP, BBP and DBP, Chromium, Octyl-/Nonylphenol	Yes	
Vinyl flooring	Phthalates DEHP, BBP, DBP, Bisphenol A, Lead, Brominated flame retardants (HBCD, TBBPA), medium-chained chlorinated paraffins (short-chain paraffins are prohibited)	No	
Wallpaper (vinyl-/wet room wallpaper and fibreglass wallpaper)	Brominated flame retardants (HBCD, TBBPA), Phthalates DEHP, BBP and DBP, Lead, Arsen og medium-chained chlorinated paraffins	No	
Carpets	PFOS/PFOA	No	
Woodwork	Creosote	Yes	
XPS (extruded polystyrene), EPS (expanded polystyrene) Cellular rubber insulation	Brominated flame retardants (HBCD, TBBPA) (flame retardants penta-, okta- og deka-BDE is prohibited)	No	
Polycarbonate sheet	All polykarbonat contains Bisphenol A	No	
Windows/ exterior doors	Bisphenol A, Brominated flame retardants (HBCD, TBBPA), Phthalates DEHP, BBP and DBP, chlorinated paraffins, PFOS/PFOA, Octyl-/Nonylphenol	Yes	
Chemical products			
Glue	Bisphenol A, BBP and DBP, chlorinated paraffins, Krom, Octyl-/Nonylphenol	Yes	
Fillers, sealants and foam	Bisphenol A, Phthalates DEHP, BBP og DBP, chlorinated paraffins, Chromium, Octyl-/Nonylphenol, siloksan (D5)	Yes	
Paint, stains and varnishes	Bisphenol A, Lead, Phthalates DEHP, BBP and DBP, cadmium, chlorinated paraffins, Chromium, Octyl-/Nonylphenol og siloksan (D5)	Yes	

Information regarding checklist A20

Background

The list is based on Klifs list of the most environmentally hazardous chemicals, the “worst chemicals”, and their list of what chemical products and building materials they can be found in. Klif has gathered this information on their website www.erdetfarlig.no.

The basis for BREEAM-NORs requirements on documenting the absence of the “worst chemicals” lies in the law of product control § 3a The substitution duty, and TEK 10 § 9-2. Also, most products containing the “worst chemicals” are categorised as hazardous waste. The disposal of hazardous waste when replacing products means increased costs for the building owner.

Checklist A20 contains the most health- and environmentally hazardous chemicals based on Klifs assessment. There are more health- and environmentally hazardous chemicals in building materials. Visit www.erdetfarlig.no for further information. However, the minimum requirement of the content of these health- and environmental hazardous chemicals in BREEAM-NOR, is only related to Checklist A20.

How to use the checklist.

For each building material given in the left column, the project must document the absence of the corresponding chemicals in the building material. If the project does not use the building material in the left column, the project manager must confirm this in writing. When several products are used within each product group, ex. different types of paint or glue, all products used in the project must be checked out and documented.

The project can write a deviation statement if one finds it necessary, due to technicalities, to use a product which contains one of the “worst chemicals”. The deviation statement must be approved by auditor to be valid as an exception from BREEAM-NORs minimum requirements.

For building materials, approved documentation is one of the following:

- EPD (Environmental Product Declaration) stating the chemical content
- Sintef Byggforsk Teknisk Godkjenning (TG) of 1.1.10, as a guarantee that the product does not contain the listed chemicals.
- Eco – labelled the Swan or the EU-flower, for a listing of the labelled products see www.ecolabel.no
- A letter from the legally responsible at the producer in question stating that the given product does not contain one of the chemicals from the A20 checklist.

