

Code for Sustainable Homes

Technical Guide





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Acknowledgements

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Foreword



We must act on climate change. Scientific evidence shows that it is real and happening already, and that urgent action is needed now. At the same time we need to build more houses – if we build the houses we need then, by 2050, as much as one-third of the total housing stock is yet to be built. It's vital that we ensure these homes are built in a way that minimises the use of energy and reduces their harmful carbon dioxide emissions. The Government is committed to this, as demonstrated by the draft Climate Change Bill proposing to enshrine in law our commitment to cut carbon dioxide emissions by 60 per cent by 2050, relative to 1990 levels.

Building sustainable homes is about more than just carbon dioxide. We also need to build and use our homes in a way that minimises their other environmental impacts, such as the water they use, the waste they generate, and the materials they are built from.

The Code for Sustainable Homes provides this all-round measure of the sustainability of new homes, ensuring that sustainable homes deliver real improvements in key areas such as carbon dioxide emissions and water use. The Government's ambition for the Code is that it becomes the single national standard for the design and construction of sustainable homes, and that it drives a step-change in sustainable home building practice.

This technical guidance manual sets out the requirements for the Code, and the process by which a Code assessment is reached. It aims to make the system of gaining a Code assessment as simple, transparent and rigorous as possible, a process that inspires confidence in Code assessors, home builders, product manufacturers and, crucially, consumers.

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Preface

The Code for Sustainable Homes was launched in December 2006 with the publication of ‘Code for Sustainable Homes: A step change in sustainable home building practice’ (Department for Communities and Local Government 2006). This introduced a single national standard to be used in the design and construction of new homes in England, based on the BRE’s EcoHomes[®] scheme. Adoption of the Code is intended to encourage continuous improvement in sustainable home building.

The Code for Sustainable Homes is a set of sustainable design principles covering performance in nine key areas listed below:

- Energy and CO₂
- Water
- Materials
- Surface water run-off
- Waste
- Pollution
- Health and well being
- Management
- Ecology

In each of these categories, performance targets are proposed which are in excess of the minimum needed to satisfy Building Regulations, but are considered to be sound best practice, technically feasible, and within the capability of the building industry to supply.

The Code uses a rating system of one to six stars, and it differs from EcoHomes in several key regards outlined below:

- It is assessed at the level of an individual ‘**Dwelling**’ (Defined in Section 4.3)
- It contains minimum mandatory standards for energy, water, materials, waste and surface water run-off, which must be met before even the lowest level of the Code can be achieved.
- It demands higher minimum standards for energy and water to be met before the higher levels of the Code can be achieved.
- It is performed in two stages with ‘**Final**’ Code certification taking place after a Post Construction Review has been carried out.

In addition to the mandatory requirements, each design category scores a number of percentage points. The total number of percentage points establishes the ‘star rating’ for the dwelling.

Formal assessment of dwellings using the Code for Sustainable Homes may only be carried out using licensed and registered individuals, who are qualified ‘competent persons’ for the purpose of carrying out Code assessments. Training, registration and licensing of these individuals is carried out by the Building Research Establishment according to a UKAS registered ‘competent persons scheme’ and under ISO 14001 and ISO 9001. BRE also carry out quality assurance of the assessments and issue certificates on behalf of Communities and Local Government.

1.0 Purpose of the Guide

The purpose of this document is to provide a detailed list of requirements for each credit area of the Code for Sustainable Homes, and to explain the process of gaining a Code rating. This document also provides useful reference material for anyone involved in the process. The system of awarding points under the Code is therefore transparent and open to scrutiny.

This technical guide includes

- PART ONE
 - Explanation of the procedure for assessment of houses and credit verification
 - Explanation of the scoring and weighting system
- PART TWO:
 - Details of the new credit definitions and their evidence base
 - Specification of methods of credit verification,
 - Calculation algorithms, checklists and other tools which are part of the assessment method.

1.1 A Summary of Assessments under the Code for Sustainable Homes scheme

The Code for Sustainable Homes is an environmental assessment system for new housing in England which

- Presents a range of environmental standards, which have been researched as being reasonable and achievable
- Assesses the environmental performance using objective criteria and verification methods
- Provides a formal certificate showing performance

The 'Code for Sustainable Homes: A Step-change in sustainable home building practice' (Department for Communities and Local Government 2006) defined a set of sustainable design principles for new housing covering performance in nine key areas, known as 'Categories' listed below:

Categories

- Energy and CO₂

- Water
- Materials
- Surface water run-off
- Waste
- Pollution
- Health and well being
- Management
- Ecology

Within these nine categories, performance criteria are defined for the individual **Issues** which are described in detail, together with the requirements for verification in Section Two of this report.

The Assessment system described in greater detail in Section 2 assigns to each Issue a simple integer number of **CREDITS** (One, two three). The Credits allocated for each Issue are then summed to give a total number of credits per Category.

Each category is allocated a total maximum score in terms of **Percentage POINTS out of 100**. The weighting system is designed to reflect the importance of that environmental category in the view of a cross section of stake holders and the methodology for arriving at these weightings is discussed in detail later in this Section in 5 Scoring and 6 Weighting. As a result, the value of weightings in different sections is not the same.

Assessment of any particular development is carried out against these environmental criteria and credits are awarded, from which Points are calculated using the weighting system. The assessment process is discussed in detail below:

2.0 Organisations Involved in the carrying out Code ratings

Formal assessment of dwellings using the Code for Sustainable Homes may only be carried out using licensed AND registered individuals, known as 'Code Assessors' who are qualified 'competent persons' for the purpose of carrying out Code assessments.

Assessors

Code Assessors are individuals qualified to carry out Code ratings. Any building professional can attend one of the training courses, pass the examination, and be registered (as having passed the exam). To be licensed as a 'Code Assessor', assessors must also be members of Licensed organisations: the company employing them or their own business if self employed. The licensed organisation pays a license fee which covers the provision of management of the system, a free telephone help line, regular updates and access to a private extranet.

Existing 'EcoHomes' Assessors who have qualified in the past will inherit UKAS 'grandfather rights' to operate as 'Code Assessors', subject to attendance at a training update session.

This document will be used by 'Assessors' to carry out Code ratings

Building Research Establishment (BRE)

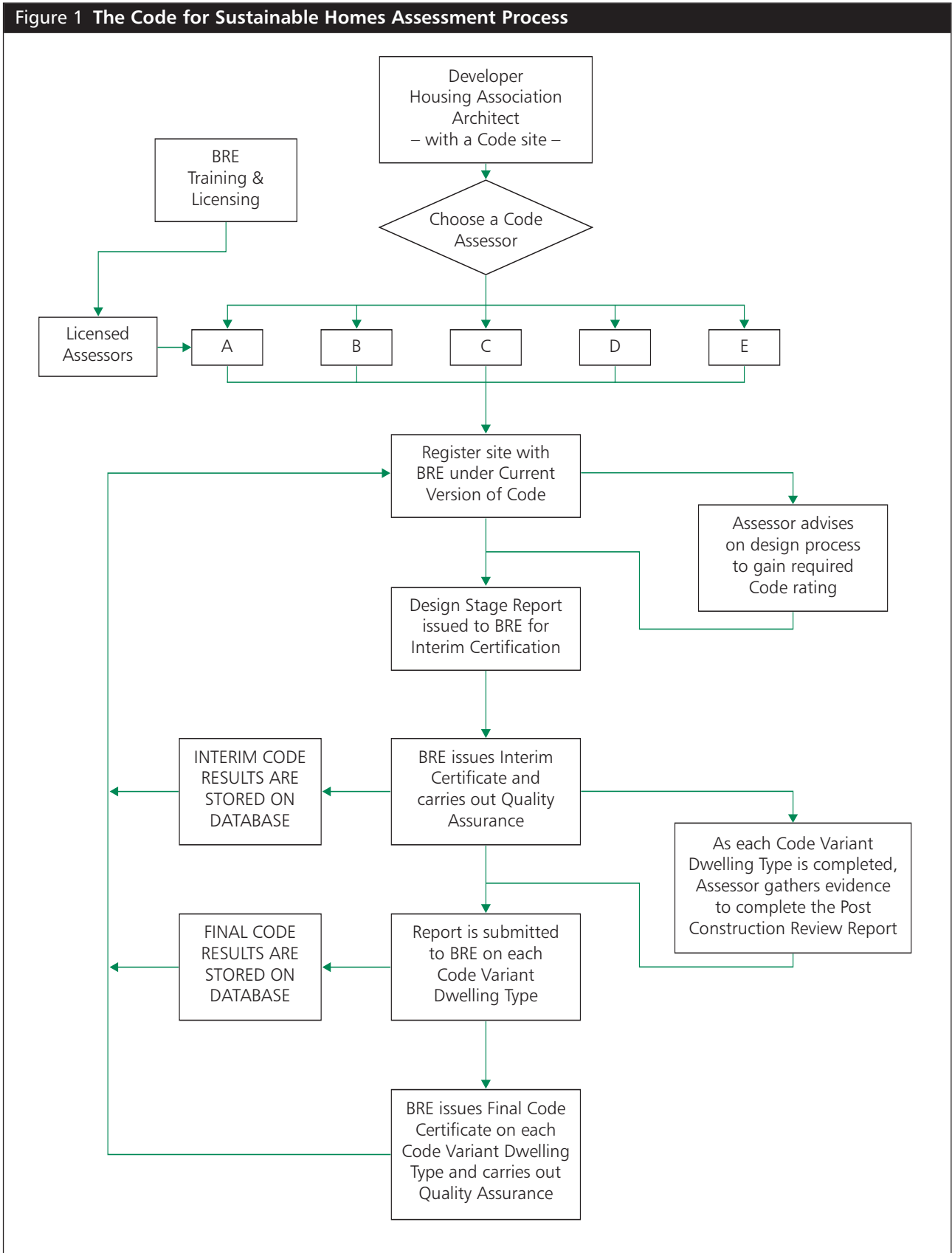
Code ratings are certified by BRE on behalf of Communities and Local Government. BRE operates a UKAS accredited competent persons scheme under which it trains and examines individuals and licenses organisations to perform Code Assessments.

BRE quality assures and certifies the Code Ratings on behalf of Communities and Local Government using its management systems which are ISO 14001 and ISO 9001 compliant.

Developers/Architects/Clients

Those wishing to have assessments carried out have a choice of assessment organisations willing to compete for the business (details available from the website www.breeam.org).

Figure 1 The Code for Sustainable Homes Assessment Process



3.0 The Process of Gaining a Code Rating

3.1. Registering a Housing Site (before detailed designs are finalised)

The first stage of the process is for a qualified Code Assessor to register a housing site with BRE as soon as the requirement for the Code is known – this registration lasts for five years.

This enables the version of the Code to be set such that even if the Code is updated (say every two years), the version of the Code used across the site will remain the same.

Once a site is registered by the Assessor on the BREEAM database, it is given a unique registration number.

3.2. Site Wide Issues and Individual Dwelling Issues

Assessments are carried out to award credits and points based on environmental features of the individual dwelling. These features either refer to:

- Features which the dwelling shares with all other dwellings on the site known as **Site Wide Issues**
- Features which entail access to some common facility shared with a number of other dwellings known as **Shared Issues** (but less than the whole site)
- Features which relate to the performance of the dwelling itself known as **Dwelling Issues**

Table 3.1 shows that for each feature the assessment may be based on the dwelling, the site, shared, or a combination of these three.

In order to reduce the number of different assessments, dwellings may be combined together as similar '**Code Dwelling Types**'. To be of the same '**Code Dwelling Type**' dwellings must have exactly the same set of Code scoring features – this is defined in detail in the next section. Within each category, issues are scored initially as credits. They are then converted to percentage scores known as 'Points'.

Some credits are always awarded for the site as a whole, whilst other credits can be awarded either for an individual dwelling or for a site wide approach or for a combination of the two (an example of this would be the provision of renewable energy).

At an early stage the assessor will assess and calculate the Whole Site Credits and resulting Points. This can then be added to the points score for the Code Dwelling Type issues to gain the total rating score for a dwelling Type.

Table 3.1 Site wide, Shared and Dwelling Issues			
Code categories and Issues	Site Wide	Shared	Dwelling
ENERGY			✓
Dwelling Emission Rate DER			✓
Building Fabric			✓
Internal Lighting			✓
Drying Space			✓
EcoLabelled White Goods			✓
External Lighting		✓	✓
Low/ Zero Carbon	✓ (if part of community energy system)	✓	✓
Cycle Storage		✓	✓
Home Office			✓
POTABLE WATER			
Internal			✓
External			✓
POLLUTION			
GWP			✓
NOx Emissions	✓ (if part of community energy system)	✓	✓
SURFACE WATER			
Surface Water Run-off	✓	✓	✓
Flood Risk	✓	✓	
MATERIALS			
Environmental Impact			✓
Responsible Sourcing – Basic			✓
Responsible Sourcing – Finishing			✓
WASTE			
Construction	✓		
Household		✓	✓
Composting		✓	✓
HEALTH AND WELLBEING			
Daylighting			✓
Sound			✓
Private Space		✓	✓
Lifetime Homes			✓
MANAGEMENT			
Home User Guide			✓
Considerate Constructors	✓		
Construction Site Impacts	✓		
Security		✓	✓
ECOLOGY			
Value	✓		
Enhancement	✓		
Protection	✓		
Change in value	✓		
Footprint		✓	✓

Points gained for Whole Site Issues	+	Points gained for Code dwelling type	=	Final Score for dwelling type
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3.3 Identifying the Code Dwelling Types on a Site

The number of dwelling types that require separate assessment is likely to be different on every site and will depend on the number of features that vary from dwelling to dwelling.

As mentioned above, Code assessments are carried out on each ‘**Code Dwelling Type**’ on a site. ‘**Code Dwelling Types**’ have exactly the same set of Code scoring features. A schedule of Code Dwelling Types will need to be prepared.

Qualified Code Assessors will be trained to advise developers on the number of different ‘**Code Dwelling Types**’ that exist on one site.

3.4 Performing Code Assessments

Code Assessments are carried out in two stages as detailed below:

The first part of the assessment is carried out at the design stage (called the Design Stage Assessment) and each ‘**Code Dwelling Type**’ is given an ‘**Interim**’ Code certificate at this stage.

The second part is carried out after construction (called the Post Construction Review) –and each ‘**Dwelling**’ is given a ‘**Final**’ Code certificate at this stage.

3.4.1 *Design Stage Assessment*

This first stage of the Code assessment is carried out on the detailed designs of the homes, in the period up to the issue of tender documents (RIBA Stages A–G). Because the Code addresses many aspects of a home’s performance it is necessary to specify in more detail for a Code assessment than say for Building Regulations compliance. For example, details of all the sanitary fittings are required to calculate the score for the water category of the Code.

At this initial design stage assessment the Assessor will also be able to calculate any whole site related points and so details of the final landscaping and ecological enhancement measures will also need to be known.

The assessor will need to work closely with the design team to :

- Evaluate the performance of each environmental feature
- Assemble and check evidence provided by the developer and design team and other consultants to show the intended specification.

When the Assessor is satisfied with the performance under the Code he/she will submit a report to BRE to receive 'Interim' Code certification. This report will contain some documentary together with an 'audit trail' for all specification clauses, drawings, reports and other evidence. BRE provides a standard report format for this report

3.4.2 *Post Construction Review*

This can be carried out on each dwelling as it is completed. For the first example of the **Code Dwelling Type**, the Assessor will collate either documentary, photographic, or site survey evidence to demonstrate that this dwelling has been built in accordance with the details given at the Design Stage. This assessment is called an 'Initial PCR Assessment'.

When the Assessor is satisfied with the performance under the Code he/she will submit a report to BRE to receive '**Final**' Code certification for the dwelling. If changes have been made to the as built case that affect the Code score the Assessor will re-calculate the '**Final**' score. This may be different to the Interim score.

This process is repeated in a reduced form as subsequent dwellings of the same Code dwelling type are completed. This is called a 'Repeat PCR Assessment'.

3.5 **Certifying Code for Sustainable Homes Assessments on behalf of Communities and Local Government**

All requests for certification (both **Interim** and **Final**) are logged on the BREEAM database under the original site registration number.

When BRE receives reports for certification it performs a basic administrative quality check on every report.

A percentage of reports are also checked, prior to certification, in more detail (called a technical credit check), to ensure that the assessment has been carried out correctly by the Assessor, and that material is properly referenced – proof of performance is demonstrated etc.

In addition, a small number of every Assessor's reports are completely re-calculated as part of the BRE's UKAS accredited competent person's scheme (which covers all BREEAM and Code for Sustainable Homes Assessors).

4.0 Scoring

The Code has 6 levels as follows:

- Code Level 1 – above regulatory standards and a similar standard to BRE’s EcoHomes PASS level and the EST’s Good Practice Standard for energy efficiency
- Code Level 2 – a similar standard to BRE’s EcoHomes GOOD level
- Code Level 3 – a broadly similar standard to BRE’s EcoHomes VERY GOOD level and the EST’s Best Practice Standard for energy efficiency
- Code Level 4 – Broadly set at current exemplary performance
- Code Level 5 – Based on exemplary performance with high standards of energy and water efficiency
- Code Level 6 – aspirational standard based on zero carbon emissions for the dwelling and high performance across all environmental categories

The Code Level is awarded on the basis of achieving BOTH a set of mandatory minimum standards and a minimum overall score as set out in the diagram below. Most of the criteria within the method are tradable (i.e. they are voluntary and a developer/designer can make choices on the most appropriate standards for a given site). This gives a degree of flexibility in achieving the standards.

4.1 Mandatory Standards

Before a dwelling can start to be awarded points under the Code it must achieve minimum standards in the following categories:

1. Carbon dioxide (CO₂) emissions resulting from operational energy consumption and calculated using SAP 2005)

There are six levels of mandatory minimum standards – one for each Code Level.

Code Levels	Minimum Percentage reduction in Dwelling Emission Rate Over Target Emission rate
Level 1 (★)	10 %
Level 2 (★★)	18%
Level 3 (★★★)	25%
Level 4 (★★★★)	44%
Level 5 (★★★★★)	100%
Level 6 (★★★★★★)	‘Zero carbon home’

2. Potable Water Consumption (from WCs, showers and baths, taps and appliances, calculated using the Code Water Calculator)

There are three levels of mandatory standards;

Code Levels	Minimum Potable water Consumption in litres per person per day
Level 1 (★)	120
Level 2 (★★)	120
Level 3 (★★★)	105
Level 4 (★★★★)	105
Level 5 (★★★★★)	80
Level 6 (★★★★★★)	80

3. Embodied impacts of construction Materials

There is a single mandatory requirement to be met whatever Code level is sought.

4. Surface Water Runoff

There is a single mandatory requirement to be met whatever Code level is sought.

5. Construction Site Waste Management

There is a single mandatory requirement to be met whatever Code level is sought.

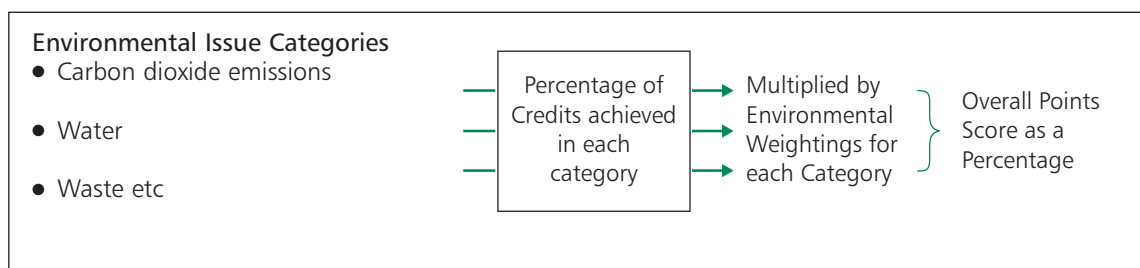
6. Household Waste Storage Space and Facilities

There is a single mandatory requirement to be met whatever Code level is sought.

This guidance manual sets out the full requirements for each of these minimum standards in the appropriate technical section.

4.2 Tradable Credits and Points Available

The following diagram sets out the calculation method adopted within the Code for obtaining an overall Points Score:



Credits:

In each category the individual environmental features are awarded a score in terms of simple integer ‘credits’ (One, two, three) relating to their relative contribution to improved performance. **Credits** in this Guide do NOT have the same value between categories.

Points:

The total number of credits for each category is then multiplied by an Issue Weighting Factor to determine the points score relating to that section of the code. These weighting factors reflect the relative importance of each of the issues covered in the Code and are described in more detail in Section 6 below.

The following table gives the total number of credits and the weightings factor for each of the Issue Categories.

Environmental Impact Categories	No of Credits in Category	Environmental Weighting Factor (as % of total possible Points Score available)
Category 1 – Energy/CO ₂	29 credits	36.4%
Category 2 – Water	6 credits	9%
Category 3 – Materials	24 credits	7.2%
Category 4 – Surface Water Run-off	4 credits	2.2%
Category 5 – Waste	7 credits	6.4%
Category 6 – Pollution	4 credits	2.8%
Category 7 – Health and Well being	12 credits	14.0%
Category 8 – Management	9 credits	10.0%
Category 9 – Ecology	9 credits	12.0%
Total	104 credits	100.00%

Of the **mandatory minimum standards** above, only Energy and Water carry points. These can be added to the tradable points achieved in all the other categories to achieve a total number of Points. This can then be used to determine the Code Level that has been achieved. For each level it is necessary to :

- Achieve the all mandatory minimum standards for that level
- Achieve the total tradable points needed for the level (the sum of both tradable points for mandatory issues and tradable points for flexible issues)

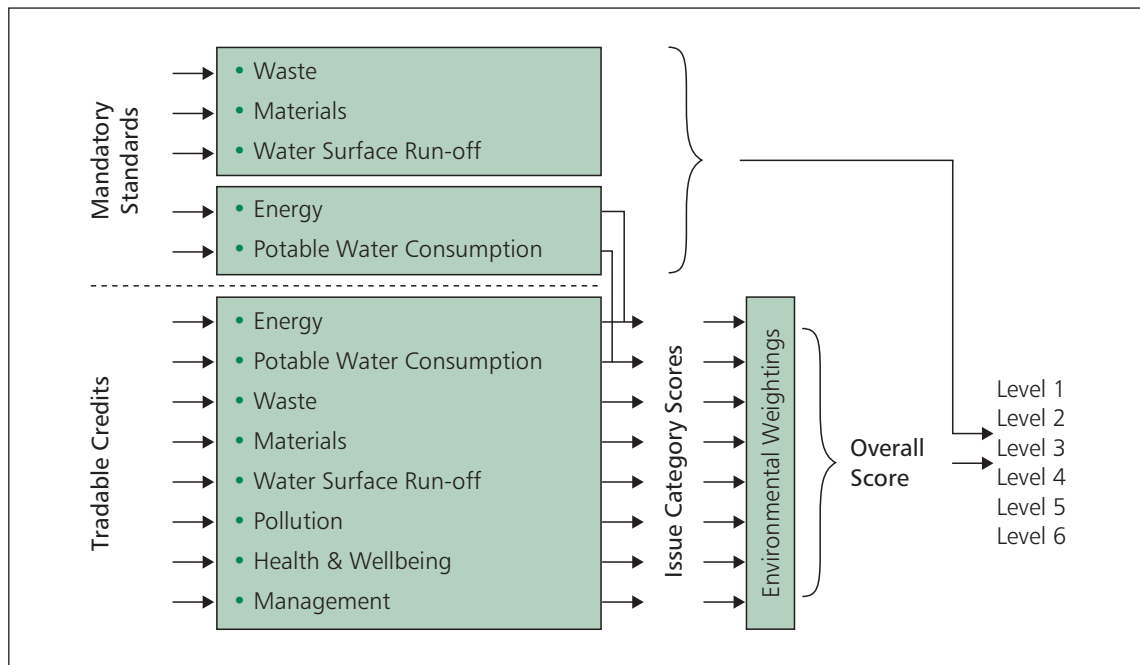
Tradable Points are available by achieving a level of performance in the following environmental impact categories:

- Energy/CO₂ – Operational Energy and the resulting emissions of carbon dioxide to the atmosphere
- Water – The consumption of potable water from the public supply systems or other ground water resources

- Materials – The embodied environmental impacts of construction materials for key construction elements
- Surface Water Runoff – The change in surface water runoff patterns as a result of the development
- Waste – Waste generated as a result of the construction process and facilities encouraging recycling of domestic waste in the home
- Pollution – Pollution resulting from the operation of the dwelling
- Health and Wellbeing – The effect that the dwellings design and indoor environment has on its occupants
- Management – Steps that have been taken to allow good management of environmental impacts in the construction and operation of the home.
- Ecology – The impact of the dwelling on local eco-system, biodiversity and land use.