For chemical products one can also check against the Safety Data Sheet (EHS – data sheet) for the product. Safety Data Sheets are statutory for chemical products. The unwanted chemicals may occur under alternative conditions. Therefore; see the following alternative names for the different chemicals:

Bisfenol A: 4, 4'-isopropylidendifenol 4, 4'-(1-metyletyliden)bisfenol	Bromerte flammehemmere: Tetrabrombisfenol A (TBBPA) Heksabromsyklododekan (HBCDD)
Ftalater Di(2-Ethylhexyl)phthalate Dietylheksylftalat	PFOS/PFOA Perfluoroktansulfonat Perfluoroktansyre
Oktyl-/nonylfenoler Octylphenol Nonylphenol Oktylfenoletoksilat Octylphenol ethoxylate Nonylfenoletoksilat Nonylphenol ethoxylate Poly(oxy-1,2-ethanediyl), a-(nonylphenyl)-w-hydroxy- Fenol, 4-nonyl-, forgrenet	Bly Pb Lead Blykromat Blyfosfitt Blyoksid (blymønje) Blymonoksid Tetraetylbly Blynaftenat Blyulfomolybdatkromat (C.I.Pigment Red 104) Blyulfokromatgul (C.I.Pigment Yellow 34)
Krom	Klorparafiner

<p>Dikromtrioksid Kromtrioksid Blyulfokromatgul (C.I.Pigment Yellow 34) Blyulfomolybdatkromat (C.I.Pigment Red 104) Natriumdikromat Strontiumkromat Bariumkromat</p>	<p>Chlorinated paraffins Mellomkjedete klorparafiner Klorerte alkaner, C14-17 Medium chained chlorinated paraffins (MCCP)</p>
<p>Arsen Arsensyre Arsin (arsenhydrid) Blyhydrogenarsenat Diarsenpentoksid (arsenpentoksid) Diarsentrioksid (arsentrioksid, arsenikk) Trietylarsenat Galliumarsenid</p>	<p>Siloksan D5 Cyclomethicone Cyclopentasiloxane Pentacyclomethicone Dekametylsyklopentasiloksan</p>
<p>Kadmium Cd Cadmium Kadmiumcyanid Kadmiumoksid Kadmiumsulfid Kadmiumformiat Kadmiumfluorid Kadmiumjodid Kadmiumklorid Kadmiumsulfat Kadmiumheksafluorsilikat(2-)</p>	

15.0 References

Information listed by BREEAM issue.

Man 1

- **NS-EN 12599:2000** *Ventilasjon i bygninger - Prøvingsprosedyrer og målemetoder for overtakelse av installerte ventilasjons- og luftkondisjoneringsanlegg*
- **NS-EN 14336:2004** Varmesystemer i bygninger. Installasjon og ferdigstillelse av vannbaserte varmesystemer.
- **CEN EN 50491** *General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)*
- *Model Building Specification for Design, Installation, and Commissioning of Insulated Envelopes and Insulated Floors for Temperature Controlled and Ambient Environments*, International Association for Cold Storage construction (June 2003)
- *Good Practice Guide 347: Installation and commissioning of refrigeration systems*, Carbon Trust, 2003.
- *Cold Store Code of Practice Part 1 Enclosure Construction*, The Institute of Refrigeration, 1996.
- **EN 14175-2:2003** Fume cupboards - Part 2: *Safety and performance criteria*, 2003.
- **EN 14175-2:2003** Fume cupboards - Part 2: *Safety and performance criteria*, 2003.
- **EN 12469** – Biotechnology – Performance criteria for microbiological safety cabinets. 2000.

Man 3

- *COPERT II Computer programme to Calculate Emissions from Road Transport - Methodology and Emissions Factors*, Technical report No 6. <http://reports.eea.eu.int/TEC06/en>
- <http://www.smartwaste.co.uk>
- *Control of Dust from Construction and Demolition Activities*". V Kukadia, S Upton, D Hall BRE Press, 2003.
- *Controlling particles, vapour and noise pollution from construction sites*" - set of five Pollution Control Guides. V Kukadia, S Upton, C Grimwood, BRE Press, 2003.
- *Construction Site Transport: The Next Big Thing*, 2003, BRE and DTI. Available from: www.bre.co.uk/pdf/constructiontraffic.pdf
- *DTI Construction Industry KPI Pack includes Methods of Measurement, Handbook, KPI Wall Chart*, 2005. www.constructingexcellence.org.uk

Man 12

- **ISO 15686-5** *Service Life Planning – Life Cycle Costing*.

Hea 1

- **EN12464** *Light and lighting – Lighting of work places – Part 1: Indoor work places*
- Information Paper IP 23/93 "Measuring daylight", BRE, 1993.

Hea 5

- **EN 12464-1** *Light and lighting - Lighting of workspaces*, 2002
- **EN 12464-2** *Lighting of work places - Part 2: Outdoor work places*, 2007

Hea 8

- **EN 13779:2007** – *Ventilation for non-residential buildings – Performance requirements for ventilation and room-conditioning systems*.

- EN 15251:2007 – *Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics.*

Hea 9

- NS-EN 13986:2002 Wood-based panels for use in construction – Characteristics, evaluation of conformity and marking.
- NS-EN 14080:2005 Timber structures – Glued laminated timber – Criteria.
- NS-EN 14342:2005 Wood flooring – Characteristics, evaluation of conformity and marking.
- NS-EN 14041:2004 Resilient, textile and laminate floor coverings. Essential characteristics.
- NS-EN 13964:2004 Suspended ceilings. Criteria and test methods.
- NS-EN 13999-1:2007 Adhesives – Short term method for measuring the emission properties of low-solvent or solvent-free adhesives after application – Part 1: General procedures.
- NS-EN 233:1999. Wallcoverings in roll form – Specification for finished wallpapers, wall vinyls and plastics wallcoverings.
- NS-EN 234: Specification for wallcoverings for subsequent decoration.
- NS-EN 259-1:2001 Wallcoverings in roll form – Heavy duty wallcoverings – Part 1: Specifications.
- NS-EN 266:1992 Specification for Textile wallcoverings.
- NS-EN 717-1:2004 Wood-based panels Determination of formaldehyde release. Formaldehyde emission by the chamber method.
- NS-EN 13999-2:2007. Part 2: Determination of volatile organic compounds.
- NS-EN 13999-2:2007. Part 3: Determination of volatile aldehydes.
- NS-EN 13999-2:2007. Part 4: Determination of volatile diisocyanates.
- NS-EN 12149:1997 Wallcoverings in roll form – Determination of migration of heavy metals and certain other elements, of vinyl chloride monomer and of formaldehyde release.
- NS-EN 13300:2001 Paints and varnishes – water-borne coating materials and coating systems for interior walls and ceilings – Classification.
- Directive 2004/42/CE of the European Parliament and of the Council of 21 April 2004 on the limitation of emission of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC. Official Journal of the European Union L.143/87, 30.4.2004.
- EN ISO 11890-2:2006 Paints and varnishes. *Determination of volatile organic compound (VOC) content. Gas-chromatographic method.*
- BRE Digest 464 VOC Emissions from Building Products - Part 1: "Sources, testing and emission data", Chuck Yu, Derrick Crump, CRC Ltd, 2002
- BRE Digest 464 VOC Emissions from Building Products - Part 2: "Control, evaluation and labelling schemes", Chuck Yu, Derrick Crump, CRC Ltd, 2002.

Hea 10

- NS-EN 15251:2007 *Energy performance of buildings – Criteria for the indoor environment including thermal, indoor air quality, light and noise.*
- ISO EN 7730: 2005 *Ergonomics of the thermal environment - Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria*
- BRE's Environmental Design Guide for Naturally Ventilated and Daylit Offices. Report 345.
- CIBSE Applications Manual AM11 *Building energy and environmental modelling*, CIBSE, 1998.