4.3 Overall Points Score and Code Level

The Category points scores are then summed to give an overall percentage score for the dwelling. The code level achieved is dependent on this overall points score and on the achievement of the mandatory requirements as outlined above. The following diagram sets out the scoring system adopted within the Code:



4.4 How the Points Score is converted to a Code Level

As the steps required to achieve higher performance in one impact category can often mean that a lower level of performance is achieved elsewhere, a Points Score of 100 is not possible. The table below shows how the Points relate to the different Code Levels. Each Code Level is represented by a number of Stars as illustrated.

Code Levels	Total Points Score (equal to or greater than)
Level 1 (★)	36 Points
Level 2 (★★)	48 Points
Level 3 (★★★)	57 Points
Level 4 (★★★★)	68 Points
Level 5 (★★★★★)	84 Points
Level 6 (★★★★★★)	90 Points

Note: The Point Scores set out in the document ‘Code for Sustainable Homes – A step-change in sustainable home building practice’ (Communities and Local Government, December 2006) are rounded to one decimal place. The BRE Assessment Calculator Tool should be used to determine an accurate score for an assessment.

5.0 Environmental Weightings

The relative importance of each of the environmental impact categories within the Code is adjusted by applying a set of consensus based environmental weighting factors. These weighting factors were derived from an extensive study carried out in 1998 for BRE's EcoHomes and BREEAM assessment method. This study involved a wide range of stakeholder groups who were asked to evaluate the relative importance of each of the issues covered within the method.

These original weighting factors have recently been reviewed in the light of a second study carried out by BRE as part of the Green Guide 2007 development.

The recent BRE study¹ derived weightings for a series of external environmental impacts by;

- surveying an international panel of experts
- carrying out an open consultation exercise (with industry representatives).

These groups were asked to rank (in order of importance) a range of environmental impacts. This process adopted was then peer reviewed by Professor Andrew Pearman of the Centre for Decision Making at Leeds University.

The results from the two survey groups were broadly similar and those from the expert group were used to inform the revised environmental weightings used in the Code taking account of:

- the contribution that new housing in the UK makes to the impact category concerned
- the opportunity that exists to influence the impact at the design and construction stage.

Some aspects of the Code were not covered by the recent survey and weightings for these areas have been taken from previous consensus studies carried out to support BRE's EcoHomes method.

The breakdown of credits per environmental issue are given in Table 5.1.

¹ BRE IP, The BREEAM Green Guide Environmental Weighting System (BRE, 2007 to be published)

Table 5.1 Summary Of Environmental Issues and Credits		
	Maximum No. Credits	Category Weighting Percentage
Carbon dioxide emissions		
Dwelling Emission Rate	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	11	
	12	
	13	
	14	
	15	
Building Fabric	2	
Internal Lighting	2	
Drying Space	1	
Energy Labeled White Goods	2	
External Lighting	2	
Low/ Zero Carbon	2	
Cycle Storage	2	
Home Office	1	
Total	29	36.40
Potable Water		
Internal	5	
External	1	
Total	6	9.00
Surf Water/Pollution		
GWP	1	
NOx Emissions	3	
Surf Water	2	
Flood Risk	2	
Total	8	5.00
Materials		
Environmental Impact	15	
Responsible Sourcing – Basic elements	6	
Responsible Sourcing – Finishing elements	3	
Total	24	7.20
Waste		
Construction	2	
Household	4	
Composting	1	
Total	7	6.40
Health and Well-being		
Daylighting	3	
Sound	4	
Private Space	1	
Lifetime Homes	4	
Total	12	14.00
Management		
Home User Guide	3	
Considerate Constructors	2	
Construction Site Impacts	2	
Security	2	
Total	9	10.00

Table 5.1 Summary Of Environmental Issues and Credits (continued)		
	Maximum No. Credits	Category Weighting Percentage
Ecology		
Value	1	
Enhancement	1	
Protection	1	
Change in value	4	
Footprint	2	
	Total	9
		12.00
Total Number of Credits:	104	100%

6.0 Keeping This Guide Up To Date

This technical guide is published as a web-only document so that updating is easier.

It will be updated at intervals if standards change or are introduced, if technologies change, and if processes change.

The Communities and Local Government website will always contain the latest version.

Category 1 Energy and Carbon Dioxide Emissions

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 1	Dwelling Emission Rate as defined by 2006 Building Regulations	15	Yes

Aim

To limit emissions of carbon dioxide (CO₂) to the atmosphere arising from the operation of a dwelling and its services.

Assessment Criteria

Credits are awarded based on the percentage improvement in the Dwelling Emission Rate (DER), (estimated carbon dioxide emissions in kg per m² per annum arising from energy use for heating, hot water and lighting for the actual dwelling), below the Target Emission Rate (TER), (the maximum emission rate permitted by Building Regulations), for the *dwelling* where DER and TER are as defined in Approved Document L1A 2006 Edition of the Building Regulations. Credits are awarded in accordance with the table below. Note that to reach Level 6 (zero carbon) there are additional requirements, (see below).

Criteria		
% improvement of DER over TER	Credits	Mandatory Levels
≥ 10%	1	Level 1
≥ 14%	2	
≥ 18%	3	Level 2
≥ 22%	4	
≥ 25%	5	Level 3
≥ 31%	6	
≥ 37%	7	
≥ 44%	8	Level 4
≥ 52%	9	
≥ 60%	10	
≥ 69%	11	
≥ 79%	12	
≥ 89%	13	
≥ 100%	14	Level 5
'True Zero Carbon' as defined below	15	Level 6
Default Cases		
None		

Information required to demonstrate compliance

The following section details any relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage for each Dwelling Type.

Schedule of Evidence Required To be read in conjunction with the Definitions and Calculations Sections below	
Design Stage	Post Construction Stage
<p>Design Stage – SAP 2005 Worksheet* for each <i>dwelling type</i> and accompanying list of specifications from an accredited energy assessor /Part L ‘Competent person’</p> <p>*Full worksheet, dated with assessor name, registration number where appropriate and address of development, prepared at plans approval stage.</p> <p>Copy of plans, elevations and sections as designed and construction details sufficient to check building details.</p>	<p>As-Built Stage – SAP 2005 Worksheet* for each <i>dwelling type</i> and accompanying list of specifications from an accredited energy assessor if different from design stage</p> <p>*Full amended worksheet, dated with assessor name, registration number where appropriate and dwelling address, prepared at construction completion stage, if different from Design Stage</p> <p>Evidence of final construction materials, built form and accompanying list of specifications (including heating, hot water service and ventilation systems) in the form of photographs or purchase orders or assessor site review</p>
<p>A copy of the ‘Design Stage’ Part L1A Building Regulations Compliance Checklist*, showing full compliance for each <i>dwelling type</i>.</p>	<p>Confirmation by the person carrying out the work that the dwelling has been constructed in accordance with the specifications which accompanied the – SAP 2005 Worksheet* in line with regulations 17C and 20D for each <i>dwelling type</i>, as supplied to Building Control</p> <p>A copy of the ‘As-Built’ Part L1A Building Regulations Compliance Checklist showing full compliance for each <i>dwelling type</i>. This evidence may also be provided by an Accredited Energy Assessor or Part L ‘Competent Person’</p> <p>*Alternatively, documentary evidence from a Building Control Officer confirming full AD L1A compliance.</p>
<p>Relevant Calculations (below) showing the weighted average % improvement of the Dwelling Emission Rate below the Target Emission Rate for each <i>dwelling type</i>, based on Design Stage SAP 2005 data).</p> <p>Additionally to meet Level 6 (zero carbon), until SAP is updated, to include the appliances element, each home must also provide an amount of renewable electricity equal to a specified amount of kWh per m² of floor space in addition to that required to meet zero carbon in SAP2005, to approximate the average appliance energy consumption.</p>	<p>As design stage.</p>
<p>Proof of accreditation for ‘accredited external renewables’</p>	

Relevant Definitions

AD L1A	The Building Regulations for England and Wales Approved Document L1A: Conservation of Fuel and Power in New Dwellings (2006).
SAP	The Government's Standard Assessment Procedure for Energy Rating of Dwellings. The approved methodology for rating the energy performance of dwellings. The indicators are used to demonstrate compliance with AD L1A of the Building Regulations. Currently SAP 2005
Design Stage SAP 2005 Worksheet	An output of SAP 2005 software summarising all relevant design stage construction data and the emissions calculated by SAP 2005 for the dwelling as designed For an up-to-date list of SAP 2005 approved software visit: www.bre.co.uk/sap2005 .
As-Built SAP 2005 Worksheet	An output of SAP 2005 software summarising all relevant as built construction data and the emissions calculated by SAP 2005 for the dwelling as built.
<i>dwelling type</i> (for Ene 1 & Ene 2 purposes)	A set of dwellings on a development site are of the same 'type', if they exhibit each of the following: <ul style="list-style-type: none">• The same dwelling size, built form and construction details.• The same space heating and hot-water system and controls.• The same orientation and level of over-shading/sheltering.• The same assumed/actual air permeability and ventilation system In cases where buildings contain more than one dwelling (such as in a terrace of houses or in a block of flats) it is acceptable to consider area-weighted DER and TER for each of the dwelling types in the building. For terraced dwellings there are likely to be at least two dwelling types (mid and end terrace). For flats the following would be required: <ul style="list-style-type: none">• Average for all ground floor dwellings of the Dwelling Type• Average for all mid floor dwellings of the Dwelling Type• Average for all top floor dwellings of the Dwelling Type Note: This is different from the requirements described in clause 23 of Approved Document L1A and relates to the proposed methodology for the calculation of Energy Performance Ratings in new homes.
Accredited energy assessor/Part L 'Competent person'	As defined in AD L1A, CO ₂ emission rate calculations 20D-(1) "a person registered by either FAERO Limited or BRE Certification Limited, in respect of the calculation of CO ₂ emission rates of buildings" and any future approved scheme.

Building Regulations Compliance Checklist	Checklist illustrated in AD L1A Appendix A. This is also provided as an output of SAP 2005 software detailing a dwelling's performance against a set of key criteria. Assessed on a 'PASS' or 'FAIL' basis, all criteria must be met for the dwelling to meet full AD L1A compliance. This document may be sent to Building Control at design stage to demonstrate L1A compliance and again at completion.
DER	The Dwelling Emission Rate , is the estimated carbon dioxide emissions per m ² for the building as designed, for energy in use for heating, hot water and lighting. This is calculated using the SAP method, and is defined in AD L1A of the Building Regulations.
TER	The Target Emission Rate is the maximum allowable carbon dioxide emissions for energy use in heating, hot water and lighting which would meet the Building Regulations. This is calculated using the SAP 2005 method, and is defined in AD L1A of the Building Regulations.
True Zero Carbon Dwelling	<p>Where net carbon emissions resulting from ALL energy used in the dwelling is zero. This includes the energy consumed in the operation of the space heating/cooling and hot-water systems, ventilation, all internal lighting, cooking and all electrical appliances. The calculation can take account of contributions from renewable/low carbon installations on/in the dwelling, or provided by an ESCO on/offsite provided it directly supplies the dwelling. Alternatively it is acceptable to include in the estimate of carbon emissions, the contribution from 'Accredited external renewables'.</p> <p>For a true zero carbon home, it will also be necessary to ensure that the fabric of the building significantly exceeds the standards currently required by Part L of the Building Regulations 2000 (as amended). The "Heat Loss Parameter" (covering the walls, windows, air tightness and other elements of the building design) must be no more than 0.8W/m²K.</p> <p>The SAP computation takes into account energy consumed through heating, lighting and hot water provision. Homes will have to reach zero carbon for these factors using the SAP computation. Heat and power for this element must be generated either in the home or on the development or through other local community arrangements (including district heat and power) and must be renewable (i.e. non-fossil fuel) energy.</p> <p>A zero carbon home is also required to have zero carbon emissions from use of appliances in the homes (on average over a year). SAP does not contain any provision for energy consumption of appliances but will be updated to do so in due course. Until SAP is updated the appliances element of the qualification will be that each home must provide an amount of renewable electricity</p>

equal to a specified amount of kWh per metre squared of floor space in addition to that required to meet zero carbon in the SAP 2005 to approximate to the average appliance energy consumption. This additional power must be renewable power produced either within the area of the building and its grounds, elsewhere in the development, or elsewhere as long as the developer has entered into arrangements to ensure that the renewable generation is additional to existing plans.

The amount of such additional power can be reduced by any surplus from the arrangements to meet zero carbon on heating, hot water and lighting.

Accredited external renewables

These are renewable energy schemes located offsite which

- Are accredited renewables (as defined by the Energy Act 2004) These will be Renewable Energy Guarantee of origin (REGO) certified.
- Create new installed generation capacity, designed to meet the loads of the dwelling (i.e not just units of carbon)
- Are additional to capacity already required under the Renewables Obligation

Some ESCOS achieve these requirements.

ESCO

An Energy Services Company

Assessment Methodology

Design Stage

1. Confirm that the SAP 2005 Worksheets and Building Regulation Compliance Checklist are from an accredited energy assessor / Part L 'competent person'.
2. Documentation provided by a non-authorised SAP2005 assessor/ Part L competent person must have been verified by Building Control and evidence of this must be supplied before any assessment can take place.
3. Confirm that the *dwelling type* meets full building regulations compliance using the relevant Compliance Checklist : Design Stage. Note: All criteria must 'PASS'.
4. Calculate the % improvement in DER below TER for the dwelling type, using the methodology detailed in the Calculation Procedures section below.

Where buildings contain more than one dwelling (such as in a terrace of houses or in a block of flats), a floor area-weighted average TER and DER can be calculated for each dwelling 'type' as defined in 'Relevant Definitions'.

5. For dwellings with energy systems not currently covered under SAP 2005 such as wind power and or air-conditioning systems please refer to *Special Cases*.
6. Level 6: Where the dwelling exceeds the percentage improvement of dwelling emission rate over target emission rate of 100%, calculate the total carbon emissions, as for 'true

zero carbon' below. Confirm that all renewables comply with definitions above. Confirm that heat loss parameter requirements are not exceeded.

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.
2. Compare Design stage and As-Built SAP (2005) worksheets (as submitted for Building Control purposes) and confirm that there have been no changes. Where changes have occurred the assessor should reassess the dwelling as set out above.
3. Verify that each *dwelling type* meets full building regulations compliance using the relevant Compliance Checklist: As-Built. Note: All criteria must 'PASS'.

For any situation not covered by the above, please contact BRE.

Calculation Procedures

Calculation for % improvement of DER over TER

Level 1–5: % improvement = $[1 - \{DER/TER\}] \times 100\%$ (a)

Level 6: Calculation for 'True Zero carbon'

The Standard Assessment Procedure (SAP) 2005 does not include appliances and cooking and therefore cannot be used to calculate the extent of renewables needed to achieve a 'true zero carbon' dwelling.

For dwellings which achieve over 100% improvement using the formula (a) above total CO₂ emissions including those arising from appliances and cooking can be estimated from the following assumptions

	KWh pa supplied	Carbon emissions factor (from SAP2005)	Kg CO ₂
	a	b (4)	a x b
Carbon emissions from heating and hot water and lighting from SAP worksheet (line107)			(1)
Carbon emissions for fans and pumps from SAP Worksheet (line108)			(1)
Carbon emissions for lighting, from SAP Worksheet (line109)			(1)
Carbon emissions from appliances and cooking	(2)		
Sub total carbon emissions (A)			
LESS			
Carbon displaced by renewables (B)		(3)	
Total predicted emissions (A–B)			

(1) Heating hot water lighting, pumps and fans from SAP 2005 Worksheet

- (2) Carbon emissions for appliances and cooking from the following formula (BRE, 2007):

$$110 \times (\text{TFA} \times \text{N})^{0.4714} + 16.17 \times \text{N} - 3.63 \times \text{TFA} - 17.3$$

where TFA = Total Floor Area in m²

N = Number of Occupants

For TFA < 43 m²; N = 1.46

TFA ≥ 43 m²; N = 2.844 × (1 – exp (–0.000391 × TFA²))

- (3) Carbon emissions factor (SAP2005) for electricity displaced to be used

- (4) Carbon emission factors from SAP 2005 (See C. Pout, BRE, 2005)

Checklists and Tables

None.

Common Cases of Non Compliance

Green tariffs cannot be used to discount CO₂ emissions

It is not possible to offset improved efficiency in non-SAP energy consumption such as appliances to achieve Code levels 5 or below.

Special Cases

Renewable systems not currently dealt with under SAP 2005.

Wind Power and some other more unusual renewable systems are not currently dealt with under SAP 2005. If these systems are specified please contact BRE for advice on the calculation procedures.

Air-conditioning

Air-conditioning is currently not dealt with under SAP 2005. If air-conditioning is specified:

AC will need to be estimated separately – supply the following information to BRE who will supply information on appropriate calculation procedures

Total floor area	Proportion of floor area cooled (0–1)	ΣAY	Heat loss coefficient (SAP box 37)	Description of air conditioning system including fuel type, controls and seasonal coefficient of performance.

(Y is the admittance in W/m²K for each element of fabric)

The total emissions for dwellings with air conditioning is calculated as follows:

DER including air conditioning = DER (taken from SAP 2005) + emissions due to air conditioning (BRE will advise on the calculation procedure based on the information provided above).

The DER is then compared against the dwelling's TER as modelled under SAP 2005 without the Air-conditioning installed.

Background

CO₂ has a direct environmental impact and is a major greenhouse gas, causing climate change. The credit scale relates to the operational energy requirements of the home under standard occupancy assumptions – rather than actual energy use. It should be noted that the actual energy consumption may be markedly different, as a range of user-specific issues will affect it, such as the hours of operation of space heating, type and size of household, use of white goods, etc.

The following Energy Saving Trust standards can give an indication of what is required to meet certain Mandatory Levels for this Issue.

- Level 1: Good Practice Standard – 10% improvement of DER over TER
- Level 3: Best Practice Standard – 25% improvement of DER over TER

References and Further Information

Department for Communities and Local Government. *Building Regulations Approved Document L1A – Conservation of fuel and power in new dwellings* (2006)
www.communities.gov.uk

Building Research Establishment Ltd. The Government's Standard Assessment Procedure for Energy Rating of Dwellings, 2005 Edition.

Energy Saving Trust (www.est.org.uk)
www.est.org.uk/housingbuildings/standards

EST, Demonstrating compliance -Advanced practice (2006 edition)
 EST, Demonstrating compliance -Best practice (2006 edition)
 EST, Demonstrating compliance -Good practice (2006 edition)
www.est.org.uk/uploads/documents/housingbuildings

BREDEM 12 updated (BRE, 2002)

C. Pout and R. Hitchin, Carbon Emission Factors (BRE Note, 2004)

Matt Batey and Christine Pout, Delivered Energy Emission Factors for 2003 (BRE Filelibrary December 2005) from www.bre.co.uk/filelibrary/2003EmissionFactorUpdate.pdf

BNXS01: Carbon Emission Factors for UK Energy Use from Market Transformation programme.
www.mtprog.com/ApprovedBriefingNotes/

C. Pout, 'CO₂ emission figures for policy analysis', BRE, July 2005

BRE, Update to BREDEM 12 for appliances and cooking, (2007, to be published)

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 2	Building Fabric	2	No

Aim

To future proof the energy efficiency of dwellings over their whole life by limiting heat losses across the building envelope.

Assessment Criteria

Credits are awarded based on the Heat Loss Parameter for each dwelling, in accordance with the table below:

Criteria	
Heat Loss Parameter (HLP)	Credits
≤ 1.3	1
≤ 1.1	2
Default cases	
None	

Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the Definitions and Calculations sections below	
Design Stage	Post Construction Stage
<p>Design Stage – SAP 2005 Worksheet* for each <i>dwelling type</i> and accompanying list of specifications from an accredited energy assessor Part L ‘Competent Person’.</p> <p>*Full worksheet, dated with assessor name, registration number where appropriate and address of development, prepared at plans approval stage.</p> <p>Copy of plans, elevations and sections as designed and construction details sufficient to check building details.</p>	<p>As-Built Stage – SAP 2005 Worksheet* for each <i>dwelling type</i> and accompanying list of specifications from an accredited energy assessor Part L ‘Competent Person’ if different from design stage.</p> <p>*Full amended worksheet, dated with assessor name, registration number where appropriate and dwelling address, prepared at construction completion stage if different from Design Stage.</p> <p>Evidence of final construction materials, built form and accompanying list of specifications (including boiler) in the form of photographs or purchase orders or assessor site survey.</p>

Design Stage	Post Construction Stage
<p>A copy of the 'Design Stage' Part L1A Building Regulations Compliance Checklist*, showing full compliance for each <i>dwelling type</i>.</p>	<p>Confirmation by the person carrying out the work that the dwelling has been constructed in accordance with the specifications which accompanied the – SAP 2005 Worksheet* for each <i>dwelling type</i>, as supplied to Building Control</p> <p>A copy of the 'As-Built' Part L1A Building Regulations Compliance Checklist from an showing full compliance for each <i>dwelling type</i>. This evidence may also be provided by from an accredited energy assessor Part L 'Competent Person'.</p> <p>*Alternatively, documentary evidence from a Building Control Officer confirming full AD L1A compliance.</p>

Relevant Definitions

AD L1A	The Building Regulations for England and Wales Approved Document L1A: Conservation of Fuel and Power in New Dwellings (2006).
SAP	Standard Assessment Procedure – Government approved methodology for rating the energy performance of dwellings. The indicators are used to demonstrate compliance with AD L1A of the Building Regulations. Currently SAP 2005
Design Stage SAP 2005 Worksheet	<p>An output of SAP 2005 software summarising all relevant design stage construction data and the emissions calculated by SAP 2005 for the dwelling as designed</p> <p>For an up-to-date list of SAP 2005 approved software visit: www.bre.co.uk/sap2005.</p>
As-Built SAP 2005 Worksheet	An output of SAP 2005 software summarising all relevant as built construction data and the emissions calculated by SAP 2005 for the dwelling as built.
<i>dwelling type</i> (for Ene 1 and Ene 2 purposes)	<p>A set of dwellings on a development site are of the same 'type', if they exhibit each of the following (as used to demonstrate compliance under Part L of the Building Regulations and SAP2005):</p> <ul style="list-style-type: none"> • The same (or similar) dwelling size, built form and construction details. • The same space heating and hot-water system and controls.

- The same orientation and level of over-shading/sheltering. East and west are identical.
- The same assumed actual air permeability and ventilation system.

In cases where buildings contain more than one dwelling (such as in a terrace of houses or in a block of flats) it is acceptable to consider area-weighted DER and TER for each dwelling type as defined in ENE1.

Accredited Energy Assessor/Part L ‘Competent Person’

As defined in AD L1A, CO₂ emission rate calculations **20D-(1)** “a person registered by either FAERO Limited or BRE Certification Limited, in respect of the calculation of CO₂ emission rates of buildings” and any future approved scheme

Heat Loss Parameter (HLP)

The total fabric and ventilation heat losses from the dwelling, divided by the total floor area. (W/m²K).

Assessment Methodology

Design Stage

1. Confirm that the SAP 2005 Worksheets and Building Regulation Compliance Checklist are from an accredited energy assessor / Part L ‘Competent Person’.
2. Documentation provided by a non-authorized SAP2005 assessor/ Part L competent person must have been verified by Building Control and evidence of this must be supplied before any assessment can take place.
3. Confirm that the SAP 2005 Worksheets are the correct version, i.e. Design Stage.
4. Take the relevant HLP figure(s) from SAP Box 38, for the dwelling type, and award credits accordingly.

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.
2. Compare Design stage and final As-Built SAP (2005) worksheets (as submitted for Building Control purposes) and confirm that there have been no changes.

Calculation Procedures

None.

Checklists and Tables

None.

Common Cases of Non Compliance

None

Special Cases

None

Background

This credit assesses the thermal performance of the building envelope on its own. Although innovative systems for provision of services to the building may reduce the energy consumption, it is the building envelope that can have the most significant long-term effect, as the envelope is unlikely to be radically altered during its life, other than where extensions are added.

The Heat Loss Parameter is a statistic which combines the impact of both external surface area, insulation value of construction and airtightness. Rewarding a lower value for Heat Loss Parameter encourages the design of efficient built form such as flats and terraces as well as increased levels of insulation and airtightness.

Further information on reducing the energy use in buildings to the point at which almost no energy is used in heating, known as the 'PassivHaus' concept can be found at the internet reference below:

References and Further Information

Department for Communities and Local Government. *Building Regulations Approved Document L1A – Conservation of fuel and power in New Dwellings* (2006)

Building Research Establishment Ltd. The Government's Standard Assessment Procedure for Energy Rating of Dwellings, 2005 Edition.

www.passivhaus.org.uk

Specific EST guidance (available from www.energysavingtrust.org.uk/housing)

- Insulation materials chart – thermal properties and environmental ratings (CE71)
- Improving airtightness in dwellings (CE137 / GPG224)
- Energy efficient ventilation in housing. A guide for specifiers (GPG 268)

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 3	Internal Lighting	2	No

Aim

To encourage the provision of energy efficient internal lighting, thus reducing the CO₂ emissions from the dwelling.

Assessment Criteria

Credits are awarded for the provision of fixed dedicated energy efficient internal light fittings as follows:

Criteria	
Provision for lighting	Credits
Where \geq 40% of fixed internal fittings are dedicated and energy efficient.	1
Where \geq 75% of fixed internal fittings are dedicated and energy efficient.	2
Default Cases	
None	–

Note: SAP2005 assumes 30% low energy fittings.

Information required to demonstrate compliance

The following section details any relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage for each *Dwelling type*.

Schedule of Evidence Required	
To be read in conjunction with the Definitions and Calculations Sections below	
Design Stage	Post Construction Stage
<p>Calculation of the percentage of dedicated energy efficient light fittings in all rooms</p> <p>Relevant design stage drawings clearly showing:</p> <ul style="list-style-type: none"> Location and type of all light fittings in all rooms. <p>Text describing (on drawings or in specification*):</p> <ul style="list-style-type: none"> Location and type of all light fittings in all rooms. <p>*or a letter of instruction to a contractor/ supplier or a formal letter from the developer to the Code Assessor giving the specific undertaking.</p>	<p>As built drawings/ specifications or written confirmation that the dwelling has been constructed in accordance with the design stage drawings/ specifications)</p> <p>AND copies of purchase orders/receipts,</p> <p>OR</p> <p>Photographic evidence,</p> <p>OR</p> <p>Evidence provided on the basis of an Assessor site survey.</p>

<p>Manufacturers literature confirming:</p> <ol style="list-style-type: none"> 1. Dedicated energy efficient light fittings. 2. Efficacy of less than 40 lumens per circuit watt for any lamp. 	
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Relevant Definitions

Dedicated energy efficient light fittings

Fittings that comprise of the lamp, control gear, **and** an appropriate housing, reflector, shade or diffuser. The fitting must be dedicated in that it must be capable of **only** accepting lamps having a luminous efficacy greater than 40 lumens per circuit Watt. The fixing must be permanently fixed to the ceiling or wall.

Tubular fluorescent and compact fluorescent lighting fittings would normally meet this requirement. Lighting fittings for GLS tungsten lamps with bayonet cap or Edison screw bases, or tungsten halogen lamps would not comply.

Rooms

When calculating the percentage of energy efficient fittings, for all dwelling types the following rooms/areas must be included:

Living rooms, dining rooms, kitchens, bedrooms, hallways, studies, bathrooms, WC's and utility rooms

the following rooms/areas are excluded:

Garages, walk-in wardrobes, cupboards.

External areas are also excluded from the calculation.

Compact Fluorescent Lamp (CFL)

A type of fluorescent lamp that screws into a standard light bulb socket or plugs into a small dedicated lighting fixture. CFLs have a longer rated life and use less electricity than conventional incandescent light bulbs.

Tubular Fluorescent Lamp (TFL)

A type of fluorescent lamp that is named after its shape. These lamps have their own range of dedicated fittings and have a longer rated life and use less electricity than conventional incandescent light bulbs.

Assessment Methodology

Design Stage

1. Check that the energy efficient light fittings to be supplied are dedicated fittings.
2. Express the quantity of fixed dedicated energy efficient light fittings within habitable rooms as a percentage of the total number of fixed light fittings within habitable rooms.

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.

Calculation Procedures

None.

Checklists and Tables

None.

Common Cases of Non Compliance

Fixed light fittings that can accept both CFL and tungsten filament lamps.

Special Cases

None.

Background

The Building Regulations England and Wales, Part L1A requires fixed dedicated energy efficient light fittings to be installed in the most frequented locations in the dwelling to a number not less than one per 25m² floor area or one per four fixed light fittings.

Under SAP2005, 30% of the internal lighting is assumed to be low energy by default. The Code for Sustainable Homes requires a greater amount of fixed low energy light fittings to be installed for additional credits to be awarded. All internal fixed light fittings are assessed in this Issue.

The requirement is to provide energy efficient lighting to minimise energy consumption. In most homes, lighting accounts for around 10–15 per cent of an electricity bill. Traditional bulbs waste a lot of their energy. Each energy saving bulb can reduce a household electricity bill by up to £7 a year. This equates to a reduction in CO₂ emissions of approximately 43 kg/yr. Compact fluorescent light bulbs (CFLs) use around 60 per cent less electricity than traditional incandescent lights, while lasting ten to twelve times as long. Their long life means they need replacing less often and so are particularly suitable for use in inaccessible fixtures.

References and Further Information

Department for Communities and Local Government. *Building Regulations Approved Document L1A – Conservation of Fuel and Power in New Dwellings* (2006)

Specific EST guidance (available from www.est.org.uk/housing)

- Energy efficient lighting – a guide for installers and specifiers (CE61)
- Low energy domestic lighting (GIL20)

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 4	Drying Space	1	No

Aim

To minimise the amount of energy used to dry clothes.

Assessment Criteria

Credits are awarded based on the provision for drying space for each dwelling type in accordance with the table below:

Criteria		Credits
Where space with posts and footings or fixings capable of holding 4m+ of drying line for 1–2 bed dwellings, and 6m+ of drying line for 3+ bed dwellings, is provided for drying clothes. This space (internal or external) should be secure.		1
Default Cases		
None		–

Information required to demonstrate compliance

The following section details any relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage, for each dwelling type.

Schedule of Evidence Required To be read in conjunction with the Definitions and Calculations Sections below	
Design Stage	Post Construction Stage
Relevant design stage drawings clearly showing: For internal drying space: <ul style="list-style-type: none"> • Location of drying fixings • Details/location of ventilation provided For external drying space: <ul style="list-style-type: none"> • Location of fixings/footings or posts. 	As design stage AND Copies of purchase orders/receipts of internal or external drying devices, OR Photographic evidence (photographs must clearly show the dwelling being assessed), OR Evidence provided on the basis of an Assessor site survey.

Design Stage	Post Construction Stage
<p>Text describing (on drawings or specification*):</p> <ul style="list-style-type: none"> • Location and type of internal or external drying fixings/footings and posts. • Confirmation of the minimum length of drying line. • Specification of any humidistat controlled extract fan/passive vent(s). <p>* or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code Assessor giving the specific undertaking.</p>	

Relevant Definitions

Internal Drying Space

A heated space with adequate, controlled ventilation, complying with Building Regulations AD F (Ventilation)

Note: Rooms that commonly meet these requirements are a bathroom or utility room

OR

An unheated outbuilding may also be acceptable, where calculations by an appropriate CIBSE engineer (or equivalent professional) confirms that ventilation is adequate to allow drying in normal climatic conditions and to prevent condensation/mould growth.

The fixing/ fitting needs to be a permanent feature of the room

For flats with communal dedicated internal drying spaces; access should be restricted to residents.

Assessment Methodology

Design Stage

1. Confirm specification

Post Construction Stage

1. Confirm provision

Calculation Procedures

None.

Checklists and Tables

None.

Common Cases of Non Compliance

Internal drying spaces are not allowed in the following rooms:

Living-room, kitchen, dining room, main hall or bedrooms.

Special Cases

None.

Background

This credit was introduced to encourage the drying of clothes ‘naturally’ rather than using a tumble dryer. It has become increasingly common practice to include a place for a tumble dryer without necessarily attempting to design in a space for natural drying. This Issue is especially important for those dwellings without a large garden.

Ventilation for indoor spaces supplied with drying fixings should conform to the recommendations of EST and will depend on the air tightness strategy,

References and Further Information

Energy Saving Trust
www.est.org.uk

Good practice Guide 268 Energy efficient ventilation of dwellings-a guide for specifiers (2006)

Department for Communities and Local Government. *Building Regulations Approved Document F – Ventilation* (2006)

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 5	Energy Labelled White Goods	2	No

Aim

To encourage the provision or purchase of energy efficient white goods, thus reducing the CO₂ emissions from the dwelling.

Assessment Criteria

Credits are awarded where information is provided relating to the provision of energy efficient white goods, or where energy efficient white goods are supplied in accordance with the table below for each dwelling:

Criteria	Credits
EITHER Where the following appliances have an A+ rating under the EU Energy Efficiency Labelling Scheme: Fridges, freezers and fridge/freezers.	1
AND/OR Where the following appliances have an A rating under the EU Energy Efficiency Labelling Scheme: Washing machines and dishwashers, And the following have a B rating: Washer dryers and tumble dryers.	1
OR If no white goods are provided, but information on the EU Energy Efficiency Labelling Scheme of efficient white goods is provided to each dwelling.	1
Default Cases None	–

Information required to demonstrate compliance

The following section details any relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage, for each dwelling type.

Schedule of Evidence Required To be read in conjunction with the Definitions and Calculations Sections below	
Design Stage	Post Construction Stage
<p>Text describing (on drawings or in the specification*):</p> <ul style="list-style-type: none"> • Make and model of all white goods provided. • A copy of the Energy rating (EU Energy Efficiency Labelling Scheme) of all white goods provided. <p>* or a letter of instruction to a contractor/ supplier or a formal letter from the developer to the Code assessor giving the specific undertaking.</p>	<p>As at design stage</p> <p>AND</p> <p>Copies of purchase orders/ receipts for all white goods provided</p> <p>AND</p> <p>Confirmation of installation referring to specific dwelling</p> <p>OR</p> <p>Evidence provided on the basis of an Assessor site survey.</p> <p>If undertaking given at design stage then manufacturer's literature* confirming the EU Energy Efficiency Labelling Scheme energy rating for all white goods installed is provided.</p>
<p>If no white goods are provided:</p> <ul style="list-style-type: none"> • A copy of a leaflet describing the EU Energy Efficiency Labelling Scheme. The information should clearly explain what the EU Energy Efficiency Labelling Scheme is and how it works. • Text on drawings or in the specification* confirming that leaflets are going to be provided to all dwellings. <p>* or a letter of instruction to a contractor/ supplier or a formal letter from the developer to the Code assessor giving the specific undertaking.</p>	<p>As at design stage</p> <p>AND</p> <p>Written confirmation of information provided referring to specific dwelling (could be part of a Home User Guide).</p> <p>OR</p> <p>Evidence provided on the basis of an Assessor site survey.</p>

Relevant Definitions

EU Energy Efficiency Labelling Scheme

The EU energy label rates products from A (the most efficient/least energy used) to G (the least efficient/most energy used). For refrigeration, the scale now goes up to A+ +. By law, the label must be shown on all refrigeration and laundry appliances, dishwashers, electric ovens and light-bulb packaging at point of sale.

Assessment Methodology

Design Stage

1. Check the specification for white goods meets the credit requirements or that information as detailed is to be provided.

Post Construction Stage

1. Verify via site inspection or audit of written confirmation that the appliances provided are as specified at the Design Stage, or that information describing appliance labelling has been provided.

Calculation Procedures

None.

Checklists and Tables

None.

Common Cases of Non Compliance

None.

Special Cases

None.

Background

For a typical new (Part L 2006) semi-detached dwelling, the CO₂ emissions from lights and appliances will make up about 43% of the total CO₂ emissions. Emissions from lights and appliances (including cooking) are now higher than both space and water heating emissions. In such a typical semi, space heating would account for 26% of the CO₂ emissions, water heating 22% and cooking 9%.

The choice of appliances will therefore play an important role in terms of reducing total CO₂ emissions. Up to 190kg per year of CO₂ can be saved by each household for choosing an energy efficient fridge freezer compared to a more 'traditional' model. This equates to a monetary saving of around £35 a year.

Lights and appliances represents the area of greatest growth in residential energy use. Over the past 30 years energy use for lights and appliances have increased at around 2% per annum.

There is increasing likelihood that when occupants choose their own white goods they will consider the energy consumed during use, especially for products of equal cost. To encourage

them to do so, the developer must provide information to help the occupier to select the most energy efficient and cost effective appliances, where no white goods are provided.

References and Further Information

Energy Saving Trust (EST)

www.est.org.uk

EST helps you find energy efficient products and gives you information on the EU energy efficiency labelling scheme.

<http://www.est.org.uk/myhome/efficientproducts/recommended/index.cfm>

<http://www.est.org.uk/myhome/efficientproducts/energylabel/>

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 6	External lighting	2	No

Aim

To encourage the provision of energy efficient external lighting, thus reducing CO₂ emissions from the dwelling.

Assessment Criteria

Where all external space lighting not fixed to the external surface of the dwelling is provided by dedicated energy efficient fittings, as follows:

Criteria	Credits
<p>Space lighting</p> <p>Where all external space lighting, including lighting in common areas is provided by <i>dedicated energy efficient fittings</i>, taking into account the needs of people who have visual impairments.</p> <p>Note: Statutory safety lighting is not covered by this requirement.</p>	1
<p>Security lighting</p> <p>Where all security light fittings are designed for energy efficiency and are adequately controlled such that:</p> <p>all burglar security lights have:</p> <ul style="list-style-type: none"> ● a maximum wattage of 150W AND ● movement detecting control devices (PIR) AND ● daylight cut-off sensors. <p>all other security lighting:</p> <ul style="list-style-type: none"> ● has <i>dedicated energy efficient fittings</i> AND ● is fitted with daylight cut-off sensors OR timers. 	1
<p>Default Cases</p> <p>If no security lighting is installed, then the security lighting credit can be awarded by default provided all the conditions of the first issue covering space lighting have been met. Dual lamp luminaires with both space and security lamps also can be awarded both credits provided they meet the above criteria for energy efficiency.</p>	1

Information required to demonstrate compliance

Schedule of Evidence Required To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
<p>Relevant drawings clearly showing:</p> <ul style="list-style-type: none"> • Location of all external light fittings. <p>Text describing (on drawings or in specification*):</p> <ul style="list-style-type: none"> • Location and type of all external light fittings. <p>*or a letter of instruction to a contractor/ supplier or a formal letter from the developer to the Code Assessor giving the specific undertaking.</p>	<p>As design stage (but as built drawings/ specifications or confirmation that the dwelling have been constructed in accordance with the design stage drawings/ specifications)</p> <p>AND</p> <p>copies of purchase orders/receipts,</p> <p>AND/OR</p> <p>Photographic evidence,</p> <p>AND/OR</p> <p>Evidence provided on the basis of an Assessor site survey.</p>
	<p>Manufacturers' literature confirming:</p> <ol style="list-style-type: none"> 1. Dedicated energy efficient light fittings. 2. Control systems used for the security lighting.

Relevant Definitions

Space lighting

The normal lighting required to illuminate a space when in use. It can be used outside the entrance to the home, in outbuildings such as garages and external spaces such as paths, patios, decks, porches, steps and verandas Space lighting should usually be designed to be switched off when the space is uninhabited and during daylight hours.

Security lighting

Security lighting is provided to deter burglars or intruders and to protect property. There are two types of security lighting commonly used in dwellings – high wattage intruder lights that are operated via PIR sensors which only switch on for a short time, and low wattage lighting that is controlled by time switches and daylight sensors.

Statutory safety lighting

Safety lighting is usually provided in multi-residential buildings like block of flats to illuminate stairwells and exit routes when the main lighting system fails. Its design is specified by regulation and is therefore outside the scope of the Code.

Dedicated energy efficient light fittings	<p>Fittings that comprise of the lamp, control gear and an appropriate housing, reflector, shade or diffuser. The fitting must be dedicated in that it must be capable of only accepting lamps having a luminous efficacy greater than 40 lumens per circuit Watt. The fixing must be permanently fixed to the ceiling or wall.</p> <p>Tubular fluorescent and compact fluorescent lighting fittings (CFLs) would normally meet this requirement. Light fittings for GLS tungsten lamps with bayonet cap or Edison screw bases, or tungsten halogen lamps would not comply.</p>
Compact Fluorescent Lamp (CFL)	<p>A type of fluorescent lamp that screws into a standard light bulb socket or plugs into a small dedicated lighting fixture. CFL's have a longer rated life and use less electricity than conventional incandescent light bulbs.</p>
Tubular Fluorescent Lamp (TFL)	<p>A type of fluorescent lamp that is named after its shape. These lamps have their own range of dedicated fittings and have a longer rated life and use less electricity than conventional incandescent light bulbs.</p>
Control systems	<p>A method for controlling the external lighting to ensure that it will not operate unnecessarily during daylight hours.</p> <p>Control systems that can be considered are Passive Infra Red (PIR), 'Dusk to Dawn' daylight sensors and time switches.</p>
Movement detecting shut-off devices (PIR)	<p>A type of motion detector which uses infra red light to detect movement and switch lighting on.</p>
Daylight sensors (Dusk to Dawn)	<p>A type of sensor which detects dusk and dawn and switches lighting on at dusk and off at dawn.</p>
Time switch	<p>A switch with an inbuilt clock which will allow lighting to be switched on and off at programmed times.</p>

Assessment Methodology

Design Stage

1. For **houses**, fittings serving the following areas should be included in the assessment of space and security lighting:
 - External door, front porch, steps/ pathways, patio, garage, garden, carports and any other outbuildings.
2. For **flats**, fittings serving the following areas should be included in the assessment of space lighting:
 - Communal lobbies, main external entrances, internal entrance porches, external steps and pathways.

These areas should be equipped with dedicated fluorescent fittings (or more efficient luminaires like SON) and should be controlled by a time clock or daylight sensor.

- Hallways, landings, stairwells, internal corridors and garages

These areas should be equipped with dedicated fluorescent fittings that are controlled by push button time switches/ PIR sensors or equivalent.

- Specific communal rooms (laundries, cycle and other storage spaces etc)

These areas should be equipped with dedicated fluorescent fittings and manual switching or occupant sensors

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.

Calculation Procedures

None.

Checklists and Tables

None.

Common Cases of Non Compliance

Credits cannot be awarded by default if no space lighting is installed, even though the Issue requirements for security lighting are met.

Background

The requirement is to provide energy efficient lighting that is adequately controlled to minimise energy consumption.

Intruder security lighting for domestic use is normally fitted with halogen or bright tungsten luminaires. Whilst these are not particularly energy efficient, there are few alternatives. In view of this, the main objective is to ensure that appropriate wattage fittings are installed to avoid over-specification.

The current Building Regulations England, Part L1a (2006), requires fixed external lighting i.e. lighting fixed to an external surface of the dwelling, to be either fixed low energy light fittings or, for security lighting, max 150 W with PIR and daylight cut off sensors. However, garage lighting, lighting on outbuildings, security lighting, feature lighting or lighting in communal areas in blocks of flats are not covered. Neither are they included in SAP and the DER which is why this component of external lighting is covered under the Code.

References and Further Information

Energy Saving Trust (EST)

www.est.org.uk/myhome/

Energy Efficiency Best Practice and Housing (EEBPH)

www.est.org.uk/housingbuildings/professionals/

The Carbon Trust

www.thecarbontrust.co.uk/energy/pages/home.asp

Office of the Deputy Prime Minister. *Building Regulations Approved Document L1a and L1b – Conservation of fuel and power* (2006)

Secured by Design – Guidance for New Homes, Section 2.9

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 7	Zero or Low Carbon (ZLC) Energy Technologies	2	No

Aim

To reduce carbon emissions and atmospheric pollution by encouraging local energy generation from renewable sources to supply a significant proportion of the energy demand.

Assessment Criteria

Credits are awarded based on the percentage reduction in total carbon emissions that result from using Zero or Low Carbon (ZLC) Energy Technologies for each *dwelling* using the calculation method detailed in *Calculation Procedures*, with credits awarded as detailed below:

Criteria	Credits
Where energy is supplied from local renewable or low carbon energy sources funded under the Low Carbon Building Programme (or similar), or is designed and installed in a manner endorsed by a feasibility study prepared by an independent energy specialist AND There is a 10% reduction in carbon emissions as a result of this method of supply.	1
OR There is a 15% reduction in carbon emissions as a result of this method of supply.	2
Default Cases None	–

Information required to demonstrate compliance

Schedule of Evidence Required To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
Confirmation that a feasibility study has been carried out by an independent energy specialist to establish the most appropriate ZLC energy source for the building/development.	Confirmation that design has been carried out by an independent energy specialist

Design Stage	Post Construction Stage
<p>'Design Stage' –SAP2005 Worksheet* for each <i>dwelling type</i> from a person who is registered by:</p> <ol style="list-style-type: none"> 1. FAERO Limited; or 2. BRE Certification Limited <p>showing the carbon emissions arising from energy demand without ZLC technologies.</p> <p>*Full worksheet, dated, assessor name, registration number and address of development, prepared at plans approval stage.</p>	As for design stage.
<p>Manufacturer's details or similar calculations stating the estimated heat or electricity output of the ZLC system.</p>	As for design stage.
<p>For renewable electricity generation: Relevant calculations showing the energy and carbon emissions equivalent contribution from renewable electricity</p>	As for design stage.
<p>For biofuels and other Low carbon Fuels show the carbon emissions resulting both with and without the Low carbon technology.</p>	
<p>Drawings showing location of ZLC equipment in the dwelling.</p>	<p>As for design stage</p> <p>AND/OR</p> <p>Photographic evidence,</p> <p>AND/OR</p> <p>Evidence provided on the basis of an Assessor site survey.</p>
<p>Text describing (on drawings or in the specification*):</p> <ol style="list-style-type: none"> 1. type and location of LZC equipment in the dwelling. 2. type of appliances that use an output from the ZLC equipment in the dwelling. 	<p>As for design stage</p> <p>AND/OR</p> <p>Photographic evidence,</p> <p>AND/OR</p> <p>Evidence provided on the basis of an Assessor site survey.</p>

Relevant Definitions

Low or Zero Carbon Technologies

The following Zero emission technologies may be considered (from the Energy Act 2004)

Solar:

- Solar Hot Water
- Photovoltaics

Water:

- Small scale hydro power

Wind:

- Wind turbines

Other:

- Fuel cells using hydrogen generated from any of the above 'renewable' sources.

The Department of Trade and Industry (DTI) hope to launch in Spring 2007 a scheme which will approve micro-generation equipment.

It will be a UKAS (United Kingdom Accreditation Service) accredited certification scheme covering products, installers and manufacturers. It will provide consumers with an independent indication of reliability of products, assurance that the installation will be carried out to an appropriate standard and a route for complaints should something go wrong.

This scheme is being developed by the Buildings Research Establishment (BRE) on behalf of Government.

All micro-generation equipment will need to comply with this scheme in order to satisfy the requirement for credits.