Hea 13

- NS-EN ISO 717-1 *Acoustics – Rating of sound insulation in buildings and of building elements. Part 1. Airborne sound insulation*, 1997.
- NS-EN ISO 717-2 *Acoustics - Rating of sound insulation in buildings and of building elements. Part 2. Impact sound insulation*, 1997.
- NS-EN ISO 140-7 *Acoustics – Measurement of sound insulation in buildings and of building elements. Part 7. Field measurements of impact sound insulation of floors*, 1998.
- NS-EN ISO 140-4:1998 *Acoustics – Measurement of sound insulation in buildings and of building elements. Part 4. Field measurements of airborne sound insulation between rooms*

Ene 1

- “Energy Performance of Buildings Directive (EPBD)” <http://www.diag.org.uk/>
- “Thermal Insulation: Avoiding Risks”, C. Stirling, BRE Press, 2002.
- “U-Values in Europe” <http://www.eurima.org/index.php?page=u-values-in-europe>
- “Ventilation for Non-Residential Buildings – Performance Requirements for Ventilation and Room-Conditioning Systems”.
- www.aiisa.it/news/norma%20europea%20CEN%20TC%20156%20pr-EN13779.pdf
- “Ventilation for Buildings – Air Handling Units – Mechanical Performance”.
- <http://www.sistem-klima.com.tr/pdf/standards/prEN1886.pdf>

Ene 6

- NS-EN13187 Thermal performance of buildings, “*Qualitative detection of thermal irregularities in building envelopes. Infrared method*”.

Ene 7

- “*Guidelines on Energy Efficiency of Lift & Escalator Installations*”, EMSD, 2007.

Ene 8

- “*Energy consumption and efficiency potentials of lifts*”, Jürg Nipkow, Max Schalcher, Swiss agency for efficient energy use S.A.F.E.
- ISO DIS25745-1 *Energy performance of lifts, escalators and moving walks – Part 1 Energy and conformance*

Ene 9

- “*Guidelines on Energy Efficiency of Lift & Escalator Installations*”, EMSD, 2007.

Tra2

- OECD (1994). *Creating rural indicators for shaping territorial policy*. Organisation for Economic Co-operation and Development.

Tra 4

- NS-EN 12464-2 *Lighting of work places - Part 2: Outdoor work places*, 2007
- European Transport Safety Council (ETSC) <http://www.etsc.eu/home.php>
- *Safety of pedestrians and cyclists in urban areas*, ETSC, 1999

Tra 5 & 6

- *A travel plan resource pack for employers*, DfT, 2000.
- *A good practice guide to green travel plans* BCO, 2004.
- *The Essential Guide to Travel Planning*, DfT, 2008.
- Transport Energy Best Practice, *A Guide on Travel Plans for Developers*, DfT, 2005.

Wat 1 & 2

- CEN EN 997: *WC pans and WC suites with integral trap*, 2003.

Wat 5

- NS-EN 752:2008 Drain and sewer systems outside buildings
- NS-EN 12056:2000 Gravity drainage systems inside buildings
- NS-EN 12566:2000 *Small wastewater treatment plants <50PT*
- BRE Digest 365 *Soakaway Design*
- BRE Good Building Guide No 42 *Reed Beds*

Mat 1/2/6

- The Green Guide to Specification: www.thegreenguide.org.uk
- Envest – <http://www.bre.co.uk/page.jsp?id=52>
- Green Globes – <http://www.greenglobes.com/>
- Equer from Ecole des Mines – <http://www.cenerg.ensmp.fr/english/logiciel/indexequer.html>
- Eco-Quantum from IVAM – <http://www.ivam.uva.nl/index.php?id=59&L=1>
- ATHENA® Impact Estimator for Buildings - <http://www.athenasmi.ca/tools/impactEstimator>

Mat5

- EU Eco-Management and Audit Scheme (EMAS) (www.emas.org.uk/aboutemas/mainframe.htm) (http://europa.eu.int/comm/environment/emas/index_en.htm)
- International Standards for Organisation (ISO) www.iso.org/iso/en/ISOOnline.frontpage
- Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) (<http://www.cites.org/>)
- EU Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan (<http://europa.eu.int/>)
- SGS timber tracking programme (http://www.sgs.com/forest_services_?serviceld=8535&lobld=5548)
- TFT – Tropical Forest Trust (<http://www.tropicalforesttrust.com/>)
- FERN - European NGO campaigning for forests (www.fern.org)
- ProForest (www.ProForest.net)
- WWF (www.panda.org)
- Greenpeace Ancient Forest Campaign (www.greenpeace.org)
- Forests Forever Campaign (www.forestsforever.org)
- TFT - Tropical Forest Trust publication “*Good Wood, Good Business*” – (www.tropicalforesttrust.com)
- “*Good Wood Guide*”, Friends of the Earth/ Flora and Fauna International, 2002- (www.goodwoodguide.com)
- Wood for Good (www.woodforgood.com)
- “*Certification of Forest Products*”, BRE, 1999.
- Saving the Wood, Building for a Future (Autumn 2001)