The following Low emission technologies may be considered:

Biomass

- Biomass single room heaters/ stoves
- Biomass boilers
- Biomass community heating schemes

Combined Heat and Power (CHP)

- CHP
- Biomass CHP

Community heating, including heating from waste.

Heat Pumps:

- Air source heat pumps (ASHP)
- Ground source heat pumps (GSHP)
- Water source heat pumps (WSHP)

The Low or Zero Carbon (ZLC) Energy Technologies can be situated either on-site or off-site, with the electricity from the

off-site ZLC technologies being delivered via an Energy Services Company (ESCo) or from an “accredited external renewable” as defined in Ene 1.

For recently developed ZLC technologies or ZLC technologies that are not mentioned here, please contact the BRE to ensure compliance.

Low Carbon Buildings Programme

The DTI’s Low Carbon Buildings Programme provides grants for microgeneration technologies to householders and is managed by the Energy Saving Trust.

Feasibility study

A study carried out by an independent energy specialist to establish the most appropriate ZLC energy source for a building or development.

The feasibility study must cover as a minimum:

- Energy generated from ZLC energy source per year
- Payback
- Land use
- Local planning requirements
- Noise
- Whole life cost/ life cycle impact of the potential specification in terms of carbon emissions
- Any available grants
- All technologies appropriate to the site and energy demand of the development.
- Reasons for excluding other technologies.

The feasibility study must be carried out at the outline proposal stage, (RIBA stage C). Where the feasibility study has been carried out at other stages please contact BRE for advice.

SAP

Standard Assessment Procedure – Government approved methodology for rating the energy performance of dwellings. The indicators are used to demonstrate compliance with *ADL1A* of the Building Regulations.

Dwelling Type

A set of dwellings on a development site of the same ‘type’, are those that exhibit each of the following:

- The same dimensions and construction details.
- The same space heating and hot-water system and controls.
- The same exposed area for each construction element.
- The same orientation.
- The same level of over-shading/sheltering.
- The same assumed/actual air permeability, see definition in Ene 1.

Assessment Methodology

Design Stage

1. Calculate the total reduction in carbon emissions resulting from using ZLC technologies using Table 1.
2. Provided that there is a direct supply to the dwelling when there is a demand, any surplus electricity from a local ZLC source may be exported to the National Grid. The exported electricity may be included in this calculation as if it were consumed within the dwelling/development.
3. Confirm that renewables are accredited

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.

Calculation Procedures

Figures used for the calculations of the percentage of energy provided by ZLC technologies are based on the output from SAP 2005 worksheets.

1. Use *Table 1* in Checklists and Tables to calculate the total energy demand including the space heating, water heating, lighting, appliance and cooking for a dwelling with no renewables/low carbon technology. Assume standard gas heating, hot water and lighting services as assumed in SAP 2005
2. Calculate the carbon reduction arising from renewable electrical generation
3. Calculate the total carbon emissions from using low carbon technology. Subtract from 1 to give carbon reductions using heat generating low /zero carbon technologies.
4. Add 2 and 3. Divide by 1. to give percentage reduction in CO₂/m² pa.

Checklists and Tables

Table 1: Total Carbon Demand for Dwelling Type:				
		KWh/m ² pa supplied	Carbon emissions factor (from SAP2005)	Kg CO ₂
		a	b	a × b
1	Carbon emissions from heating and hot water and lighting from SAP Worksheet (line107)			(ref1)
2	Carbon emissions for fans and pumps from SAP Worksheet (line108)			(ref1)
3	Carbon emissions from lighting, SAP Worksheet (line109)			(ref1)
4	Carbon emissions from appliances and cooking	(ref 2)		
5	Total carbon emissions from a standard system (1+2+3+4)			
6	Carbon reduction from Electricity generated by renewables		(ref3) (ref4)	
7	For biomass or other low/zero carbon heating, total carbon emissions from heating and hot water from SAP 2005			
8	Carbon reduction from low/zero non electrical (7-1)			
9	Total carbon saving (6+8)			
10	Carbon saving as a percentage of notional carbon emissions (9/5×100)			

(1) Heating hot water lighting, pumps and fans from SAP 2005 Worksheet

(2) Appliances and cooking. See Ene 1:

$$110 \times (\text{TFA} \times \text{N})^{0.4714} + 16.17 \times \text{N} - 3.63 \times \text{TFA} - 17.3$$

where TFA is the floor area and N is the number of occupants

For $\text{TFA} < 43 \text{ m}^2$, $\text{N} = 1.46$

$$\text{TFA} \geq 43 \text{ m}^2, \text{N} = 2.844 \times (1 - \exp(-0.000391 \times \text{TFA}^2))$$

(3) Carbon emissions factor (SAP2005) for electricity displaced to be used

(4) Where renewable sources service other users (eg mixed-use developments). The electrical output should be allocated between all users in relation to their respective energy consumption.

Common Cases of Non Compliance

1. Energy supplied from remote sources through the National Grid, will not be eligible for any credits in this issue. This includes electricity procured through 'Green Tariffs'.

Special Cases

None.

Background

The use of zero and low emission energy sources will not only lead to reduced emissions of greenhouse gases and other pollutants, but will also help to conserve the finite global fossil fuel resources and develop a market for such technologies.

The government has set a target that 10% of energy in the UK should be generated from renewable sources by 2010. The greater the number of individual buildings that obtain 10% or more of their energy from renewable sources, the easier this target will be to achieve.

This credit rewards energy efficient design in addition to the inclusion of renewable energy technology. Supplying energy efficient buildings with 10% of their energy demand from zero or low carbon sources will be easier than for less energy efficient buildings since their total demand is lower.

References and Further Information

ODPM, *Planning Policy Statement 22: Renewable Energy*, HMSO (2004)

ODPM, *Planning for Renewable Energy A companion Guide to PPS22*, HMSO (2004)

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 8	Cycle Storage	2	No

Aim

To encourage the wider use of bicycles as transport by providing adequate and secure cycle storage facilities, thus reducing the need for short car journeys.

Assessment Criteria

Credits are awarded where adequately sized, safe, secure, convenient and weather-proof cycle storage is provided for each dwelling in accordance with the following criteria:

Criteria	Credits
Where either individual or communal cycle storage is provided that is adequate, safe, secure and weather-proof (as defined in <i>Relevant Definitions</i> below) for the following number of cycles: <ul style="list-style-type: none"> • Studio or 1 bedroom dwelling – 1 cycle for every two dwellings (only applicable to communal storage) • 2 and 3 bedroom dwellings – storage for 1 cycle • 4 bedrooms and above – storage for 2 cycles. OR <ul style="list-style-type: none"> • studios or 1 bedroom dwellings – storage for 1 cycle • 2 and 3 bedroom dwellings – storage for 2 cycles • 4 bedrooms and above – storage for 4 cycles. 	1
Default Cases	
None	–

Information required to demonstrate compliance

Schedule of Evidence Required To be read in conjunction with the relevant definitions below.	
Design Stage	Post Construction Stage
<p>Drawings showing:</p> <ol style="list-style-type: none"> 1. location, type and size of storage. 2. access to cycle storage 3. any security measures 4. details of the proprietary system (if applicable) <p>Text describing (on drawings or in the specification*):</p> <ol style="list-style-type: none"> 3. location, type and size of storage 4. access to cycle storage 5. security measures 6. details of the proprietary system (if applicable) <p>* or a letter of instruction to a contractor/ supplier or a formal letter from the developer to the EcoHomes assessor giving the specific undertaking.'</p>	<p>1. Confirmation that what was agreed at design stage was implemented. This could include:</p> <ul style="list-style-type: none"> • Purchase orders • Photographic evidence • Details from an assessor site visit

Relevant Definition

Cycle storage

Cycles may be stored in any of the following:

- garage or shed
- external or internal communal cycle store
- proprietary system

Adequate sized Cycle storage

The minimum storage area required to store cycles on the floor, defined by the *New Metric Handbook* which includes space to allow the cycles to be moved independently.

- 1 cycle: 2m long × 0.75m wide
- 2 cycles: 2m long × 1.5m wide
- 4 cycles: 2m long × 2.5m wide

OR

Where a proprietary storage or hanging system is provided, the space requirements are flexible but the system must allow each cycle to be removed independently and meet all other criteria.

Where cycle storage is provided in a shed a minimum of 1m² is required for garden tools (in addition to the above dimensions). The shed should be set on an concrete foundation.

Where cycle storage is provided in a garage, adequate space must be provided to store both the bicycle(s) and the car(s) at the same time.

For double garages, it must be assumed that each garage space is occupied by a car. Storage areas above should be added to typical minimum garage sizes:

- 2.4m × 4.9m for a single garage and
- 5m × 5.2m for a double garage (in accordance with the *New Metric Handbook*)

Secure	Secure storage is defined as the provision of a fully enclosed solid structure with a secure entrance lock (permanent lock, not a padlock) or for non solid structures (i.e. timber sheds), non fully enclosed structures (just three walls and a roof), or communal cycle stores, the provision of a secure fixing(s) to enable all cycle(s) to be locked
Secure Fixing	A steel fixing set in concrete (or similar solid foundations/hard standing) which allows both the wheel and frame to be locked securely, such as the ‘Sheffield’ type frame.
Weather-proof	Adequate protection from the elements. This would normally mean at least a roof and three walls.
Convenient access	<p>Easy and direct access from/to the dwelling(s) and from/to the cycle store to a public right of way.</p> <p>Access from the store to public right of way through the dwelling is not acceptable i.e. where cycles are stored in a shed in the back garden in a mid terraced home and there is no back garden gate.</p> <p>Communal cycle store(s) should be located within 100m (from the front door or the main entrance to a block of flats).</p> <p>If for strategic reasons outside the control of the developer the store cannot be located within the required distance, exceptions to the rule may be allowed. Full details must be provided and BRE consulted prior to awarding credits</p>

Assessment Methodology

Design Stage

1. Check that the proposed cycle store provided is of sufficient size, convenient, secure and weather-proof.

Post Construction Stage

1. Confirm that proposals made at design stage are implemented.

Calculation Procedures

None.

Checklists and Tables

None.

Common Cases of Non Compliance

Where cycles are to be stored inside the dwelling, the credit cannot be achieved (unless within a porch of adequate space as defined above).

The provision of folding cycles stored within the dwelling, would not achieve the credit. Folding cycles would be a temporary provision whereas the provision of cycle storage is a permanent feature.

Special Cases

None.

Background

The majority of all car journeys made are less than five miles. One viable alternative for those journeys is the bicycle. This will not only reduce air/noise pollution and provide more space on the streets, but also improve the health and fitness of the cyclist. In order to make cycling a practical alternative, people need somewhere convenient and safe to store their bicycles when they are at home. The Code therefore encourages the developer to provide such a space.

References and Further Information

Sustrans, National Cycle Routes

www.sustrans.org.uk

Cyclists Touring Club, CTC, the UK's National Cyclist's Organisation

www.ctc.org.uk

London Cycling Campaign

www.lcc.org.uk

Cycling England, The National body charged with co-ordinating the development of cycling across England, includes design guidance, examples, best practice etc.

www.cyclingengland.co.uk

Communities and Local Government:

Better places to live by design: a companion guide to PPG3 (2001)

Planning guidance and advice

www.communities.gov.uk

Sustrans Cycle Parking Information Sheet FF37,

www.sustrans.org.uk

Issue ID	Description	No. of credits available	Mandatory Elements
Ene 9	Home Office	1	None

Aim

To reduce the need to commute to work by providing residents with the necessary space and services to be able to work from home.

Assessment Criteria

Credits are awarded on the basis of the provision of space and services that enable a room to be used effectively as a home office.

Criteria	
	Credits
Where sufficient space and services (as defined below) have been provided which allows the occupants to set up a home office in a suitable quiet room.	1
Default Cases	
None	–

Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Review Stage
<p>Drawings showing:</p> <ul style="list-style-type: none"> • location and size of the home office • location of sockets • location of telephone points • location of windows <p>Text describing (on drawings or in the specification*):</p> <ul style="list-style-type: none"> • location and size of the home office • location of sockets • location of telephone points • that adequate ventilation will be provided <p>* or a letter of instruction to a contractor/ supplier or a formal letter from the developer to the Code assessor giving the specific undertaking,</p>	<p>Confirmation that what was agreed at design stage was implemented. This could include:</p> <ul style="list-style-type: none"> • Purchase orders • Photographic evidence • Assessor site visit

Relevant Definitions

- Sufficient space:** This is defined as the minimum size (1.8m wall length) to allow a desk and filing cabinet or bookshelf to be installed, with space to move around and open the door (the 1.8m wall size requirement can, in some circumstances, be altered if drawings can prove that a desk can be fitted in any other type of arrangement, i.e. alcove or similar, fulfilling all the above criteria).
- Sufficient services:** These services must be provided in the space of a suitable room intended as a home office:
- two double power sockets;
 - two telephone points (or double telephone point) or one telephone point where the dwelling is connected to broadband or cable .
 - window (Note that there is no requirement for this credit that the a certain daylight factor is achieved. However, in order to achieve the daylight credit the Home office must have a daylight factor of at least 1.5%)
 - adequate ventilation, either through an openable window or with alternative ventilation such as passive stack, etc.
- Suitable room:** For dwellings with three or more bedrooms, a suitable room is a room other than the kitchen, living room, master bedroom or bathroom. For dwellings with one or two bedrooms or studio homes, a suitable room may be in the living room, one of the bedrooms or any other suitable area in the home such as a large hall or dining area (provided the minimum service requirements defined above are met). However, the room must be large enough not to prevent the intended use of that room i.e. if a home office is to be set up in the main bedroom that room also needs to be able to fit in a double bed and other necessary furnishing.

Assessment Methodology

Design Stage

Check that the drawings and specification provide the required services described above

Post Construction Review Stage

Verify that the evidence provided at the Design Stage are still valid and that no changes have occurred during construction.

Calculation Procedures

None.

Checklists and Tables

None

Common Cases of Non Compliance

Special Cases

Background

The number of self-employed people is increasing, as is the number of people who work from home. Many job functions can readily be performed remotely, so it is quite feasible for individuals to work from home (or elsewhere) on either a full or part time basis. Currently there are 1.1 million people in the UK who have such non-traditional work patterns. Information from social trends indicates that 29% and 24% of employed men and women respectively have, at some time, worked from home. The benefits of working from home include reductions in transport movements, increased time available for the home worker and greater opportunity to participate within community activities.

Working from home for many people requires a telephone line as well as a connection to the internet for data transference and even video conferencing. Two telephone points or broadband will enable residents to use the telephone and the computer at the same time.

References and Further Information

Better places to live by design: a companion guide to PPG3 (2001)
www.communities.gov.uk

Communities and Local Government:
Planning Policy Guidance Note 08. – Telecommunications (2001)
Planning Policy Guidance Note 13. – Transport (2002)

Category 2 Water

Issue ID	Description	No. of credits available	Mandatory Elements
Wat 1	Internal Potable Water Use	5	Yes

Aim

To reduce the consumption of potable water in the home.

Assessment Criteria

Credits are awarded based on the predicted average household water consumption (calculated using the Code Water Calculator – see *Calculation Procedures*) for the Dwelling type in accordance with the table below:

Water consumption (l/person/day)	Credits	Mandatory Levels
≤ 120 l/p/day	1	Levels 1 and 2
≤ 110 l/p/day	2	
≤ 105 l/p/day	3	Levels 3 and 4
≤ 90 l/p/day	4	
≤ 80 l/p/day	5	Levels 5 and 6
Default Cases		
None.		

Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
Drawings showing: Text describing (on drawings or in the specification*): 1. Location, details and type of appliances/ fittings that use water in the dwelling including any specific water reduction equipment. 2. Location and details of any rainwater and greywater collection systems in the dwelling.	As at design stage (but as built drawings/ specifications giving details of all fittings installed OR confirmation that the dwelling has been constructed in accordance with the design stage drawings/ specifications) AND Copies of purchase orders/receipts AND/OR Evidence provided on the basis of an Assessor site survey.

Design Stage	Post Construction Stage
<p>Drawings showing:</p> <ol style="list-style-type: none"> 1. Location of any rainwater and greywater collection systems in the dwelling. <p>* or a letter of instruction to a contractor/ supplier or a formal letter from the developer to the assessor giving a specific undertaking.</p>	
	<p>Manufacturer literature confirming:</p> <ol style="list-style-type: none"> 1. Type and details of appliances/ fittings that use water in the dwelling incl. any specific water reduction equipment. 2. Type and details of any rainwater and grey water collection systems in the dwelling.
<p>Water calculation sheet from assessor showing internal potable water use per Dwelling Type.</p>	<p>As for design stage</p>

Relevant Definitions

Mains potable water	Drinking quality water that is taken from a connection to the main water supply in the dwelling.
Water reduction equipment	Fittings such as flow restrictors may be fitted in taps, showers and delayed inlet valves may be fitted in WCs.
Rainwater recycling	The collection and storage of rain from roofs in order to replace the use of potable water in WCs and/or washing machines. Rainwater recycling will be accomplished by the use of rainwater collection systems.
Greywater recycling	The collection of shower, bath and tap water in order to replace the use of potable water in WCs and/or washing machines. Greywater recycling will be accomplished by the use of greywater collection systems.

Assessment Methodology

Design Stage

1. Calculate the water consumption for each Code Dwelling type using the water calculation tables in *Calculation Procedures* or the Code water calculation tool, (available for assessors to download from the extranet).

The water use calculation assumes a standard usage pattern for each person and is determined by the water consumption levels of the specified appliances and fittings. The water use calculation is not affected by the number of appliances, only by the variation in the performance of appliances and fittings.

2. Where a type of appliance or fitting is unspecified, assume current building regulations or standard fittings. e.g. regular taps, high flow shower and standard bath, a typical use washing machine (49 litre/use) and dishwasher (13 litre/use). If the volume of the WCs is not specified, assume a 6 litre cistern. Assume no water softener or bidet unless the specification states otherwise.
3. If more than one type of any given fitting is installed this can be included in the calculation by following the note relating to Column 5 in Calculation Procedures below,
4. Where both a shower and bath are installed, use the given approximate number of uses per day, i.e. 0.6 and 0.4. If there is either a shower or a bath, assume 1 use of the installed fitting. Wall-mounted showers (above baths) and hand held showers (mounted on the bath or basin) are both considered to be a shower installations.
5. Ensure that the specified shower/tap flow rates are correct for a water pressure of 0.3MPa. For showers, the flow rate should be calculated assuming a delivered water temperature of 37°C.
6. If the space and plumbing is provided for dishwashers, typical practice dishwashers can be assumed.
7. Note that the use of washing machines must always be assumed, even where the developer is providing neither the space, the plumbing or the appliance itself. Assume typical practice unless best practice machines are to be supplied.
8. If washing machines and dishwashers of known water usage are being provided, actual consumption figures can be used, provided these are supported by manufacturer's information (Design Stage). Photographic/site visit evidence is required for the Post Construction Review Stage.
9. Communal washing machines should also be included in the calculations by assuming that each home has a washing machine installed, (i.e. 0.34 uses per day per bed space). Exact water usage figures can be used in the calculation tool, provided they are supported by manufacturer's information (Design Stage) or photographic evidence (Post Construction) otherwise typical domestic figures can be used.
10. If water recycling is used, deduct the volume of water collected from where it is to be used using the water recycling tables in *Calculation Procedures*.
11. If exact figures for the collection of grey water or rainwater (for internal use) can be provided, these can be used instead of the estimated mean annual rainfall from Checklists and Tables.

12. If water is locally extracted from a borehole, it should be assessed as potable water taken from the mains supply. This Issue seeks to reduce total water abstraction from all sources, through the use of water efficient fittings, appliances and recycling systems. In addition, borehole well water will not reduce the burden on drainage and treatment systems.

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.

Calculation Procedures

Calculate the water consumption for the Dwelling Type in accordance with the tables and guidance below.

Calculation of internal potable water consumption using BRE Water Calculator [®]						
Installation type	Unit of measure	Capacity/ flow rate	Use Factor	Proportion in dwelling max=1	No of uses/ person/ day	Litres water used/ person/day
WC (fixed flush)	Flush		1.00		4.80	
WC (dual flush)	Full Flush		0.33		4.80	
	Part Flush		0.67		4.80	
Bidet*	Litre per use	2.64	1.00		2.00	
Wash hand basin	Litres/minute		0.67		7.90	
Shower	Litres/minute		5.00		0.60	
Bath	Capacity to overflow		0.40		0.40	
Kitchen sink	Litres/minute		0.67		7.90	
Washing machine	Typical Practice	49	1.00		0.34	
	Actual Litres/use					
Dish washer	Typical Practice	13	1.00		0.30	
	Actual Litres/use					
Water* softener	Litres per use	12.5	1.00		1.00	
Total internal use						<input type="text"/>

* where no bidet or water softener is specified the proportion should be entered as zero.

Table 1 Notes

The water calculation table above is divided into 7 columns [1] – [7].

In all cases, the following formula applies:

$$[3] \times [4] \times [5] \times [6] = [7]$$

Figures highlighted in grey are those which remain fixed.

Column [1] details the type of installation, column [2] details the unit of measure related to the capacity or flow rate and column [3] relates to the capacity or flow rate of the installation type from manufacturers' information or from default figures. For dual flush WC's, the capacity of the cistern for both full and part flush should be entered and then combined to predict the consumption (per person per day) for that fitting. Where manufactures' information for specified dishwashers and washing machines, indicates a lower water consumption than the 'typical' figure (given in the table), the actual consumption can be entered.

Column [4] relates to the ratio per use and is based on the following:

WC: For dual flush WCs a flushing ratio of 1(big flush):2(small flush) is assumed. (this equates to 0.33 full flushes and 0.67 partial flushes per flush).

Wash Hand Basin and Kitchen Sink Taps: The 0.67 factor for wash hand basin taps and kitchen sink taps assumes the average time the taps are on for washing hands is 41 seconds.

Shower: The factor 5.0 assumes an average shower lasts for 5 minutes.

Bath: The factor of 0.40 assumes that a typical bath involves filling a bath to 40% of its overflow capacity.

Washing Machine, Dishwasher, Bidet and Water Softener: A factor of 1.0 is used for these fittings as there is no volume or capacity per use factor required.

Column [5] refers to the proportion of each type of fitting supplied. For example, if only one type of toilet is installed, the proportion of fittings throughout the house should be 1 (100%). If two types of toilet are supplied (in a home with a total of two WCs), the proportion for each type of toilet is 0.5 (representing 50% each). In this instance an additional row would need to be added to the above table.