Wst 1

- For information and further advice on Site Waste Management Plans and to freely download BRE’s new SMARTWaste Plan tool visit: www.smartwaste.co.uk
- Revised European Waste Framework Directive, June 17, 2008
<http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P6-TA-2008-0282+0+DOC+XML+V0//EN>
- European Environment Agency <http://www.eea.europa.eu/>
- European Demolition Association <http://www.eda-demolition.com/>
- European Waste Catalogue for definition of hazardous waste:
<http://www.envirowise.gov.uk/page.aspx?o=166037>

Wst 2

- AggRegain website (managed by WRAP) has many case studies, guidance and specifications for using recycled and secondary aggregates: www.aggregain.org.uk
- MINRES website has technical information and case studies relating to the use of recycled and secondary aggregates in a number of high value applications e.g. bricks, concrete etc., and can also help users to locate sources of secondary aggregates: www.minres.co.uk

Wst 3

- *Metric handbook – Planning and design data*, Adler, Architectural Press, 2nd Ed., 1999.

LE2

- CLEA Overview Documents (These and other documents relating to CLEA are available from the Environment Agency's website: www.environment-agency.gov.uk):
 - CLR 7: Assessment of risks to human health from land contamination; an overview of the development of Soil Guideline Values and related research.
 - CLR 8: Potential contaminants for the assessment of land.
 - CLR 9: Contaminants in soil: collation of toxicological data and intake values for humans.
 - CLR 10: The Contaminated Land Exposure Assessment (CLEA) model: technical basis and algorithms.
- Further advice and technical publications are available for download from the Environment Agency's website: www.environment-agency.gov.uk, including;
 - Remedial methods for contaminated groundwater.
 - Verification of treatment performance – How sure can you be?
 - Issues for the selection of remedial strategies, good practice guidance.
 - Process-based remediation of land contamination.
- BS 10175: 2001, *Investigation of potentially contaminated sites – code of practice*

LE6

- Earthwatch Europe: www.businessandbiodiversity.org
- European Environment Agency <http://www.eea.europa.eu/themes/biodiversity>
- European Bioforum <http://www.nbu.ac.uk/bioforum/>

Pol 1

- Guidance note 01 *New CFC's, HCFCs, HFC's and halons, Professional and practical guidance on substances that deplete the ozone layer*, CIBSE, 2000.
- *Code of practice for the minimisation of refrigerant emissions from refrigerating systems*, Institute of Refrigeration, 1995.
- "Thermal Guidelines for Data Processing Environments", ASHRAE, 2004.
- EC F-gas Regulation 842/2006: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:161:0001:0011:EN:PDF>
- EN 378-1:2000, *Specification for refrigerating systems and heat pumps. Safety and environmental requirements. Part 1 - Basic requirements, definitions, classification and selection criteria*

Pol 2

- *Code of practice for the minimisation of refrigerant emissions from refrigerating systems*, Institute of Refrigeration, 1995.
- Guidance Note 01 – *New CFC's, HCFC's, HFC's and halons, Professional and practical guidance on substances that deplete the ozone layer*, CIBSE, 2000.
- EC F-gas Regulation 842/2006: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:161:0001:0011:EN:PDF>

- EC F-gas Regulation 842/2006: <http://europa.eu.int/eur-lex/lex/JOHtml.do?uri=OJ:L:2006:161:SOM:EN:HTML>
- EC Regulation 2037/2000 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32000R2037:EN:NOT>
- NS-EN 378-1-4, *Specification for refrigerating systems and heat pumps. Safety and environmental requirements*, 2000.

Pol 4

- NS-EN 297:1994. A1:1995, A2:1996, A3:1996, A5:1998 and A6:2003 Gas-fired central heating boilers, page 42, table 14, section 3.6.2
- NS-EN 676:2003. A2:2008 – *Automatic forced draught burners for gaseous fuels*

Pol 5

- EU Floods Directive 2007/60/EC on the assessment and management of flood risks, http://ec.europa.eu/environment/water/flood_risk/key_docs.htm
- NS-EN 12056-3, Gravity drainage systems inside buildings — Part 3: Roof drainage, layout and calculation.
- NS-EN 752: 2008, Drain and sewer systems outside buildings
- http://ec.europa.eu/environment/water/index_en.htm
- <http://www.floodsite.net>
- <http://www.worldweather.org>.
- C623 *Standards for the repair of buildings following flooding*, CIRIA, 2005.
- C523 *Sustainable urban drainage systems – best practice manual for England, Scotland, Wales and Northern Ireland*, CIRIA, 2001.
- C697 *The SUDS Manual*, CIRIA, 2007.
- *Flood estimation handbook*, Centre for ecology and hydrology, National Environmental Research Council, 1999.
- *Flood estimation for small catchments*, Marshall DCW and Bayliss AC. IOH Report No.124. Institute of hydrology, Wallingford, 1994.
- BRE Good Repair Guide 11 *Repairing Flood Damage*, Part 1-4, BRE Press, 1997.
- BRE Digest 365 *Soakaway design*, BRE, 1991.
- BRESOAK Soakaway design software (2007) <http://www.brebookshop.com/details.jsp?id=376>

Pol 6

- NS-EN 858-2:2003 *Separator systems for light liquids (e.g. oil and petrol)*
- NS-EN 1825-2:2002 *Grease separators*
- NS-EN 1253-5:2003 *Gullies for buildings. Gullies with light liquids closure.*
- NS-EN 12056-3, Gravity drainage systems inside buildings — Part 3: Roof drainage, layout and calculation.
- NS-EN 752-4: 1997, *Drain and sewer systems outside buildings — Part 4: Hydraulic design and environmental considerations*
- BRE Digest 365 *Soakaway design*, BRE, 1991.
- BRESOAK Soakaway design software (2007) <http://www.brebookshop.com/details.jsp?id=376>
- Figures for rainfall are available from <http://www.worldweather.org>.

Pol 7

- *Guide on the Limitation of the effects of obtrusive light from outdoor lighting installation*, Commission Internationale D'éclairage (CIE), Publication 150, 2003.
- *Guidelines for minimising sky glow*, Commission Internationale D'éclairage (CIE), Publication 126, 1997.

- EN 12464-2:2007 *Light and lighting – Lighting of work places – part 2: Outdoor work places*

Pol 8

- ISO 1996-1:2003 *Acoustics -- Description, measurement and assessment of environmental noise -- Part 1: Basic quantities and assessment procedures*
 - ISO 1996-2:2007 *Acoustics — Description, measurement and assessment of environmental noise — Part 2: Determination of environmental noise levels*
 - ISO 1996-3:1987 *Acoustics -- Description and measurement of environmental noise -- Part 3: Application to noise limits*
 - European Directive 2002/49/EC relating to the assessment and management of environmental noise
 - European Directive 2000/14/EC on the approximation of the laws of the Member States relating to the noise emission in the environment by equipment for use outdoors.
-

⁴ EU Code of Conduct on Data Centres:

http://re.jrc.ec.europa.eu/energyefficiency/html/standby_initiative_data%20centers.htm