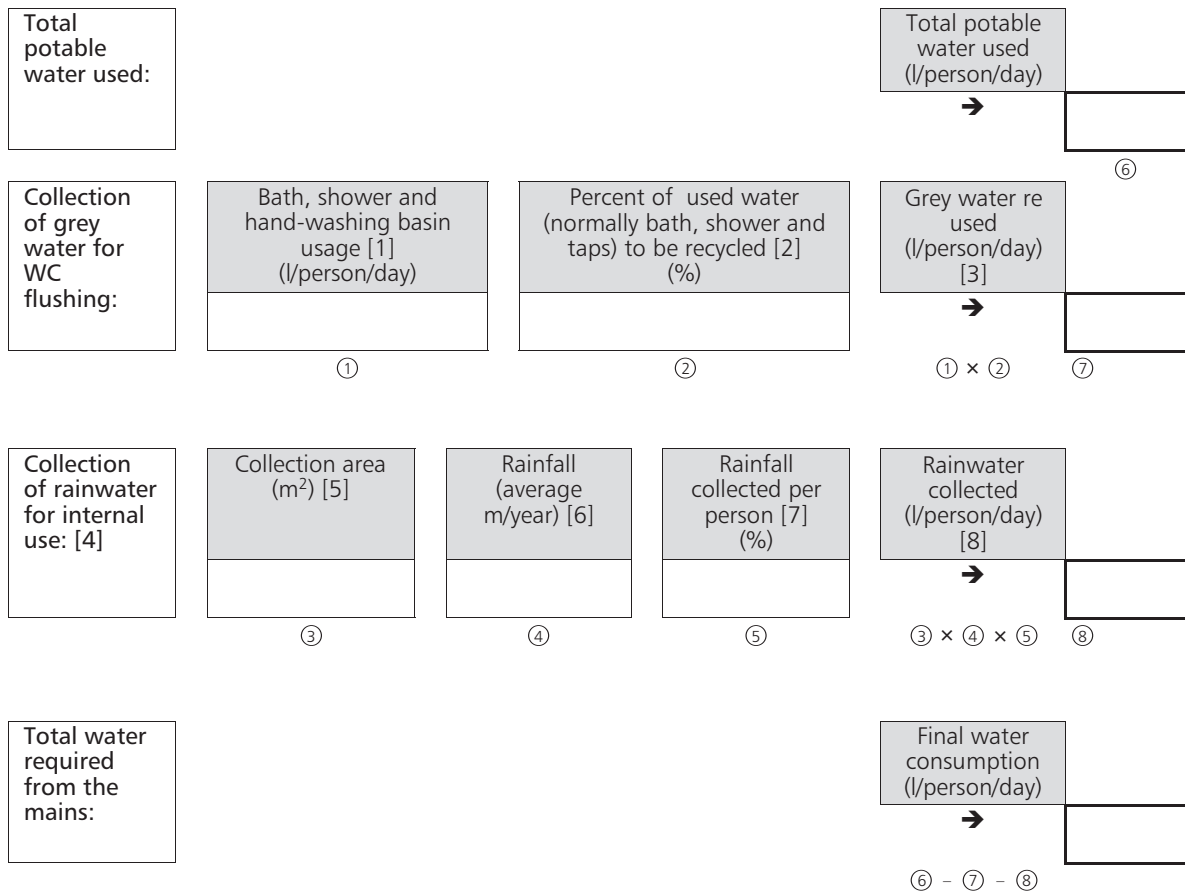
Column [6] refers to the number of times the fitting is used per person per day (a constant).

By multiplying together the flow capacity/rate (in litres/minute), the use factor, the proportion, and the number of uses per day, the total use for each fitting per person per day is given [7]. The water consumption figures for each fitting (litres/person/day) are then added together to give the total predicted water consumption in (litres/person/day).

This final predicted water consumption is an estimate of how much water would typically be used (per occupant per day), given the flow rates and capacities of the water consuming devices specified. This is unlikely to match actual consumption, which is highly dependant on personal behaviour.

- Dual flush cisterns are cisterns which have the facility to provide higher flush volume for solids and paper and lower flush volume for liquids.
- Flow restrictors contain precision made holes or filters to restrict flow and reduce the outlet flow and pressure.
- Delayed inlet valves prevent water entering the cistern until after the cistern has completely emptied into the bowl.

Calculation of total potable water needed from the mains, for internal use, taking into account any grey or rain water recycling



Grey-water recycling systems normally collect shower, bath and tap water and recycle this for toilet flushing. Rainwater recycling systems use collected rainwater typically for toilet flushing and washing machines.

Table 2 Notes

- [1] Include only usage of these fittings from which water will be recycled. If other sources please amend as appropriate.
- [2] The manufacturer/ designer of the grey water recycling system should be able to provide this figure.
- [3] Note that if grey water is only used for flushing the WC, the amount of water deducted for re-use cannot be greater than the amount of water required for flushing the WC.
- [5] Rainwater collection area is the area the rainwater is collected from. If the water is collected from the roof, the collection area = the roof area.
- [6] For the average rainfall in the UK see the map of Mean Annual Rainfall in the UK in *Checklist and Tables*.
- [7] If no exact figures for the collection of rainwater can be provided, assume 60% of the

rainwater is collected for re-use. The following formula should be used to determine the percentage rainwater collected per person.

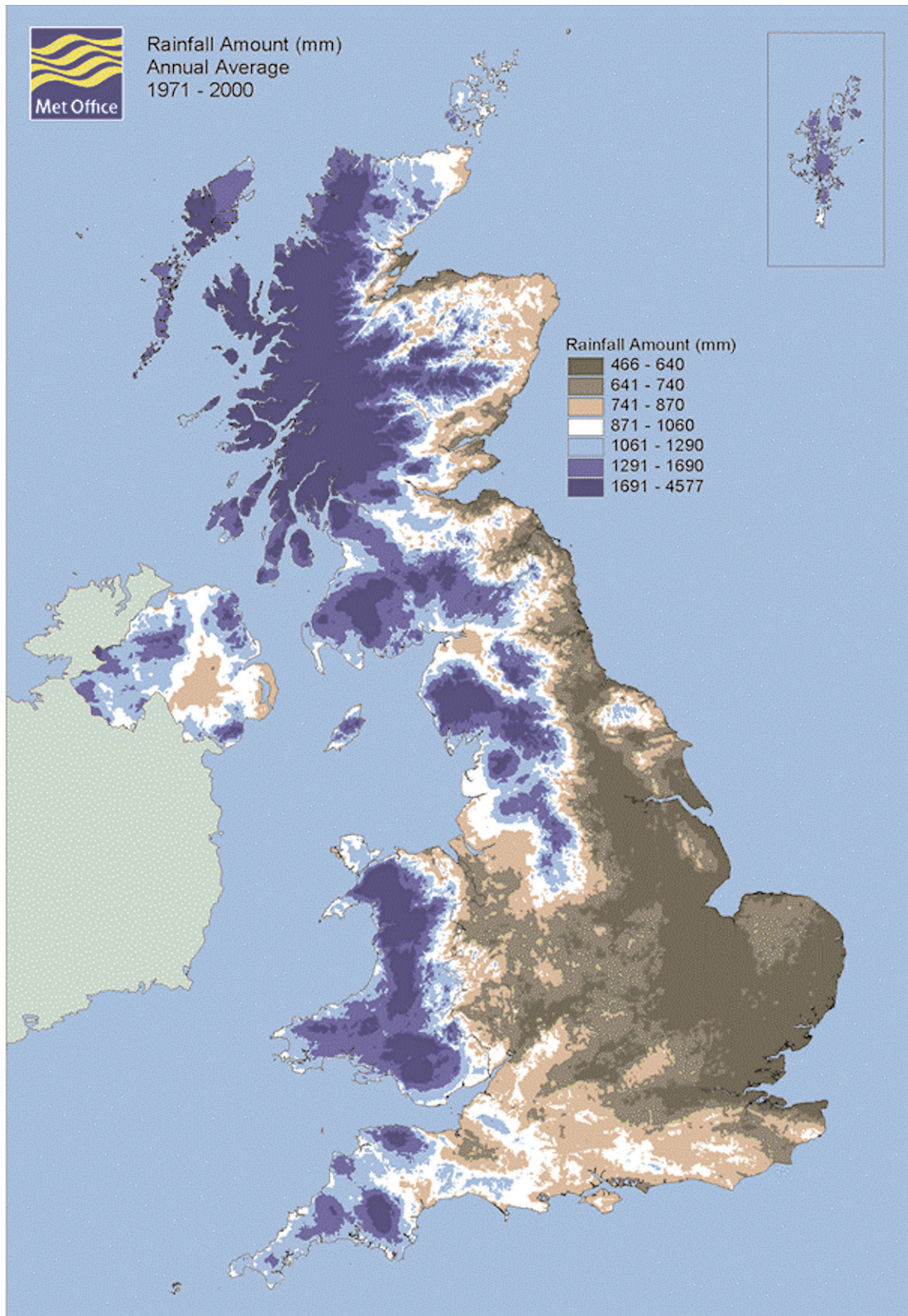
$$\% \text{ of rainwater collected per person} = \frac{\text{percentage collection (60\%)}}{\text{total number of occupants}}$$

- [8] The volume of water deducted from the total predicted use (to account for rainwater recycling) cannot be greater than the volume required by the appliances supplied by recycled rainwater.

Checklists and Tables

Mean Annual Rainfall in the UK

Source: Met Office, 2006, Map of average annual rainfall 1971–2000



Common Cases of Non Compliance

None.

Special Cases

None.

Background

Water is becoming increasingly scarce as demand continues to increase dramatically. There are many actions that can be taken to minimise water consumption and all should be considered.

Sanitary use of water within a dwelling is significant and a number of steps can be taken to minimise consumption. This Issue encourages the use of low-water-use WCs, showers, taps and appliances, as well as wastewater recycling and rainwater harvesting.

References and Further Information

CIRIA. C522, *Sustainable Urban Drainage Systems – design manual for England and Wales*, (2000)

Environment Agency National Water Demand Management Centre. *Conserving Water in Buildings* (2001)

Office of the Deputy Prime Minister, *Buildings Regulations Approved Document H – Drainage and waste disposal*, (2002)

Water Regulations Advisory Scheme. Information and Guidance Note 09-02-04. *Reclaimed Water Systems. Information about Installing, Modifying or Maintaining Reclaimed Water Systems* (1999)

Office of the Deputy Prime Minister, *Housing Quality Indicators Form (version 2)*, www.odpm.gov.uk/housingqualityindicators

Environment Agency, *Conserving Water in Buildings 4: Rainwater reuse*, www.environment-agency.gov.uk

Market Transformation Programme, *BN DW BATHS: Bath design and efficiency – Briefing Note relating to Policy Scenario Objectives in Policy Brief*

Market Transformation Programme, BNWAT02: Domestic baths specification and stock model information

Environment Agency: Assessing The Cost Of Compliance With The Code For Sustainable Homes WRc Ref: UC7231.

The Economics of Water efficient products in the Household. Report for the Environment Agency by Elemental Solutions, June 2003

Institute of Plumbing, Plumbing Engineering Services Design Guide, 2002

Shower survey, BRE report 200456,

WRc report, CP187, 2005

BRE IP, The BRE Water Calculator, 2007 (to be published)

Issue ID	Description	No. of credits available	Mandatory Elements
Wat 2	External Potable Water Use	1	No

Aim

To encourage the recycling of rainwater and reduce the amount of mains potable water used in landscape /garden watering.

Assessment Criteria

One credit is awarded for providing a system to collect rain water for use in irrigation as follows:

Criteria	
	Credits
Where a correctly specified system to collect rainwater for external/internal irrigation use has been provided to a dwelling with a garden, patio or communal garden space (examples of such systems include rainwater butts and central rainwater collection systems).	1
Default Cases	
If no individual or communal garden spaces are specified or if only balconies are provided, the credit can be awarded by default.	1

Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction stage
Drawings showing: 1. Type, size and location of any rainwater collection system/s Text describing (on drawings or in the specification*): 1. Type, size and location of any rainwater collection system/s * or a letter of instruction to a contractor/supplier or a formal letter from the developer to the assessor giving a specific undertaking.	As design stage (but as built drawings/specifications) AND copies of purchase orders/receipts, OR Photographic evidence, OR Evidence provided on the basis of an Assessor site survey.
	Manufacturer's details of the system.

Relevant Definitions

Garden	Normally an external space but may be an internal atrium. This may be a private or communal space.
Mains potable water	Drinking quality water that is taken from a connection to the main water supply in the dwelling.
System to collect rainwater	The collection and storage of rain from roofs in order to replace the use of potable mains water for external irrigation/watering.
Rainwater butt	A large cask or barrel which is set up on end to collect and store rainwater for irrigation purposes.
Central rainwater collection system	A system which will collect and store rainwater for use across the development. This could be a large storage tank or some sort of surface water system.
Sufficient Size	<p>Size requirements for homes with individual gardens, patios and terraces:</p> <ul style="list-style-type: none"> • terraces and patios – 100 litres minimum • 1–2 bedroom home with private garden – 150 litres minimum • 3 + bedroom home with private garden – 200 litres minimum <p>The above volume requirements can be halved if there is no planting provided and the whole of the external space is covered by a hard surface.</p> <p>For houses with a front and a rear garden a water butt is only required in the main (i.e. largest) garden but should meet the capacity requirements above.</p> <p>Size requirements for communal gardens:</p> <ul style="list-style-type: none"> • 1 litre/m² of land allocated to the dwelling, up to a maximum of 30 litres/dwelling. The allocated land can either be planted (including grass) or left as unplanted soil and can be either split into plots or communally maintained. • Where planting requiring little water has been specified (following the recommendations from a Recognised Ecological Consultant, see Eco 1 and 2), above requirements can be halved subject to written confirmation from the REC being provided stating that this is acceptable. • There is a minimum requirement of 200 litres/communal garden.
Correctly specified	<p>The specification of the rainwater collector should meet the following criteria:</p> <ul style="list-style-type: none"> • no open access at the top of the collector, (a child proof lid is allowed),

- provision of a tap or other arrangement for drawing-off water,
- connection to the rainwater down pipes with an automatic overflow into the conventional rainwater drainage system.
- a means of detaching the rainwater down pipe and access provision to enable cleaning of the interior.
- where the collection system is to be sited outside, and not buried, it must be stable and adequately supported; the material used for the container shall be durable and opaque to sunlight.

Assessment Methodology

Design stage

1. Check the specification and size conforms with the definitions above..

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction. Where changes have occurred, the assessor should re-assess the issue as set out above.

Calculation Procedures

None

Checklists and Tables

None

Common Cases of Non Compliance

Pools hot tubs or other large water-using features which are fed by mains water, will automatically mean a score of zero for this issue. This rule applies whether it is an internal or external pool. Where pools are present, credits can only be awarded if the features use 100% rainwater or 100% recycled water.

Special Cases

None

Background

Water is an increasingly scarce resource and more and more homes have metered water supplies with householders having to pay for any water they use.

Rainwater could be collected to reduce:

- the amount of water being discharged into drains and watercourses,
- the risk of localised flooding
- overall water bills for householders.

The simplest and most cost effective system for rainwater collection is the water butt. More complex central collection communal systems, (using the same principles as the water butt), are available for apartment blocks.

Collection of rainwater for use in the dwelling, e.g. for WC flushing, is covered in Category 2: Wat 1 – Potable Water.

References and Further Information

Water UK

www.water.org.uk

UK Rainwater Harvesting Association (UKRHA)

<http://www.ukrha.org>

Category 3 Materials

Issue ID	Description	No. of credits available	Mandatory Elements
Mat 1	Environmental Impact of Materials	15	Yes

Aim

To encourage the use of materials with lower environmental impacts over their life cycle.

Credit Criteria

Credits are awarded on the following basis:

Criteria	Credits	Mandatory
Where at least three of the following five key elements achieve a relevant Green Guide rating from the 2007 version of <i>The Green Guide</i> of A+ to D: <ul style="list-style-type: none"> ● Roof ● External Walls ● Internal Walls (including separating walls) ● Upper and Ground Floors (including separating floors) ● Windows 	–	All Levels
Where the <i>CSH Materials Calculator</i> is used to assess the number of credits awarded for the five key elements described above.	1–15	–
Default Cases		
None.		

Information Required to Demonstrate Compliance

The following section details the relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage for each Dwelling Type.

Schedule of Evidence Required To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
Drawings showing: 1. location and area of the elements 2. details of the materials used within the elements	Documentary evidence* showing: 1. the area and location of elements 2. type of products used 3. location of products used *such as purchase details or similar.

Design Stage	Post Construction Stage
<p>Text describing (on drawings or in the specification*):</p> <ol style="list-style-type: none"> 1. location and area of the elements 2. details of the materials used within the elements <p>* or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking.</p>	
<p>Where the Green Guide rating for a similar specification has been taken, the assessor should explain why it is appropriate.</p> <p>Evidence of bespoke Green Guide rating(s) provided by the BREEAM Office.</p>	<p>Where the Green Guide rating for a similar specification has been taken, the assessor should explain why it is appropriate.</p> <p>Evidence of bespoke Green Guide rating(s) provided by the BREEAM Office.</p>

Relevant Definitions

2007 version of The Green Guide

This is a publication based on BRE's extensive quantitative data for materials, which has been translated into simple environmental profiles for building elements. An A+ to E rating system is used to rank elements and components (where A+ represents the specification with the lowest environmental impact). This is used to assess the major building elements.

BRE will provide assessors with copies of the relevant Green Guide ratings to be used as an interim measure if The Green Guide has not been published at the launch of the Code.

CSH Materials Calculator[©]

This is a tool developed for calculating the number of points and overall credit score for this issue.

Assessment Methodology

1. For all elements described in the *Credit Criteria*, obtain the relevant rating from The Green Guide.

The Green Guide will have ratings for a number of building types including low-rise housing, apartment blocks over three storeys and mixed used developments. The Green Guide will provide guidance on the appropriate section to use.

Whilst exact matches in specifications are not always possible, the Assessor is likely to be able to find a similar one. If in doubt, or if no similar specification is clear, the Assessor should contact the BREEAM office for a bespoke rating. In order to obtain a bespoke rating the assessor will need to provide the following:

- The development registration number; and

- A scaled, dimensioned and fully labelled construction drawing clearly showing the specified element, all materials and specification references.
2. Confirm that at least three mandatory elements have achieved a rating of A+ to D. This applies to 100% of the area for each element.
 3. Calculate the number of credits per code dwelling type using the method described in Calculations Procedures below.

Calculation Procedures

Design Stage

1. Credits are awarded based on the rating given in the 2007 version of the *Green Guide*, as follows:

Green Guide Rating	Credits
A+ Rating	3
A Rating	2
B Rating	1
C Rating	0.5
D Rating	0.25
E Rating	0

Credits are awarded in multiples of whole numbers, rounded down to the lower credit value (i.e. 1.5 will be awarded 1 credit).

Where there is more than one specification for an element (e.g. more than one type of external wall), the number of credits for that element are area weighted according to the rating of each specification. For the purpose of this credit, any doors with a large expanse of glazing, such as patio doors, should be assessed as *windows*. Similarly glazed areas of conservatories and rooflights should be assessed as windows.

Internal walls and separating walls (party walls) should be assessed using the relevant ratings for each element, and credits awarded on the basis of the relative areas of each.

Ground floors, upper floors and separating floors (party floors) should be assessed using the relevant ratings for each element, and credits awarded on the basis of the relative areas of each.

2. The *CSH Materials Calculator tool* allows up to four different specification types per element.

Where an exact match to a specification in the Green Guide is present, enter the details of the specification and the Green Guide Rating in the appropriate columns.

Where a specification does not have an exact Green Guide match, a description of the specification and the Bespoke rating must be entered provided. The BREEAM Materials Bespoke Reference Number must be included in the 'Reference' Column.

3. Calculate the percentage of each specification type for each element based on area. Enter this in the column titled '*Percentage*'.
4. The tool will calculate the total credits that can be awarded.

Post Construction Stage

1. Confirm that the final building construction matches that specified at design stage. Where any design changes have occurred, re-assess the element.
2. Ensure that the documentary evidence provided meets the requirements as stated in the post construction section of *Information Required to Demonstrate Compliance*.

Checklists and Tables

None.

Common Cases of Non Compliance

None.

Special Cases

None.

Background

The production, use and disposal of building materials accounts for significant quantities of energy and resources, both internationally and in the UK. The Green Guide provides a simple tool to aid specifiers in considering the environmental implications of their choices. The Green Guide and BRE's Environmental Profiles Methodology are based on life cycle assessment (LCA), an approach which measures and assesses a range of environmental impacts from "cradle to grave". The Green Guide uses LCA data gathered from the majority of UK construction products trade associations.

The environmental issues considered reflect the generally accepted areas of concern related to the production of building materials used in the UK. The same weighting system that underpins the Code scoring procedure is used to calculate a summary score, on a scale from A+ to E, with A+ rated specifications having the lowest overall environmental impact.

It is these summary Green Guide ratings that the Code considers for the five key elements above. Materials and components are presented in their typical, as-built elemental form. They are compared on a like-for-like basis, as specifications that fulfil similar functions; important variables such as the mass of a material required to fulfil a particular function are taken into account. The specifications are compared over a 60 year study period. Included in this is any repair and maintenance over the 60 year life, and impacts relating to an assumed dismantling/demolition of the building at the end of its life which may occur at any point after 60 years.

References and Further Information

BRE environmental profiles
www.bre.co.uk/envprofiles

Blackwells and IHS Press: BREEAM Specifications: The Green Guide (2007) (to be published in late 2007)

Issue ID	Description	No. of credits available	Mandatory Elements
Mat 2	Responsible Sourcing of Materials – Basic Building Elements	6	No

Aim

To recognise and encourage the specification of responsibly sourced materials for the basic building elements.

Credit Criteria

Points are awarded where materials used in key building elements are responsibly sourced according to the following criteria:

Criteria	
	Credits
Where 80% of the <i>assessed materials</i> in the following <i>Building Elements</i> are responsibly sourced: a. Frame b. Ground floor c. Upper floors (including separating floors) d. Roof e. External walls f. Internal walls (including separating walls) g. Foundation/substructure h. Staircase Additionally, 100% of any timber in these elements must be legally sourced.	1–6
Default Cases None.	

Information Required to Demonstrate Compliance

The following section details any relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage for each Dwelling Type.

Schedule of Evidence Required	
To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
Design drawings showing: 1. the location of elements and materials specified 2. details of the materials specified	As Built drawings or text confirming: 1. the location of elements and materials used 2. details of the materials used

Design Stage	Post Construction Stage
<p>Text describing (on drawings or in the specification):</p> <ol style="list-style-type: none"> 1. the location of elements and materials specified. 2. details of the materials specified 	<p>Copies of purchase orders/ receipts for all applicable materials, including those recycled or reused.</p>
<p>A copy of the output from the Materials Calculator Tool.</p>	<p>A copy of the output from the Materials Calculator Tool (if different from Design Stage).</p>
<p>For materials certified through the EMS route, a letter of intent to use suppliers who can provide an EMS certificate (or equivalent) for the process and/or extraction stages of their product must be provided.</p>	<p>For materials certified through the EMS route, any one of the following must be provided as appropriate:</p> <ol style="list-style-type: none"> 1. Copy of the ISO 14001 certificate. 2. Copy of the EMAS certificate. 3. For <i>Small</i> companies, (see <i>Relevant Definitions</i>) confirmation that the company EMS is structured in compliance with BS 8555 2003 (or equivalent) and the EMS has completed phase audits one to four as outlined in BS 8555. This evidence can be found from company documentation demonstrating the process and typical outputs from phase four audits such as an EMS manual/paperwork and guidance to staff. Where independent certification exists to demonstrate these phases, it can be used as evidence.
<p>Certified timber requires a letter of intent to use suppliers capable of providing certification to the level required for the particular tier claimed. This could be demonstrated by a commitment to use a specific scheme(s).</p>	<p>Certified timber requires a copy of the certification document or Chain of Custody (CoC) certificate (as appropriate).</p>
<p>Where any non certified timber is used, written confirmation from the developer confirming that all timber will come from a 'legal source' (as defined in <i>Relevant Definitions</i>).</p>	<p>Where any non certified timber is used, written confirmation from the supplier(s) confirming that:</p> <ol style="list-style-type: none"> 4. All timber comes from a legal source. 5. 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>One of the following statements (or similar) must be provided, signed by the timber</p>

Design Stage	Post Construction Stage
	<p>supplier(s) and included in the assessment report:</p> <p>“I confirm that none of the timber species used within this development are identified on the CITES list (Appendices I, II and III)” OR</p> <p>“I confirm that none of the timber species used within this development are identified on the CITES list (Appendices I and II) and where a timber species used in the development is listed in Appendix III of the CITES list, I confirm that it has not been sourced from the country seeking to protect this species as listed in Appendix III”</p>
<p>Reused Materials</p> <p>Documentation that demonstrates that the relevant materials used within the development will be reused materials. This should be in the form of trade information or a letter from the developer.</p>	<p>Reused Materials</p> <p>Documentation that demonstrates that the materials used within the development have been reused from other sources. This should be in the form of a letter from the supplier, and should include material quantities.</p>
<p>Recycled Materials</p> <p>Documentation that demonstrates that the relevant materials used within the development will be recycled. Additionally, a letter of intent to use suppliers who can provide an EMS certificate (or equivalent) for the recycling process must be provided.</p>	<p>Recycled Materials</p> <p>Documentation that demonstrates that the relevant materials used within the development will be recycled. Additionally, the evidence requirements for materials certified through the EMS route must also be provided for the Key Processes stage.</p>

Relevant Definitions

Responsible Sourcing	is demonstrated through auditable third party certification schemes.
Tier levels	a graded scale to reflect the rigour of the certification scheme used to demonstrate <i>responsible sourcing</i> , forming the basis for awarding <i>points</i> (all as detailed in Table 1).
Reused materials	Materials that can be extracted from the waste stream and used again without further processing, or with minor processing that does not alter the nature of the material (e.g. cleaning, cutting, fixing to other materials).