Schedule of changes BREEM-NOR v1.1			
BREEM-NOR issue	Amendment to English version of manual		
Kap			
0	General	Aim	–
1	Introduction		Minor corrections to text
4	Man 1	Second credit	–
4	Man 1	Compliance notes	–
4	Man 1	Relevant definitions	–
4	Man 1	Schedule of Evidence	–
4	Man 2	Compliance notes - Assessment of Checklist A2	Minor corrections to text
4	Man 2	Checklist A2, 3c	–
4	Man 3	Checklist A3, e	–
4	Man 3	Checklist A3, d Notes	Minor correction – Text corrected with reference to Byggforskserien
4	Man 3	Checklist A3 a, c Notes	–
4			
4	Man 3	Checklist A3 g	–
4	Man 3	Checklist - Appointment of a fit contractor who operates an Environmental Management System	–
4	Man 4,	Additional information section 7b	Minor corrections to text – reference to Green Guide removed
4	Man 12	Relevant definitions	–
4	Man 13.5	Assessment criteria	–
4	Man 13.5	Compliance notes	Text added with reference to relevant governments
4	Man 13.6	Assessment criteria	Minor corrections to text

4	Man 13.6	Schedule of evidence	Text corrected to be in line with assessment criteria
4	Man 13.6	Compliance notes	Corrections to text - Reference to British government replaced with Norwegian government
4	Man 13.7	First credit	–
4	Man 13.7	Compliance notes, Existing shared facilities	–
4	Man 13.7	Compliance notes: Relevant bodies	–
4	Man 13.8	Schedule of evidence	Minor corrections to text
4	Man 13.9	Assessment criteria 2	Minor corrections to text
4	Man 13.9	Assessment criteria 3	–
4	Man 13.10	Assessment criteria	Amended to be relevant for all buildings, not just educational buildings
4	Man 13.10	Compliance notes	–
4	Man 13.11	Compliance notes	–
4	Man 13.11	Schedule of evidence	Corrections to text to be in line with assessment criteria
4	Man 13.11	Additional information	Definitions removed
4	Man 14	Schedule of evidence	Corrections to text to be in line with assessment criteria
4	Man 14, P.N 13.3 Man 14:		–
5	Hea 1,2,3,4,5 and 8 PN	Relevant definitions	Definitions of occupied space is taken out - the term is not used under this issue
5	Hea 1	Table 5.1	Minor corrections to text
5	Hea 1	Assessment criteria	–
5	Hea 1	Compliance note	Removed compliance note Options to demonstrating the daylight factor
5	Hea 1	Definitions	Minor corrections to text
5	Hea 1	Exemplary level credit	Minor corrections to text
5	Hea 2	Compliance notes	Compliance note for excluded areas added
5	Hea 3	Relevant definition	–
5	Hea 3	Aim	Minor corrections to text
5	Hea 3	Criteria 1	–
5	Hea 5	Criteria 1	–

5	Hea 8	Compliance note	Minor corrections to text
			–
5	Hea 8	First credit	
5	Hea 8	Schedule of evidence 1,2,	Corrections to text to be in line with assessment criteria
5	Hea 9	Compliance notes	–
5	Hea 10	Assessment criteria	Minor corrections to text
5	Hea 10	Compliance note	Minor corrections to text
5	Hea 10	Schedule of evidence	Minor corrections to text
5	Hea 12	Assessment criteria	–
5	Hea 12	Relevant definition	–
5	Hea 13	Schedule of evidence	Minor corrections to text
5	Hea 13	Criteria 3	–
			–
5	Hea 13	Available credits	
5	Hea 20	Schedule of evidence	Corrections to text
6	Ene 1	Historic buildings	Minor corrections to text
6	Ene 1	Assessment criteria 4	Text corrected with reference to Byggforskserien
6	Ene 1	Compliance notes	Minor corrections to text – Corrections in Calculation example “Part new-build extension part refurbishment”
6	Ene 1	Example	Corrections in Calculation example
6	Ene 1	Relevant definitions	Minor corrections to text
6	Ene 1	Schedule of evidence	–
6	Ene 2	Additional information	Text added on ‘Detailed guidance on how to develop appropriate metering strategy...’
6	Ene 3	Compliance notes	Compliance note for educational buildings added
			–
6	Ene 5	First credit	
6	Ene 5	Compliance notes	–
6	Ene 5	Relevant definitions	–