Recycled Materials	Materials extracted from the waste stream that require significant processing (which alters the nature of the material) before they can be used again (e.g. crushing, grinding, reprocessing).
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 requirements for each of the assessed materials are detailed in <i>Table 2: EMS Requirements</i> .
Supply Chain EMS	<p>covers all of the major aspects of processing and extraction involved in the supply chain for the end product.</p> <p>Note: Recycled materials are not required to demonstrate a <i>Supply Chain EMS</i>. If EMS certification is provided for the Key Processes for recycled materials, this is assumed by default.</p>
Legally Sourced Timber	All timber must come from a <i>legal</i> source. Legally sourced means that harvesting and all relevant activities are carried out in line with relevant forest management laws and codes of practice in the product's country of origin, and also throughout its subsequent supply chain. Relevant documentation demonstrating the above should either be provided or made available on request subject to the availability of such materials in the country concerned. See <i>Information Required to Demonstrate Compliance</i> for further details.
Small Company	<p>A company is defined as 'small' if it satisfies at least two of the following criteria:</p> <ol style="list-style-type: none"> a. A turnover of not more than £5.6 million; b. A balance sheet total of not more than £2.8 million; c. 50 employees or less. <p>This is based on the definition stated in the Companies Act of 1985.</p>
Building Elements	<p>For the purpose of this credit, the assessed <i>Building Elements</i> are defined below:</p> <ol style="list-style-type: none"> a. Frame b. Ground floor c. Upper floors (including separating floors) d. Roof (structure and cladding, including any loft boarding) e. External walls (including external cladding) f. Internal walls (including internal partitions and separating walls) g. Foundation/substructure h. Staircase (includes the tread, rises and stringers)

Assessed Materials	<p>Only the following materials are assessed in the calculation of points;</p> <ol style="list-style-type: none">Brick (including clay tiles)CompositesConcrete (including blocks, tiles etc.)GlassPlasticsMetals (steel, aluminium etc.)StoneTimberPlasterboard <p>Note: Insulation materials, fixings, adhesives, additives and other materials not listed above are excluded from the assessment.</p>
Frame	<p>The frame is any of the main structural elements that are not included in the roof, external walls and floors.</p>
CSH Materials Calculator	<p>A BRE spreadsheet based tool designed to simplify assessment of this credit. Access is provided to all BRE licensed Code assessors.</p>

Assessment Methodology

Design Stage

- Where a construction make-up is not specified within the *CSH Materials Calculator tool*, confirm construction details of elements using the specification and drawings, or similar (see *Information Required to Demonstrate Compliance*). Obtain a breakdown of volumes and/ or percentages of materials for each element present.
- Obtain the relevant confirmation of tier certification for design stage (see *Information Required to Demonstrate Compliance*) for all* materials, from all sources/ suppliers.
* The following exclusions apply:
 - Material groups not included in the list in Relevant Definitions (e.g. insulation)
 - Materials that account for less than 10% by volume of an element may also be excluded (e.g. screws). However, if certification has been provided for materials in this category, it may be beneficial to include them in the calculation (e.g. if a material type accounting for 9% is placed in a higher tier than other materials used to make up the element).
- Assign a tier level to each material based on the level of certification provided (see *Table 1: Tier Levels and Compliance* and *Information Required to Demonstrate Compliance*).

4. Follow the *Calculation Procedure* outlined below. It is recommended that the BRE *CSH Materials Calculator Tool* is used to assess the number of points and credits to be awarded.

Post Construction Stage

1. Check that the *As Built* construction matches the construction proposed at design stage (see *Information Required to Demonstrate Compliance*). Where there are any differences 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 *Information Required to Demonstrate Compliance*) 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 1: Tier Levels and Compliance* and *Information Required to Demonstrate Compliance*).
4. Adjust the design stage *CSH Materials Calculator Tool* accordingly to include any revised information following the calculation procedure used at design stage.

Calculation Procedures

Design & Post Construction Stages

The following procedure is based on the use of the CSH Materials Calculator Tool

1. Using the BRE *CSH Materials Calculator tool*, confirm the presence of each element by selecting *present/not present* from the drop down menu beneath each element title.

If an element is not present, the number of points available are re-allocated to the other elements, and the number of points required to achieve each credit is adjusted accordingly. See *Table 3: Credit Structure* for further clarification.
2. For all present elements, select whether the calculation will be carried out using *generic specifications* within the tool (based on generic specifications included within *The Green Guide, 2007*), *user defined*, or a *combination*. Where *user defined* or *combination* are selected, select whether the calculation will be carried out using material *volume* or *percentage*.
3. For all present elements, enter the names of the material groups in the column *materials types* (this will automatically be filled in where a generic specification has been selected).
4. Generic Specification
 - a. Choose the specification in the tool 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 (up to a maximum of four – please contact BRE if more specifications are present) and indicate the percentage volume of

each specification. If no specification matches, then the specification will need to be assessed using one of the *User Defined* methods.

The material groups will automatically be entered in the material types column, and the total volume/ percentage column will automatically include the overall percentage that each material contributes to the total element volume.

User Defined – Volume

- a. Enter the total volume of each element (after disregarding excluded materials such as insulation) in the box titled *total volume of element present*.

Note: Where separating (party) walls or floors are considered at the level of an individual dwelling, then only 50% of the total construction should be allocated to the individual dwelling.

- b. Enter the total volume of each material group in the column titled *Total volume/ percentage*. The total of this column must equal at least 80% of the *total volume of material present*.

User Defined – Percentage

- a. Enter the total percentage of each material group in the column titled *Total volume/ percentage*. The total of this column must equal at least 80% of the total element volume (after disregarding excluded materials).

Combination

- a. Where combination data has been selected, the instructions for generic profiles should be followed for the generic specifications, and the instructions for either *user defined percentage* or *volume* followed for all other specifications. In addition, the percentage volume of each specification, including the user defined specifications must be entered in *box*?
- b. In the column titled *Percentage or volume of material compliant with each tier*, enter the percentage of each material group that has been allocated to each tier. This should be based on the evidence provided and the assessment carried out at *Stage 3* of *Assessment Methodology*. At least 80% of all assessed materials must be certified and be allocated to a tier.

6. The tool will calculate the total number of points taking into account the scenarios mentioned above. It will also state the associated number of credits. A printed copy of the tool should be included with the assessment report.

Checklists and Tables

Table 1: Tier Levels and Requirements				
Tier Level	Issue Assessed	Points Available per Element	Evidence/ Measure Assessed	Examples of Compliant Schemes
1	Legality & responsible sourcing	3	Certification scheme	FSC, CSA, SFI with CoC, PEFC, Reused Materials
2	Legality & responsible sourcing	2	Certification scheme	There are currently no schemes allocated to this tier.
3	Legality & responsible sourcing	1.5	Certification scheme/ EMS	Timber: MTCC, Verified*, SGS, TFT, Other materials: Certified EMS for the Key Process and <i>Supply Chain</i> , Recycled Materials with certified EMS for the <i>Key Process</i> .
4	Legality & additional issues	1	Certification scheme/ EMS	Certified EMS for the <i>Key Processes</i> .
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.				

* Verified is the name of a scheme.

Table 2: EMS Requirements		
Material	Key Process	Supply chain processes
Brick and clay products	Product Manufacture	Clay Extraction
Composites	Composite manufacture	Glass fibre production Polymer production
Concrete (including blocks, tiles, precast and insitu)	Concrete production or concrete product manufacture	Cement production Aggregate extraction
Glass	Glass production	Sand extraction Soda Ash production or extraction
Plastics	Plastic product manufacture	Plastic polymer production
Metals (steel, aluminium etc)	Metal Product manufacture – eg cladding production, steel section production	Metal production: eg for Steel: EAF/BOF process, for Aluminium, ingot production, for Copper, ingot or cathode production.
Stone	Stone product manufacture	Stone extraction
Plasterboard	Plasterboard manufacture	Gypsum extraction
Timber	Timber cannot use the EMS route unless it is reused or 100% recycled.	Timber cannot use the EMS route unless it is reused
Recycled products	Recycling process	By default
Reused products	By default	By default

Table 3: Credit Structure				
	6	4	3	2
No. of elements present	Points Range			
8	=18	≥ 12	≥ 9	≥ 6
7	≥ 15.75	≥ 10.25	≥ 7.87	≥ 5.25
6	≥ 13.5	≥ 9	≥ 6.75	≥ 4.5
5	≥ 11.25	≥ 7.5	≥ 5.625	≥ 3.75

Common Cases of Non Compliance

Timber and EMS Schemes

Where an EMS 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 1*. 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 scheme for new timber does not demonstrate timber certification and therefore does not qualify for any points.

Special Cases

If an element being considered is made up primarily of a material not specified in this credit (e.g. straw bales), contact BRE for guidance on how to proceed.

Background

Credits are awarded for responsible sourcing of materials through auditable third party certification schemes.

These schemes have been graded into four tiers based on the CPET report and BRE work advised by the EcoHomes Timber Credits Advisory Groups. A number of issues were considered when allocating certification schemes to tiers. The process took account of issues such as sustainable forest management practices, consultation process with local community by forest management company/owner at the forest management level, and Chain of Custody procedures.

Currently the majority of other construction materials do not have a third party CoC certification scheme to demonstrate compliance. The Code recognises that an EMS at the extraction and initial process stage of a material goes some way towards demonstrating responsible sourcing and is therefore recognised as such in this credit.

References and Further Information

Central Point of Expertise on Timber. *Evaluation of Category A Evidence – Review of forest certification schemes – Results* (December 2006)

Department for Environment, Food and Rural Affairs. *The Environment in Your Pocket* (2001)

Building Research Establishment Ltd. *Certification of Forest Products* (1999)

Friends of the Earth. Briefing Sheet – *The UK's Footprint: The UK Timber Industry and its Impact on the World's Forest* (2000)

Saving the Wood, Building for a Future Magazine (Autumn 2001)

ProForest
www.ProForest.net

WWF
www.panda.org

UK Tropical Forest forum
www.forestforum.org.uk

Greenpeace Ancient Forest Campaign
www.greenpeace.org.uk

Forests Forever Campaign
www.forestsforever.org.uk

UK Woodland Assurance Scheme
www.forestry.gov.uk/ukwas

Wood for Good
www.woodforgood.com

Tropical Forest Trust publication '*Good Wood, Good Business*'
www.tropicalforesttrust.com

Friends of the Earth/ Flora and Fauna International *Good Wood Guide* (2002)
www.goodwoodguide.com

Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)
www.cites.org

EU Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan
http://europa.eu.int/comm/development/body/theme/forest/initiative/index_en.htm

Forests and the European Union Resource Network (FERN)
www.fern.org

Looking into finding references that relate to other materials

Issue ID	Description	No. of credits available	Mandatory Elements
Mat 3	Responsible Sourcing of Materials – Finishing Elements	3	No

Aim

To recognise and encourage the specification of responsibly sourced materials for the finishing elements.

Credit Criteria

Credits are awarded on the basis of the requirements in the table below:

Criteria		Credits
Where 80% of the assessed materials in the following <i>Finishing Elements</i> are responsibly sourced:		1–6
<ul style="list-style-type: none"> a. Stair b. Window c. External & internal door d. Skirting e. Panelling f. Furniture g. Fascias h. Any other significant use 		
Additionally, 100% of any timber in these elements must be legally sourced.		
Default Cases		
None		

Information Required to Demonstrate Compliance

The following section details any relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage for each Dwelling Type.

Schedule of Evidence Required	
To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
Design drawings showing: <ol style="list-style-type: none"> the location of elements and materials specified details of the materials specified 	As Built drawings or text confirming: <ol style="list-style-type: none"> the location of elements and materials used details of the materials used

Design Stage	Post Construction Stage
<p>Text describing (on drawings or in the specification):</p> <ol style="list-style-type: none"> 1. the location of elements and materials specified. 2. details of the materials specified 	<p>Copies of purchase orders/ receipts for all applicable materials, including those recycled or reused.</p>
<p>For materials certified through the EMS route, a letter of intent to use suppliers who can provide an EMS certificate (or equivalent) for the process and/or extraction stages of their product.</p>	<p>For materials certified through the EMS route, any one of the following must be provided as appropriate:</p> <ol style="list-style-type: none"> 1. Copy of the ISO 14001 certificate. 2. Copy of the EMAS certificate. 3. For <i>Small</i> companies, (see <i>Relevant Definitions</i>) confirmation that the company EMS is structured in compliance with BS 8555 2003 (or equivalent) and the EMS has completed phase audits one to four as outlined in BS 8555. This evidence can be found from company documentation demonstrating the process and typical outputs from phase four audits such as an EMS manual/paperwork and guidance to staff. Where independent certification is obtained to demonstrate these phases, the certificates can be used as evidence.
<p>Certified timber requires a letter of intent to use suppliers capable of providing certification to the level required for the particular tier claimed. This could be demonstrated by a commitment to use a specific scheme(s).</p>	<p>Certified timber requires a copy of the certification document or Chain of Custody (CoC) certificate (as appropriate).</p>
<p>Where any non certified timber is used, written confirmation from the developer confirming that all timber will come from a legal source (legal source defined in <i>Relevant Definitions</i>) must be provided.</p>	<p>Where any non certified timber is used, written confirmation from the supplier(s) confirming that:</p> <ol style="list-style-type: none"> 1. All timber comes from a legal source. 2. 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>One of the following statements (or similar) must be provided, signed by the timber supplier(s) and included in the assessment report:</p>

Design Stage	Post Construction Stage
	<p>“I confirm that none of the timber species used within this development are identified on the CITES list (Appendices I, II and III)” OR</p> <p>“I confirm that none of the timber species used within this development are identified on the CITES list (Appendices I and II) and where a timber species used in the development is listed in Appendix III of the CITES list, I confirm that it has not been sourced from the country seeking to protect this species as listed in Appendix III”</p>
<p>Reused/ Recycled Materials</p> <p>Documentation should be provided that demonstrates that the materials used within the development will be reused/ recycled. This should be in the form of trade information or a letter from the developer.</p>	<p>Reused/ Recycled Materials</p> <p>Documentation should be provided that demonstrates that the materials used within the development have been reused/ recycled. This should be in the form of a letter from the supplier, and should include material quantities.</p>
<p>Recycled Materials</p> <p>In addition to the documentation required for Reused materials the evidence requirements for materials certified through the EMS route must also be provided for the Key Processes stage.</p>	<p>Recycled Materials</p> <p>In addition to the documentation required for Reused materials the evidence requirements for materials certified through the EMS route must also be provided for the Key Processes stage.</p>

Relevant Definitions

Responsible Sourcing	is demonstrated through auditable third party certification schemes.
Tier levels	a graded scale to reflect the rigour of the certification scheme used to demonstrate <i>responsible sourcing</i> , forming the basis for awarding <i>points</i> (all as detailed in Table 1).
Reused materials	Materials that can be extracted from the waste stream and used again without further processing, or with minor processing that does not alter the nature of the material (e.g. cleaning, cutting, fixing to other materials).
Recycled Materials	Materials extracted from the waste stream that require significant processing (which alters the nature of the material) before they can be used again (e.g. crushing, grinding, reprocessing)

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 requirements for each of the assessed materials are detailed in <i>Table 2: EMS Requirements</i> .
Supply Chain EMS	<p>covers all of the major aspects of processing and extraction involved in the supply chain for the end product.</p> <p>Note: Recycled materials are not required to demonstrate a <i>Supply Chain EMS</i>. If EMS certification is provided for the <i>Key Processes</i> for recycled materials, this is assumed by default.</p>
Legally Sourced Timber	All timber must come from a <i>legal</i> source. Legally sourced means that harvesting and all relevant activities are carried out in line with relevant forest management laws and codes of practice in the product's country of origin, and also throughout its subsequent supply chain. Relevant documentation demonstrating the above should either be provided or made available on request subject to the availability of such materials in the country concerned. See <i>Information Required to Demonstrate Compliance</i> for further details.
Small Company	<p>A company is defined as 'small' if it satisfies at least two of the following criteria:</p> <ol style="list-style-type: none"> a. A turnover of not more than £5.6 million; b. A balance sheet total of not more than £2.8 million; c. 50 employees or less. <p>This is based on the definition stated in the Companies Act of 1985.</p>
Finishing Elements	<p>For the purpose of this credit, the assessed <i>Finishing Elements</i> are defined below:</p> <ol style="list-style-type: none"> a. Stair (including handrails, balustrades, banisters, other guarding/rails, excluding staircase) b. Window (including sub-frames, boards, sills) c. External & internal door (including sub-frames, frames, linings, door) d. Skirting (including architrave, skirting board and rails) e. Panelling (including any other trim) f. Furniture (including fitted kitchen, bedroom and bathroom units) g. Fascias (soffit boards, bargeboards, gutter boards, others) h. Any other significant use

Assessed Materials	<p>Only the following materials are assessed in the calculation of points;</p> <ol style="list-style-type: none">Brick (including clay tiles)CompositesConcrete (including blocks, tiles etc.)GlassPlasticsMetals (steel, aluminium etc.)StoneTimberPlasterboard <p>Note that insulation materials, fixings, adhesives, additives and other materials not listed above are excluded from the assessment.</p>
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CSH Materials Calculator A BRE spreadsheet based tool designed to simplify assessment of this credit. Access is provided to all BRE licensed Code assessors.

Assessment Methodology

Design Stage

- Where a construction make-up is not specified within the *CSH Materials Calculator tool*, confirm construction details of elements using the specification and drawings, or similar (see *Information Required to Demonstrate Compliance*). Obtain a breakdown of volumes and/or percentages of materials for each element present.
- Obtain the relevant confirmation of tier certification for design stage (see *Information Required to Demonstrate Compliance*) for all* materials, from all sources/ suppliers.
* The following exclusions apply:
 - Material groups not included in the list in *Relevant Definitions*
 - Materials that account for less than 10% by volume of an element may also be excluded (e.g. screws). However, if certification has been provided for materials in this category, it may be beneficial to include them in the calculation (e.g. if a material type accounting for 9% is placed in a higher tier than other materials used to make up the element).
- Assign a tier level to each material based on the level of certification provided (see *Table 1: Tier Levels and Compliance and Information Required to Demonstrate Compliance*).
- Follow the *Calculation Procedure* outlined below. It is recommended that the BRE *CSH Materials Calculator Tool* is used to assess the number of points and credits to be awarded.

Post Construction Stage

1. Check that the *As Built* construction matches the construction proposed at design stage (see *Information Required to Demonstrate Compliance*). 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 *Information Required to Demonstrate Compliance*) 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 1: Tier Levels and Compliance and Information Required to Demonstrate Compliance*).
4. Adjust the design stage *CSH Materials Calculator Tool* accordingly to include any revised information following the calculation procedure used at design stage.

Calculation Procedures

Design & Post Construction Stages

The following procedure is based on the use of BRE's CSH Materials Calculator tool.

1. Using the BRE *CSH Materials Calculator tool*, confirm the presence of each element by selecting *present/not present* from the drop down menu beneath each element title.

If an element is not present, the number of points available are re-allocated to the other elements, and the number of points required to achieve each credit is adjusted accordingly. See *Table 3: Credit Structure* for further clarification.

2. For all present elements, select whether the calculation will be carried out using *generic specifications* within the tool (based on generic specifications included within *The Green Guide, 2007*), *user defined*, or a *combination*. Where *user defined* or *combination* are selected, select whether the calculation will be carried out using material *volume* or *percentage*.
3. For all present elements, enter the names of the material groups in the column *materials types* (this will automatically be filled in where a generic specification has been selected).
4. Generic Specification
 - b. Choose the specification in the tool 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 (up to a maximum of four – please contact BRE if more specifications are present) and indicate the percentage volume of each specification. If no specification matches, then the specification will need to be assessed using one of the *User Defined* methods.

The material groups will automatically be entered in the material types column, and the total volume/percentage column will automatically include the overall percentage that each material contributes to the total element volume.

User Defined – Volume

- c. Enter the total volume of each element (after disregarding excluded materials such as insulation) in the box titled *total volume of element present*.

Note: Where separating walls or floors are considered at the level of an individual dwelling, then only 50% of the total construction should be allocated to the individual dwelling.

- d. Enter the total volume of each material group in the column titled *Total volume/percentage*. The total of this column must equal at least 80% of the *total volume of material present*.

User Defined – Percentage

- b. Enter the total percentage of each material group in the column titled *Total volume/percentage*. The total of this column must equal at least 80% of the total element volume (after disregarding excluded materials).

Combination

- c. Where combination data has been selected, the instructions for generic profiles should be followed for the generic specifications, and the instructions for either *user defined percentage or volume* followed for all other specifications. In addition, the percentage volume of each specification, including the user defined specifications must be entered in *box*?
- d. In the column titled *Percentage or volume of material compliant with each tier*, enter the percentage of each material group that has been allocated to each tier. This should be based on the evidence provided and the assessment carried out at *Stage 3 of Assessment Methodology*. At least 80% of all assessed materials must be certified and be allocated to a tier.

7. The tool will calculate the total number of points taking into account the scenarios mentioned above. It will also state the associated number of credits. A printed copy of the tool should be included with the assessment report.

Checklists and Tables

Table 1: Tier Levels and Requirements				
Tier Level	Issue Assessed	Points Available per Element	Evidence/ Measure Assessed	Examples of Compliant Schemes
1	Legality & responsible sourcing	3	Certification scheme	FSC, CSA, SFI with CoC, PEFC, Reused Materials
2	Legality & responsible sourcing	2	Certification scheme	There are currently no schemes allocated to this tier.
3	Legality & responsible sourcing	1.5	Certification scheme/ EMS	Timber: MTCC, Verified*, SGS, TFT, Other materials: Certified EMS for the Key Process and Supply Chain, Recycled Materials with certified EMS for the Key Process.
4	Legality & additional issues	1	Certification scheme/ EMS	Certified EMS for the Key Processes.
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.				

* Verified is the name of a scheme

Table 2: EMS Requirements		
Material	Key Process	Supply chain processes
Brick and clay products	Product Manufacture	Clay Extraction
Composites	Composite manufacture	Glass fibre production Polymer production
Concrete (including blocks, tiles, precast and insitu)	Concrete production or concrete product manufacture	Cement production Aggregate extraction
Glass	Glass production	Sand extraction Soda Ash production or extraction
Plastics	Plastic product manufacture	Plastic polymer production
Metals (steel, aluminium etc)	Metal Product manufacture – eg cladding production, steel section production	Metal production: eg for Steel: EAF/BOF process, for Aluminium, ingot production, for Copper, ingot or cathode production.
Stone	Stone product manufacture	Stone extraction
Plasterboard	Plasterboard manufacture	Gypsum extraction
Timber	Timber cannot use the EMS route unless it is reused or 100% recycled.	Timber cannot use the EMS route unless it is reused
Recycled products	Recycling process	By default
Reused products	By default	By default

Table 3: Credit Structure			
	3	2	1
No. of elements present	Points Range		
8	= 18	≥ 12	≥ 6
7	≥ 15.75	≥ 10.25	≥ 5.25
6	≥ 13.5	≥ 9	≥ 4.5
5	≥ 11.25	≥ 7.5	≥ 3.75

Common Cases of Non Compliance

Timber and EMS Schemes

Where an EMS 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 1*. 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 scheme for new timber does not demonstrate timber certification and therefore does not qualify for any points.

Special Cases

If an element being considered is made up primarily of a material not specified in this credit (e.g. straw bales), contact BRE for guidance on how to proceed.

Background

Credits are awarded for responsible sourcing of materials through auditable third party certification schemes.