6	Ene 5	Exemplary level criteria, two credits	Text added - The first credit must be achieved.
6	Ene 6	Compliance notes	–
6	Ene 7	Compliance notes	Corrections to text - Scope of this issue
6	Ene 7	Schedule of evidence	Minor corrections to text
6	Ene 8	Relevant definitions	–
6	Ene 11	Schedule of evidence	Text added - Schedule of evidence
6	Ene 11	Compliance notes	Text added - Compliance note for buildings with no fume cupboards
6	Ene 12	Assessment criteria	–
6	Ene 12	Schedule of evidence	Text added - Required evidence for assessment criteria
6	Ene 19	Assessment criteria	Minor corrections to text and 'Higher education buildings only' added
6			
6	Ene 20	Schedule of Evidence required, Post criteria 1-3	–
6	Ene 20	Compliance notes	Text added - Compliance notes for Shell only and Relevant
6	Ene 23	Schedule of evidence required, demand 4,6 & 8 POST	–
6	Ene 23	Compliance notes, Synergy with Ene 1	–
6	Ene 5 PN 13.6 Ene 5-1		Text added in line with process note
7	Tra 3, process note PN 13.3 Tra 3-1		Corrections to text - Criterion 3 of Option 4 regarding renewable electricity removed
7	Tra 4 - process note PN 13.3	Heading	Available credits for education changed in heading to reflect Note and preestimator calculation tool
7	Tra 4 - process note PN.13.4.	Compliance note	Corrections to text – Not relevant reference to EN 126464-2 is removed
7	Tra 3	Compliance note	Minor corrections to text
7	Tra 3	Schedule of evidence	Corrections to text to be in line with assessment criteria

7	Tra 4	Schedule of evidence	Minor corrections to text
7	Tra 5	Compliance note	Minor corrections to text "
7	Tra 6	Compliance note	–
7	Tra 7	Compliance note	Minor corrections to text
			Corrections in text in line with process note
8	Wat 1	Assessment criteria	
8	Wat 1	Schedule of evidence	–
8	Wat 1	Relevant definition	–
8	Wat 8	Second criteria	Minor corrections to text
			–
9	Mat 1 - PN 13.3 Mat 1-1		
9	Mat 1	Compliance Notes, Concerning point 2 LCA	–
9	Mat 1	Assessment Criteria	
9	Mat 1	Table 9.2	Minor corrections to text
9	Mat 1	Schedule of Evidence	Minor corrections to text
9	Mat 1	Additional information	Minor corrections to text
9	Mat 4	Relevant definitions	Minor corrections to text
9	MAT 5	Assessment criteria	Minor corrections to text
9	MAT 5	Schedule of evidence	Minor corrections to text
9	Mat 5	Relevant definitions of Key processes and Tier levels	Minor corrections to text
9	Mat 5	Table 9.3, Note	–
9	MAT 5	Compliance note, Building element not present	Minor corrections to text regarding Mat 5 calculator
9	MAT 5	Table 9.4	–
9	MAT 5	Timber and Environmental Management Schemes (EMS)	Minor corrections to text
9	Mat 7	Compliance Notes, Suitable durability measures	Minor corrections to text

10	Wst 1	Third credit	Corrections to text – Last bullet point removed to be in line with Norwegian practice
10	Wst 1	First, Second credit	Minor corrections to text and the reference to '60 weight percent' is removed
10	Wst 2	Compliance note	–
10	Wst 4	Compliance note	Compliance note for 'Education buildings within a campus' added
10	Wst 6	Compliance notes	Compliance note for 'Education buildings within a campus' added
11	LE 1	Relevant definitions: a. Defence Buildings	–
11	LE 3	Schedule of evidence	–
11	LE 6	Compliance notes; The site and surrounding areas	–
12	POL 3	Compliance note, GWP data not available	–
12	POL 4	Compliance Notes, Heat Pumps	–
12	Pol 5, process note PN 13.3 Pol 5.1	Compliance note	Corrections to text based on
12	POL 5	Assessment criteria	Corrections to text in line with Norwegian version
12	POL 6	Aim	–
12	POL 6	Assessment criteria 3	–
12	POL 8	Assessment criteria 2	Minor corrections to text