Tiers have been allocated based on the CPET report and BRE work advised by the EcoHomes Timber Credits Advisory Groups. A number of issues were considered when allocating certification schemes to tiers. The process took account of issues such as sustainable forest management practices, consultation process with local community by forest management company/owner at the forest management level, and Chain of Custody procedures.

Currently the majority of other construction materials do not have a third party CoC certification scheme to demonstrate compliance. The Code recognises that an EMS at the extraction and initial process stage of a material goes some way towards demonstrating responsible sourcing and is therefore recognised as such in this credit.

References and Further Information

Central Point of Expertise on Timber. *Evaluation of Category A Evidence – Review of forest certification schemes – Results* (December 2006)

Department for Environment, Food and Rural Affairs. *The Environment in Your Pocket* (2001)

Building Research Establishment Ltd. *Certification of Forest Products* (1999)

Friends of the Earth. Briefing Sheet – *The UK's Footprint: The UK Timber Industry and its Impact on the World's Forest* (2000)

Saving the Wood, Building for a Future Magazine (Autumn 2001)

ProForest
www.ProForest.net

WWF

www.panda.org

UK Tropical Forest forum

www.forestforum.org.uk

Greenpeace Ancient Forest Campaign

www.greenpeace.org.uk

Forests Forever Campaign

www.forestsforever.org.uk

UK Woodland Assurance Scheme

www.forestry.gov.uk/ukwas

Wood for Good

www.woodforgood.com

Tropical Forest Trust publication '*Good Wood, Good Business*'

www.tropicalforesttrust.com

Friends of the Earth/Flora and Fauna International *Good Wood Guide* (2002)

www.goodwoodguide.com

Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)

www.cites.org

EU Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan

http://europa.eu.int/comm/development/body/theme/forest/initiative/index_en.htm

Forests and the European Union Resource Network (FERN)

www.fern.org

Category 4 Surface Water Runoff

Issue ID	Description	No. of credits available	Mandatory Elements
Sur 1	Reduction of Surface Water Runoff from site	2	Yes

Aim

To reduce and delay water run-off from the hard surfaces of a housing development to public sewers and watercourses, thus reducing the risk of localised flooding, pollution and other environmental damage.

Assessment Criteria

Credits are awarded where rainwater run-off is attenuated as follows:

Criteria	Credits	Mandatory Elements
<p>Ensure that peak run-off rates and annual volumes of run-off post development will be no greater than the previous conditions for the site.</p> <p>Where rainwater holding facilities/ sustainable drainage systems(SUDs) are used to provide attenuation of water run-off to either natural watercourses or surface water drainage systems, providing percentage peak time attenuation* should be provided as follows:</p> <ul style="list-style-type: none"> ● 50% in low flooding risk areas ● 75% in medium flooding risk areas ● 100% in high flooding risk areas <p>From</p> <ul style="list-style-type: none"> ● Hard Surfaces <p>AND Optionally</p> <ul style="list-style-type: none"> ● Roofs <p>The requirements for water run-off attenuation in a flood zone defined as having a high annual probability of flooding can be reduced by 25% to 75%, where the site was previously occupied by buildings or hard surfaces. The easing of the requirements in such cases is to recognise the benefit of not locating the development on an undeveloped site in a zone with a high annual probability of flooding, and therefore not contributing further to the flooding risk in such zones.</p>	<p>–</p> <p>1</p> <p>1</p>	<p>All Levels</p>
<p>Default Cases</p> <p>When the drainage system already discharges all surface run-off to a properly designed soakaway system including permeable paving or other SUDs device for the appropriate design storms, then the credit may be awarded without the need to specify additional attenuation measures. Confirmation that the system is designed to cope with the required water run-off is required.</p> <p>If all run off is discharged directly from the site to either the sea, estuaries covered by a shoreline management plan or designated wildlife/SSSI areas (as part of habitat management), then the credit may be awarded without the need to specify additional attenuation measures where such runoff has been approved by the appropriate statutory or management bodies.</p>		

*Where the local authority (or statutory body) requires a greater attenuation than the percentages above, and/or a more onerous design flooding frequency than that recommended in BS EN752-4, then the higher requirements must be met in order to achieve credits for this issue.

Information required to demonstrate compliance

Schedule of Evidence Required To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
Appointment of an appropriate consultant to carry out the design of rainwater attenuation according to above standard and brief as Checklist 2	Confirmation from consultant that the requirements of this credit have been achieved
Confirmation from an appropriate consultant that the capacity of the specified rain water run-off attenuation device comply with the requirements.	As for design stage
	<p>Manufacturer's data covering details of any rainwater or run-off attenuation devices for the dwelling.</p> <p>Written confirmation of advice and approval from the relevant statutory body for the attenuation facilities specified.</p>

Relevant Definitions

Low annual probability of flooding	Area where the chance of flooding each year is 0.5 per cent (1 in 200) or less.
Medium annual probability of flooding	Area where the chance of flooding in any year is 1.3 per cent (1 in 75) or less but greater than 0.5 per cent (1 in 200)
High annual probability of flooding	Area where the chance of flooding in any year is greater than 1.3 per cent (1 in 75)
Soakaways	A sub-surface structure designed to promote the infiltration of surface water in to the ground.
Run-off attenuation devices	<p>This covers the range of construction and equipment which can be employed to attenuate runoff from hard surfaces and roofs.</p> <p>Measures include: underground storage, oversized pipes, holding ponds, swales, reed beds, permeable paving, green roofs, local or centralised soakaways etc.</p>
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.

Peak flow rate	The peak rate of discharge of water from hard surfaces.
Hard surfaces	<p>This includes all drives and other surfaces with vehicular access, communal car parking, patio areas, pathways and other hard surfaces.</p> <p>This does not include: site distribution roads and associated pavements or footpaths less than 1.5m wide that have free drainage to soft landscaping areas on both sides.</p>
Soil infiltration	The passage of water into permeable ground.
Natural water courses	Any natural channel that conveys surface water.
Rainfall intensity	Depth of rain falling in unit or specified time, i.e. volume of rain falling in unit or specified time per unit area
Relevant Statutory Body	This will in most cases be the Environment Agency.
Appropriate Consultant	A consultant with qualifications relevant to the calculation of surface water run off eg. An appropriate RICS; RIBA/ARB; ICE; CIBSE member.

Assessment Methodology

Design Stage

1. Confirm that a member of the design team has been appointed and can confirm that the peak run off rates will be no greater than before development AND attenuation will be designed to attenuate 50, 75 or 100% (as applicable) of a peak flow.
2. Check that evidence have been provided that confirms that the attenuation device specified is designed to attenuate a peak flow rate applicable to that area i.e. for that specific flood risk level.
3. The assessor is not required to perform any calculation as this should be provided by the design team.

Post Construction Stage

1. Confirm that statutory approval for attenuation design obtained.

Calculation Procedures

None.

Checklists and Tables

Checklist 1: Attenuation methods

- Holding ponds, swales, reed beds etc.
- The use of 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 in to 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. Confirmation of approval from relevant statutory body needs to be provided.
- Run-off from roofs is collected as a part of a rainwater harvesting system (see additional guidance on water butts below.)
- Run-off from roofs is directed to a local soakaway or other holding facility such as tanks, ponds, swales etc.
- Green roofs. Note: For soil based grass roofs, calculation should be made on the basis of the infiltration, moisture retention and depth of soil. For sedum roofs, infiltration data should be provided by the manufacturer/installer.

When systems are used to collect run-off from vehicular areas or other areas which are subject to potential pollution risks, they must be covered by appropriate pollution control measures such as interceptors etc. Specialist advice should be sought from relevant statutory authorities on what is appropriate in such instances.

Checklist 2: Brief for Consultant

The design team calculations from an appropriate consultant should include the following:

- Type and storage volume of the attenuation device/s.
- The area of hard surfaces and roofs.
- Design storm and/ or flooding frequency (refer to BS EN 752-4, Section 11- Table 1 or statutory body requirements if they require a more onerous design flooding frequency.). The frequency is depending on the size of the development and the area.
- The design rainfall for the site from the Meteorological Office for prescribed storm and/ or flooding frequency, (unless otherwise required by a statutory body).
- For soakaways the soil infiltration rate and the method of measurement and/ or calculation.
- The calculations could be output from verified software packages which calculate the infiltration rate and system attenuation.

To ensure effective operation of the water run-off attenuation measures, the facilities must discharge half their volume within 24–48 hours of the storm event in readiness for any subsequent storm inflow, unless advised otherwise by a statutory body. Most soakaways are designed for a 24 hour half discharge.

Run-off from roofs to water butts **does not** automatically comply with the requirements of this credit, as water use is dependent on the occupier and excess water is normally discharged direct to drainage systems. Where such excess is then stored in such a manner as to meet the requirements, this credit can be awarded.

Common Cases of Non Compliance

None of the credits can be awarded where the assessed development has proceeded against the recommendation of the Environment Agency on the basis that the flooding implications are too great.

Special Cases

None

Background

Around 5 million people, (i.e. 2 million properties), live in flood risk areas in England and Wales. Excessive surface run-off can cause significant flash flooding problems to natural watercourses, rivers and municipal systems. The need to cater for such peak run-off means that systems are sized accordingly and are oversized for most of the year.

On many sites it should be possible to include holding facilities to delay the release of storm water from the site and statutory authorities may require this in certain sensitive areas, usually where natural watercourses are affected.

The main intention of this credit is to reduce the overall surface run-off of rainwater from hard landscaped surfaces and roofs within the development. In housing developments, this can be done either by specifying permeable paving for all hard surfaces in the development, or by the adoption of soakaways or other systems (including green roofs) that reduce peak run-off loads.

BRE Digest 365:1991 and BS EN 752-4 contain guidance on calculating the peak flow rate and determining the design flooding frequency .

References and Further Information

The Met Office (incl. figures for UK rainfall)
www.met-office.gov.uk

British Standards Online
<http://bsonline.techindex.co.uk/>

The Environment Agency
www.environment-agency.gov.uk/

CIRIA
Source control using constructed pervious surfaces (CIRIA publication C582)

Defra
www.defra.gov.uk

BRE Digest 365 – *Soakaway design* (1991)

BRESOAK: Soakaway design software (2007)

CIRIA. – C523 – Sustainable urban drainage systems – best practice manual for England, Scotland, Wales and Northern Ireland (2001)

BS EN 752-4 – Drain and sewer systems outside buildings – Hydraulic design and environmental considerations (1998)

BS EN 12056-3 – Gravity drainage inside buildings – Roof drainage, layout and calculations (2000)

Issue ID	Description	No. of credits available	Mandatory Elements
Sur 2	Flood Risk	2	Yes

Aim

To encourage developments in areas with low risk of flooding or if developments are to be situated in areas with a medium risk of flooding, that appropriate measures are taken to reduce the impact in an eventual case of flooding.

Assessment Criteria

Credits are awarded where evidence is provided to demonstrate that the assessed dwelling is located in an area of:

Criteria	Credits
<p>EITHER</p> <ul style="list-style-type: none"> ● low annual probability of flooding 	2
<p>OR</p> <ul style="list-style-type: none"> ● medium/high annual probability of flooding (subject to plans being approved by the relevant statutory bodies) and where: <p>the ground level of all dwellings, access routes to the ground level and the site must be designed so they are at least 600mm above the design flood level of the flood zone in which the assessed development is located.</p>	1
<p>OR</p> <ul style="list-style-type: none"> ○ Where the development has been permitted even though the ground levels of the topography/infrastructure immediately adjacent to the site fall below the 600mm threshold, the credit can still be awarded, provided <ul style="list-style-type: none"> – there are no other practical solutions for site access above this level <p>And</p> <ul style="list-style-type: none"> – safe access to the site and the dwellings can still be provided by raising both the access and the lowest occupied rooms to at least 600mm above the notional flood level 	
<p>OR</p> <ul style="list-style-type: none"> ○ Undertake an assessment of how the building and its contents will react to flooding and where necessary, use flood resilient construction to mitigate risk. 	
<p>OR</p> <ul style="list-style-type: none"> ○ Maintained flood defences are in place 	
<p>Or</p> <ul style="list-style-type: none"> ○ Non-structural measures are used to control risk to the development, e.g. flood storage potential either within the development or upstream 	
<p>In all case, credits will be withheld if the defence schemes considered for this credit reduce the performance of functional flood plains elsewhere</p>	
<p>Default Cases</p> <p>None</p>	

Information required to demonstrate compliance

Schedule of Evidence Required To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
<p>Confirmation of annual probability of flooding:</p> <p>For medium/high flood risk areas confirmation from the developer/ design team or third party of:</p> <ul style="list-style-type: none"> • The design flood level for the site/flood zone • Site plans or specification outlining the range of ground levels of the dwellings, car park and site access (lowest to highest). • Drawings showing the location and details of any flood protection measures for the dwelling. • Supporting manufacturer’s data covering details of any flood protection measures for the dwelling. <p>Written confirmation from the Environment Agency of:</p> <ul style="list-style-type: none"> • The reduction in flood risk category of brownfield sites under the protection of existing flood defences. 	<p>For low flood risk areas no further evidence is needed</p> <p>Confirmation that no changes have occurred to the plans</p>

Relevant Definitions

Flood probability	The estimated probability of a flood of given magnitude occurring or being exceeded in any specified time period. For example, the 100-year flood has a 1% chance of occurring in any given year.
Low annual probability of flooding	Low annual probability of flooding is an area where the chance of both river and sea flooding each year is <0.1% (1 in 1000) or less.
Medium annual probability of flooding	An area where the chance of river flooding in any year is 1% (1 in 100) or less but greater than 0.1% (1 in 1000) and between a 1 in 200 and 1 in 1000 chance of sea flooding (0.5% – 0.1%).
High annual probability of flooding	An area where the chance of river flooding in any year is > 1% (1 in 100) and a 1 in 200 or greater chance of flooding from the sea (>0.5%).

Flood risk	The combination of the flood probability and the magnitude of the potential consequences of the flood event.
Flood event	A flooding incident characterised by its peak level or flow, or by its level or flow hydrograph.
Flood storage	The temporary storage of excess runoff or river flow in ponds, basins, reservoirs or on the flood plain during a flood event.
Design flood level	The maximum estimated water level during the design 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.
Flood Protection Measures	This covers the range of flood protection measures which can be employed to protect individual dwellings and developments from the effects of flooding.
Relevant statutory body	This will cover all Environment Agency and Local Authority legislation as appropriate.
Flood resilient construction	Buildings that are designed to reduce the consequences of flooding and facilitate recovery from the effects of flooding sooner than conventional buildings.
Flood resistant construction	Buildings that prevent the entry of water or minimise the amount of water that may enter a building where there is flooding outside.

Assessment Methodology

1. At the design stage, the assessor should confirm that a report has been commissioned from the design team on flood risk.
2. Design team to confirm that the scope of the report includes necessary measures.
3. At post construction stage, developer to confirm construction complies with design stage report requirements.

Calculation Procedures

None.

Checklists and Tables

England Flood Zones and Probabilities of Flooding

Flood zones are defined in PPS25, Development and Flood Risk a planning, policy and technical guidance document for England.

Zones 1, 2 and 3 and the probabilities given refer to unprotected risk. Thus the Thames/London is protected to 1 in 100 years, but without defences there would be a greater risk.

Definition	England
Low annual probability of flooding	Zone 1 Less than 1 in 1000 chance of river and sea flooding (<0.1%)
Medium annual probability of flooding	Zone 2 Between 1 in 100 and 1 in 1000 chance of river flooding (1% – 0.1%) and between a 1 in 200 and 1 in 1000 chance of sea flooding (0.5% – 0.1%).
High annual probability of flooding	Zone 3a High Probability 1 in 100 or greater chance of river flooding (>1%) and a 1 in 200 or greater chance of flooding from the sea (>0.5%). Zone 3b The Functional Floodplain Land where water has to flow or be stored in times of flood. In England the risk based Sequential Test should be applied at all stages of planning, which intends that new developments are in areas at the lowest probability of flooding (Zone 1). An Exception Test can be used under certain circumstances

Historic rainfall data can be obtained from the Meteorological Office. Where historic rainfall series are not available, it is now possible to generate synthetic rainfall time series for locations in the UK. (Please refer to BS EN752-4 for more details).

Common Cases of Non Compliance

None of the credits can be awarded where the assessed development has proceeded against the recommendation of the Environment Agency on the basis that the flooding implications are too great.

Credits will also be withheld if defence schemes considered for this credit reduce the performance of functional flood plains elsewhere

Special Cases

As a result of existing flood defence installations, the flood risk for a brownfield site may be downgraded to a lower risk flood zone category.

In such circumstances, the credit can be awarded where the following conditions are met:

1. The development is not located in an area where, for the purpose of the development and/or its wider master-plan, new flood defences have to be, or have been constructed to minimise the risk of flooding to the site and its locality.
2. The development is located on a brownfield site benefiting from existing maintained flood defences. Provided the Environment Agency confirm that, as a result of such defences, the risk of a flood event occurring is reduced to low or medium risk (as appropriate to the credit levels set in the Code). If firm confirmation is not provided then the credit cannot be awarded.

Background

Flooding in the United Kingdom is increasing due to increasing development encroaching on areas prone to flooding and more extreme weather patterns brought about by global warming. Other reasons may have to do with increased run-off from hard surfaces and from some agricultural land. Coastal flooding is exacerbated by rising sea levels, also a result of global warming.

Other sources of flooding include rivers, land / overland flow, groundwater reservoirs and sewers. Sewer flooding is a major cause of flooding in urban areas, which may not necessarily be assessed through the use of flood risk maps or flood risk assessment.

Floods are now on average nearly twice as frequent as they were one hundred years ago. Over seven percent of the land area of England and Wales is at risk from flooding and around 5 million people, (i.e. 2 million properties), live in flood risk areas in England and Wales.

The Meteorological Office predicts a very significant increase in the incidence of flooding over the next century as a result of climate change. If property development continues to increase in high-risk areas, the frequency and intensity of natural catastrophes will inevitably increase too – even if the number of natural events remains constant.

References and Further Information

The Met Office (incl. figures for UK rainfall)
www.met-office.gov.uk

British Standards Online
<http://bsonline.techindex.co.uk/>

The Environment Agency
www.environment-agency.gov.uk

CIRIA
Source control using constructed pervious surfaces (CIRIA publication C582)

Development and flood risk, guidance for the construction industry, Lancaster et. al, CIRIA (2004).

CIRIA – New development and flood risk, 2005

CIRIA – Flood repair standards for buildings, 2005

BRE – Repairing flooded buildings: an insurance industry guide to investigation and repair of flood damage to housing and small businesses

Planning Policy Statement 25, “Development and flood risk”, ODPM (2006).

Approved Document H Drainage and waste Disposal ODPM (2002)

Standards for the repair of buildings following flooding, C623, CIRIA (2005).

BRE Good Repair Guide 11, “Repairing Flood Damage” Part 1–4, CRC Ltd, (1997)

BS EN 752-4: 1998, “*Drain and sewer systems outside buildings – Part 4: Hydraulic design and environmental considerations*”, British Standard Institute (1998)

BS EN 12056-3: 2000, “*Gravity drainage inside buildings – Part 3: Roof drainage, layout and calculation*”, British Standard Institute (2000)

BRE Digest 365, “*Soakaway design*”, Building Research Establishment (1991).

Category 5 Waste

Issue ID	Description	No. of credits available	Mandatory Elements
Was 1	Household Waste Storage and Recycling Facilities	4	Yes

Aim

To recognise the importance of having adequate internal and external storage space for waste to enable its appropriate management.

Assessment Criteria

Credits are awarded for the provision of storage space for household and recycling waste, in accordance with the criteria below.

Criteria		
	Credits	Mandatory Elements
<p>Mandatory requirement: Household Waste Storage</p> <p>The space allowed for waste storage should be sized to hold the larger of the two (by volume) of the following:</p> <p>EITHER</p> <ul style="list-style-type: none"> All external containers provided under the relevant <i>Local Authority</i> refuse collection/recycling schemes. Containers should not be stacked to ensure ease of access and use. <p>OR</p> <ul style="list-style-type: none"> The <i>minimum capacity</i> of waste storage as calculated from BS 5906 (Code of Practice for Storage and On-Site Treatment of Solid waste from Buildings (2005) <p>All containers must be accessible to disabled people, particularly wheelchair users and sited on a hard, level surface.</p>	–	Level 1
<p>Non mandatory requirement: Household Recycling Facilities</p> <p>Where there is no external storage for recyclable waste, and no Local Authority Collection Scheme*, dedicated internal storage for recyclable waste is provided as detailed below:</p> <p>Three internal storage bins:</p> <ul style="list-style-type: none"> – with a minimum total capacity of 60 litres; – where no individual bin is smaller than 15 litres; and – located in an <i>adequate internal space</i>. 	2	–

	Credits	Mandatory Elements
<p>Where there is a combination of adequate internal storage plus either a Local Authority Collection Scheme or external storage consisting of:</p> <p>Either Three internal storage bins for recyclable waste:</p> <ul style="list-style-type: none"> – with a minimum total capacity of 30 litres; – where no individual bin is smaller than 7 litres; <p>OR a single 30 litre bin linked with a Local Authority service that collects at least 3 types of recyclable material in a single bin</p> <ul style="list-style-type: none"> – located in an <i>Adequate Internal Space</i> (see definition below). <p>AND</p> <p>EITHER</p> <p>Provision of adequate external storage space for bins plus a <i>Local Authority</i> scheme collecting at least three types of recyclable waste:</p> <p>OR</p> <ul style="list-style-type: none"> – For individual dwellings;- an <i>adequate external space</i> for storing three external bins (as specified below) for recyclable waste <ul style="list-style-type: none"> – a minimum total capacity of 180 litres; – no individual bin smaller than 40 litres; – located within 10m of an external door. <p>OR</p> <ul style="list-style-type: none"> – For blocks of flats, a <i>private recycling scheme</i> operator is appointed to maintain the bins and collect recyclable waste on a regular basis. The recycling containers must: <ul style="list-style-type: none"> – be located in an <i>adequate external space</i>; – be sized dependent on the frequency of collection, based on guidance from the <i>recycling scheme operator</i>. – store at least 3 types of recyclable waste; – be located within 50m of an external door. 	4	–
Default Cases		
None.		

Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the definitions section below.	
Design Stage	Post Construction Stage
<p>1. Drawings showing and text* confirming:</p> <ul style="list-style-type: none"> • the number of bedrooms; • the location of internal and external storage (where applicable); • the types and sizes of storage; and • how the storage is accessed. • access arrangements conforming to H6 in AD H. 	As design stage

Design Stage	Post Construction Stage
<p>2. A letter from the <i>Local Authority</i> confirming the type and size of containers that are provided for their refuse collection and recycling scheme (where in operation).</p> <p>OR</p> <p>Where a <i>private recycling scheme operator</i> is to be appointed to collect <i>recyclable materials</i>, confirmation of this intention and details of the scheme proposed.</p>	<p>Evidence provided on the basis of an Assessor site survey.</p> <p>A written agreement to maintain and empty the bins on a regular basis. confirming:</p> <ul style="list-style-type: none"> • The recyclable waste types that will be collected; • the level of separation of waste types; and • the frequency of collection.

Relevant Definitions

Local Authority

The *Local Authority* is responsible for regular collection of waste from the Dwelling. This includes the collection of residual waste (waste not intended for recycling or composting) and in many cases recyclable waste.

Private Recycling Scheme Operator

A *private recycling scheme operator* can be appointed to collect recyclable materials where a *Local Authority* collection scheme is not in operation or where a landlord/occupier elects to go private, eg. in some apartments.

Adequate Internal Space

Internal recycling bins should be located in a dedicated non obstructive position. This should be in a cupboard in the kitchen, close to the non-recyclable waste bin, or located near to the kitchen in a utility room or connected garage.

Free standing recycling bins placed directly on the floor do not comply.

Adequate External Space

External recycling bins should be located on level hard standing and must be covered.

For blocks of flats only:

If for strategic reasons (outside the control of the developer) waste storage bins cannot be located within 50m, exceptions to the rule may be allowed.

Full details must be provided and BRE consulted prior to awarding credits.

Minimum Capacity A *minimum capacity* of 100 litres of waste storage per dwelling is required (based on a one bedroom dwelling).

An additional 70 litres is required for every additional bedroom.

Recyclable Materials For the purpose of this issue, at least three of the following recyclable materials must be collected:

- Paper
- Cardboard
- Glass
- Plastics
- Metals (tins and cans)
- Textiles (clothes and shoes)

Assessment Methodology

Design Stage

1. Check the *Minimum Capacity* required for internal and external waste and recycling storage based on the criteria set out i above.
2. Check the space available for storage of these bins.

Post Construction Stage

1. Confirm that the arrangements still apply

Calculation Procedures

None.

Checklists and Tables

None.

Common Cases of Non Compliance

None.

Special Cases

1. Credits can be awarded for developments in areas not yet covered by the Local Authority recyclable waste collection scheme where a written statement from the *Local Authority* can be provided stating when the collection will commence (this date must be within one year of the completion date).

Background

According to www.wasteonline.com

“It is established that nearly 36 million tonnes of municipal waste was generated in the UK in 2004/05. A total of 30 million tonnes of this was collected from households, which is approximately half a tonne of household waste per person. Waste from homes is generally collected by Local Authorities through regular waste collections or recycling schemes. There must be adequate storage provision for waste to enable its appropriate management.” The legal requirements are set out in the Household Waste Recycling Act (see below). The size, type and number of containers may be set out by the Waste collection Authority using their powers in sections 46 of the Environmental Protection Act 1991

References and Further Information

WRAP (The Waste and Resources Action Programme)
www.wrap.org.uk

Recycle now
www.recyclenow.com

Defra
www.defra.gov.uk/environment/waste/

Department for Communities and Local Government.
Building Regulations Approved Document H – Drainage and waste disposal (2001)
www.communities.gov.uk

BS 5906:2005 *Code of Practice for Waste Management in Buildings*

Household Waste Recycling Act; 2003

Issue ID	Description	No. of credits available	Mandatory Elements
Was 2	Construction Site Waste Management	2	Yes

Aim

To recognise the importance a Site Waste Management Plan has on the efficient use of resources during construction and demolition, and to promote the reduction and effective management of site waste.

Assessment Criteria

The construction site must comply with the criteria below:

Criteria	Credits	Mandatory Elements
<p>Mandatory Element: Site Waste Management</p> <p>A <i>Site Waste Management Plan</i> must be produced and implemented. This will require the monitoring of waste generated on site and the setting of targets to promote resource efficiency in accordance with the <i>relevant guidance</i>. Specific targets are not required.</p>	–	All levels
<p>Default Cases</p> <p>For a development costing less than £200,000 this element will be awarded by default.</p>		
<p>Minimising Construction Waste</p> <p>The <i>Site Waste Management Plan</i> must include procedures and commitments for minimising waste generated on site accordance with the <i>relevant guidance</i>.</p>	1	–
<p>AND (for an additional credit)</p> <p>The <i>Site Waste Management Plan</i> must include procedures and commitments to sort, reuse and recycle construction waste, either on site or through a <i>licensed external contractor</i>.</p>	1	–
<p>Default Cases</p> <p>None</p>		

Information required to demonstrate compliance

Schedule of Evidence Required To be read in conjunction with the definitions section below.	
Design Stage	Post Construction Stage
<p>Mandatory Element A copy of the <i>Site Waste Management Plan</i> or the specification* describing what the <i>Site Waste Management Plan</i> will contain. Details (Checklist 1) must be in accordance with the <i>relevant guidance</i> (Checklist 1) and include:</p> <ul style="list-style-type: none"> • resource efficiency targets set for each stage of construction (including demolition) • details of how the waste (as listed in Checklist 4) will be measured and monitored • the name and position of the person who is responsible for implementing the plan • how the plan will be implemented 	<p>As for design stage</p> <p>AND</p> <ul style="list-style-type: none"> • records confirming what targets were set and achieved. • records confirming the monitoring of site waste throughout the whole construction period
<p>Where there is a commitment to minimise waste generated on site supported by the Site Waste Management Plan (Checklist 2) .</p> <ul style="list-style-type: none"> • This should include procedures and targets for the efficient ordering, handling and storing of materials. <p>AND</p> <p>Where there is a commitment to sort, reuse and recycle construction waste (Checklist 3):</p> <ul style="list-style-type: none"> • Confirmation is required that as many of the categories in checklist 4 will be sorted on site and reused/recycled as appropriate. This confirmation can be in the form of a site specific waste policy or procedure, specification, letter of appointment for a waste/recycling contractor, or other formally written document. 	<ul style="list-style-type: none"> • a summary report outlining overall performance in terms of waste minimisation • a summary report outlining overall performance in terms of quantities of waste sorted reused and/or recycled.

*or a letter of instruction to a contractor/ supplier or a formal letter from the developer to the Code assessor giving the specific undertaking or the manufacturers information.

Relevant Definitions

Site Waste Management Plan (SWMP) The primary aim of a SWMP is to minimise waste at source and to ensure that site engineers, planners and procurement officers assess the use, reuse and recycling of materials and products both on- and off-site.

Relevant Guidance The *relevant guidance* refers to the guidance listed in the reference section below produced by the following organisations:

- WRAP
- Envirowise
- BRE
- DTI

Assessment Methodology

Design Stage

1. Use Checklist 1, *Mandatory Requirements* to confirm that the content of the SWMP is sufficient to meet the mandatory requirements for this issue.
2. Use Checklist 2 to confirm the obligation to minimise site waste.
3. Use Checklist 3 to confirm the obligation to sort and recycle waste.

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.

Calculation Procedures

None.

Checklists and Tables

Was 2 Construction Site Impacts

Checklist 1: Mandatory Requirements.

Confirmation that the SWMP includes procedures for the monitoring of waste on site and the setting of targets to promote resource efficiency; from WRAP (2006).

1. 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.
2. Identify the types and estimated quantities of waste that will be produced at all stages of the work programme/plan.
3. Identify waste management options including reference to the waste hierarchy (reduce, reuse, recycle), on- and off-site options, paying particular attention to arrangements for identifying and managing any hazardous wastes produced.
4. Identify waste management sites and contractors for all wastes that require them and ensure that the contracts are in place, emphasising compliance with legal responsibilities such as the Duty of Care.
5. Set targets and procedures for monitoring progress.
6. Confirmation is required that the site's construction waste is being monitored.
7. Measure how much waste and what types of waste are produced. These figures should be recorded on an established system such as SMARTStart™

Checklist 2: Minimising Construction Waste.

Procedures and commitments for minimising waste generated on site

1. Confirmation that targets are set to reduce waste generated on site.
2. Targets for waste minimisation during the construction process can be set using BRE's/DTI's Environmental KPI benchmarks. These facilitate projects in setting appropriate targets by providing benchmark figures (see references section for further details).

Checklist 3: Commitment to Sorting and Recycling Contribute Waste.**Procedures and commitments for sorting and recycling site construction and demolition waste***Checklist 1 and 2 plus*

1. Recycled waste must either be:
 - a. Reused or recycled on site, or
 - b. Sorted on site and collected for recycling

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 correct standards and that materials are re-used / recycled as appropriate.

Hazardous waste should be segregated on site, to avoid contaminating non-hazardous waste streams. This is standard practice and therefore no credit will be awarded for segregating hazardous waste.

Checklist 4: Waste Groups to be Monitored

Key Waste Group	Examples of Products in the Key Waste Group
Ceramics/bricks	Bricks, ceramic tiles, clay roof tiles, ceramic toilets and sinks
Natural – soils	Soils, clays, sand
Natural – aggregate or rock	gravel, natural stone
Metals	Radiators, metal formwork, metal sinks, cables and wires, metal bars
Packaging	Paint pots, pallets, paper/card waste if substantial quantities, bubble wrap, cable drums, wrapping bands, polythene sheets
Plastic	Gutters and downpipes, DPC, upvc windows and doors, socket boxes
Paper and cardboard	If there a substantial amounts, keep paper and card separate
Concrete	Concrete pipes, kerb stones, paving slabs, concrete rubble, solid blocks
Insulation	Glass fibre, mineral wool, foamed plastic, breather paper
Canteen/office/ad-hoc	Office waste, canteen waste, vegetation, ad hoc materials
Plaster / Cement	Render, plaster, cement, fibre cement sheets, mortar
Plasterboard	Plasterboard waste and offcuts can be recycled
Timber	Plywood, chipboard, noggins, battens, doors, windows, mdf, timber off cuts and surplus materials
Liquids and Oils	Hydraulic oil, engine oil, lubricating oil, transmission oil, liquid fuel, cleaning agents, mould oil, paint and solvents. To facilitate recycling, these wastes must not be mixed.

Architectural Features	Chimneys, façades, fireplaces, roof tiles and reclaimed bricks.
Furniture	Tables, chairs, desks, sofas, blinds, carpets
Electrical & electronic equipment	TVs, fridges, air conditioning units, lamps

Common Cases of Non Compliance

There are no common cases of non compliance for this issue.

Special Cases

There are no special cases for this issue.

Background

Waste management on site is an important issue since it can have significant impacts, especially at a local level. SWMPs are likely to become a legal requirement for all construction projects over £200,000 in 2008 (Defra). They will encourage contractors to comply with legislation and ensure efficient practices on-site. With over 100 million tonnes of construction and demolition waste generated in the UK every year and an estimated 13 million tonnes of completely unused building materials being discarded as waste every year, it is set to have a major impact on the industry.

BRE, CIRIA, WRAP, Envirowise and others publish detailed guidance on waste minimisation (referenced below). BRE operates SMARTStart™, which monitors construction and demolition waste, including the amount and type generated and segregation/recycling rates. It also calculates Environmental Performance Indicators (EPIs). The system identifies opportunities for reuse and recycling and the location of suitable facilities for this via BREMAP, an online geographical information system.

Significant reductions in waste and better management can be achieved by good design, improved logistics, better on-site construction practices and reuse/recycling wherever possible. The ability to segregate waste for reuse/recycling will depend on the construction stage as the waste will vary in terms of type and amount. It will also depend on the amount of space available on-site for segregation.

The removal of construction waste from site is subject to legislative requirements. It is not the responsibility of the assessor to ensure compliance with such legislation; however compliance should be apparent within the SWMP.

Targets

Specific targets are not set as these are project specific. For guidance on setting targets, refer to DTI's Construction Industry KPI Pack. This series of documents guides the reader through setting targets for their own projects.

The implementation of a Site Waste Management Plan is an important tool for managing the site construction waste produced. Data obtained from monitoring site construction waste can

be used to check performance against benchmarks and the effectiveness of any solutions implemented.

Two Environmental KPIs are typically used for waste generated from the construction process; waste generated in m³ per 100m² of floor area and waste generated in m³ per £100,000 of project value. Constructing Excellence and BRE produce annual benchmarks for these KPIs; these are still evolving. BRE is developing benchmarks for different types of construction and waste. Details of these are shown on BRE's SMARTWaste website. This system automatically calculates the Environmental KPIs for a project from the waste data collected and input into the system. Environmental KPIs have been used to benchmark waste minimisation for a number of schemes, including Greenwich Millennium Village and Chiswick Park where waste reduction by 50% was achieved

References and Further Information

Guide To Formulating a Site Waste Management Plan, WRAP, 2006 www.wrap.org.uk

Envirowise; information relating to Site Waste Management Plans
www.envirowise.gov.uk

Site Waste Management Plans, Guidance for Construction Contractors and Clients, Voluntary Code of Practice, DTI, 2004

BREMAP, a geographical information system of waste management facilities
www.bremap.co.uk

BRE Good Building Guide GBG57 Part 1 and 2, Construction and Demolition Waste, 2003

BRE, NHBC Templates for Site Waste Management Plans, April 07
www.bre.co.uk

BRE IP8/02 Construction Site Packaging Wastes: A market position report, 2002

BRE IP9/03 Best Practice of Timber Waste Management, 2003

SMARTWaste™
www.smartwaste.co.uk

Reduction of Site Construction Waste, Recycling and Re-use of materials: A Site Guide and A Project Management Guide
www.smartwaste.co.uk

Digest 447 Waste Minimisation on a Construction Site, 2000
Waste minimisation, an environmental good practice guide for industry – Environment Agency, 2001.

Waste minimisation and recycling in construction – Technical review: CIRIA 1999
Waste minimisation and recycling in construction – Design Manual: CIRIA 1998
Special Publication 133: Waste minimisation in construction, a site guide – CIRIA 1997.

Constructing Excellence, Annual benchmarks for KPIs,
www.constructingexcellence.org.uk

Issue ID	Description	No. of credits available	Mandatory Elements
Was 3	Composting	1	No

Aim

To encourage developers to provide the facilities to compost household waste, reducing the amount of household waste sent to landfill.

Assessment Criteria

Credits are awarded where home composting facilities are provided in houses with gardens or Local Authority kitchen waste collection /communal /community composting service in other dwelling types. The composting facilities should be suitable for normal domestic, non-woody garden, food and other compostable household waste, as outlined below. All facilities should be accompanied by information explaining how they work.

Criteria	
	Credits
<ul style="list-style-type: none"> Individual <i>home composting facilities</i>; OR for dwellings without gardens <ul style="list-style-type: none"> A <i>communal or community composting service</i> (within 50m of the external door) where Local Authority run or where there is a management plan in place OR <ul style="list-style-type: none"> A Local Authority kitchen waste collection scheme All facilities must be in a dedicated position and be accessible to disabled people.	1
Default Cases	
None	

Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the definitions section below.	
Design Stage	Post Construction Stage
Text describing (on drawings or in the specification) <ul style="list-style-type: none"> the location and size of storage access to the storage that an information booklet will be supplied 	Photographic evidence, AND/OR Evidence provided on the basis of an Assessor site survey.

Design Stage	Post Construction Stage
<p>* or a letter of instruction to a contractor/supplier, a formal letter from the developer to the Code assessor giving the specific undertaking or the manufacturers information.</p> <p>or, where applicable:</p> <p>Details of the <i>communal/community composting scheme</i> indicating:</p> <ul style="list-style-type: none"> • management arrangements • the location and size of storage • access to the storage • that an information booklet will be supplied <p>or, where applicable</p> <p>Details of the Local Authority kitchen waste collection scheme</p>	

Relevant Definitions

Composting

is a natural process which converts organic waste into an earth-like mass by means of bacteria and micro-organisms. The composting process is also supported by larvae, wood lice, beetles, worms and other such creatures.

Home Composting Facilities

Home composting facilities consist of the following:

An external composting container:

- specifically designed for composting
- located in a dedicated, not obstructive position at least 10m from dwellings to prevent unpleasant smells

Communal/Community Composting

Communal or community composting is where a group of people share a composting system. The raw materials are provided by all who take part in the scheme, and the compost is then used in the community, either by individuals in their own gardens, or for use on larger projects within the local environment.

The composting scheme must either have a waste management licence or have an exemption certificate from the Environment Agency. Planning permission may also be required and all sites must be registered with the local Waste Regulation Authority.

Kitchen Waste Collection Scheme

A kitchen waste collection scheme run by the Local Authority is an acceptable alternative to *communal/community composting facilities*.

Many Local Authorities now offer *kitchen waste collection schemes* in addition to garden waste collection schemes.

The scheme must collect from all occupants within the flats.

Information Leaflet

In all cases, an information leaflet must be to every dwelling. The leaflet must include:

- how composting works and why it is important;
- the materials that can be composted (e.g. raw vegetable peelings and fruit, shredded paper, tea bags etc.);

AND

Where *home composting facilities* are provided:

- trouble shooting information (e.g. what to do if the compost gets too dry or too wet).

AND

For communal schemes details of the operation and management plan for the scheme

Where a *kitchen waste collection scheme* is in operation the information leaflet provided by the Local Authority is sufficient to meet the information leaflet criteria.

Assessment Methodology

Design Stage

1. Confirm the intention to provide composting bins or communal composting service or kitchen waste collection service as appropriate.

Post Construction Stage

2. Confirm the provision of composting bins or communal composting service or kitchen waste collection service and information leaflet./

Calculation Procedures

None.

Checklists and Tables

None.

Common Cases of Non Compliance

None.

Special Cases

None.

Background

Composting at home is one of the easiest, most effective and environmentally-friendly ways of recycling organic waste. Organic waste in a landfill site degrades to form leachate and methane gas. Leachate is a toxic liquid, which can pollute water and soil. Methane is explosive and is also a green house gas (27 times more powerful than carbon dioxide). Over 30 per cent of household waste can be diverted from landfill by composting, which avoids the production of methane and does not contaminate water supplies.

Compost can be used in the garden as a conditioner and mulch as an alternative to peat-based compost extracted from natural wildlife sites.

References and Further Information

WRAP (The Waste and Resources Action Programme)
www.wrap.org.uk

Recycle now
www.recyclenow.com

Compost Information Sheet. 2005: *Composting and disposing of garden and kitchen waste*.
www.wasteonline.org.uk

Community Composting
www.communitycompost.org

Composting troubleshooting
www.compostguide.com

Category 6 Pollution

Issue ID	Description	No. of credits available	Mandatory Elements
Pol 1	Global Warming Potential (GWP) of Insulants	1	No

Aim

To reduce global warming from blowing agent emissions arising from the manufacture, installation, use and disposal of foamed thermal and acoustic insulating materials.

Assessment Criteria

Credits are awarded where all insulating materials in the elements of the dwelling listed below avoid the use of substances that have a significant GWP (in either their manufacture or installation):

Roofs: Including loft access

Walls, internal and external including lintels and all acoustic insulation)

Floors (including ground and upper floors)

Hot water cylinder, pipe insulation and other thermal stores

Cold water storage tanks where provided

External Doors

Criteria	
	Credits
All elements in Checklist Pol1 have a GWP of less than 5 or are deemed to satisfy the requirement (see Table 2)	1
Default Cases	
None	–

Information required to demonstrate compliance

The following section details any relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage,

Schedule of Evidence Required To be read in conjunction with the Definitions and Calculations Sections below	
Design Stage	Post Construction Stage
<p>Completed Checklist Pol1: showing the proposed insulation materials (or none) for each element and whether they are foamed, use blowing agents or un-foamed (from Table 1).</p> <p>For each element detailed drawings clearly showing:</p> <ul style="list-style-type: none"> • Type and location of all insulation materials. <p>Text describing (on drawings or in specification*):</p> <ul style="list-style-type: none"> • Type and location of insulation materials used. 	<p>Written confirmation that the materials proposed in Checklist 1 are unchanged</p> <p>OR</p> <p>Relevant ‘as built’ drawings clearly showing:</p> <ul style="list-style-type: none"> • Type and location of all insulation materials. <p>OR</p> <p>Evidence provided on the basis of an Assessor site survey.</p>
<p>For any foamed insulation material or materials installed using blowing agents:</p> <ul style="list-style-type: none"> • Manufacturer’s/installers literature confirming that all blowing agents used are either ‘deemed to satisfy’ (See Definitions) from Table 2 or have a GWP of less than 5 	<p>Copies of purchase orders/receipts of all foamed insulating materials,</p>
<p>* or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code Assessor giving the specific undertaking.</p>	<p>Where these details are not supplied at design stage: Manufacturer’s/installer’s literature confirming that all blowing agents used are ‘deemed to satisfy’ (See Definitions) from Table 2 or have a GWP of less than 5</p>

Relevant Definitions

GWP Global Warming Potential. 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 IPCC methodology using a 100 year integrated time horizon (ITH) should be applied.

Blowing Agent Any material used to produce a cellular structure in either a plastic or other foam insulation used in either manufacture or installation.

Deemed to satisfy The blowing agents listed in Table 2 are deemed to satisfy this credit since their GWP is known to be sufficiently low to justify this. All are currently believed by BRE to have a GWP of less than 5.

Assessment Methodology

Design Stage

1. Complete Checklist 1 for all elements.
2. Check drawings and specification clauses for all materials identified
3. For foamed materials, or propellants used to spray or inject insulation, provide manufacturer's/installer's documentation confirming that their product either uses blowing agents 'deemed to satisfy' the requirement from Table 2 in isolation or uses a blowing agent or blend of blowing agents which can be shown to have a GWP of less than 5 .

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.

Calculation Procedures

None.

Checklists and Tables

Table 1: Foamed and Non-Foamed insulations.

Foamed Insulation	Non-foamed insulation
Expanded polystyrene	Mineral wool or fibre
Extruded polystyrene	Glass wool or fibre
Polyurethane (PU) insulation	Cork
Cellular glass or foamed glass	Cellulose insulation
Nitrile rubber or elastomeric insulation	Wood fibre board
Phenolic insulation	Wool
Polyisocyanurate foam	Flax
Icynene foam	Recycled newspaper and jute
Tripolymer foam	Straw or strawboard
Foamed polyethylene	

Table 2: Blowing Agents deemed to satisfy the credit and believed by BRE to have a GWP of less than 5

Air
Carbon dioxide (CO ₂)
Pentane (iso-pentane, cyclopentane, n-pentane)
Isobutane

Checklist Pol1:

Element	Insulation materials proposed (or none)	Unfoamed/foamed or installed using propellants
Roofs: Including loft access		
Roof type 1		
Roof type 2		
Loft access		
Walls, internal and external including doors, lintels and all thermal and acoustic insulation)		
Floors (including ground floor/basements/foundations)		
Hot water cylinder, pipe insulation and other thermal stores		

Note: The manufacturing process of insulating materials changes regularly. Because of this, this document does not include a complete list of insulating materials that comply and manufacturers should be approached for up to date information on their products.

Common Cases of Non Compliance

Where any insulation material contains substances which are controlled under the Montreal Protocol or where the release of such substances forms a significant part of the manufacturing process, this credit should be withheld. Such substances are prohibited within the EU and only products manufactured outside the EU are at risk of containing them.

Special Cases

None.

Background

Global warming is the name given to the phenomenon whereby trace 'greenhouse' gases in the atmosphere absorb infra-red radiation emitted by the earth's surface, causing a warming of the atmosphere. Radiation from the sun in the form of light (short wave solar radiation) that reaches the Earth is absorbed by the surface and warms it up. The surface re-radiates heat or infra-red (long-wave radiation) which is absorbed by 'greenhouse gases' in the atmosphere. It is this natural effect which is responsible for maintaining temperatures at the Earth's surface, allowing life to flourish.

This is known as the ‘greenhouse effect’ as in a greenhouse, where the glass lets in light –but stops heat (infrared long wave radiation) being lost.

The actions of mankind, in industrialisation, have disrupted this natural balance by adding increased levels of greenhouse gases to the atmosphere. The main greenhouse gases being emitted today are carbon dioxide from the burning of fossil fuels, methane (from agriculture) and Nitrous oxide (from agriculture). Global warming potential (GWP) is a relative measure of how effective a gas is at absorbing infra-red radiation compared to CO₂. The GWP measures the total energy absorbed by 1 kg of released gas over a hundred years, relative to CO₂, (which is given a GWP of 1.0).

The Kyoto Protocol has set limits on six specific gases that contribute towards global warming. These are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. The table below shows the GWP for each of these gases.

Gas	GWP
Carbon Dioxide	1
Methane	21
Nitrous oxide	310
Hydrofluorocarbons – HFC’s	140–11700
Perfluorocarbons –PFC’s	6500–9200
Sulphurhexafluoride –SF ₆	23900

Reference: *National Atmospheric Emissions Inventory, UK Emissions of Air Pollutants 1970–2003*, DEFRA, UK, (GWP) based on 100 year time horizon.

References and Further Information

Guidance on the EC Regulation No 2037/2000 on Substances that deplete the ozone layer, October 2000, DTI. Available on-line at <http://www.dti.gov.uk/access/ozone.htm>

Defra, Environmental statistics

<http://www.defra.gov.uk/environment/statistics/globalatmos/gagginvent.htm>

National Atmospheric Emissions Inventory, UK Emissions of Air Pollutants 1970–2003, DEFRA (2005)

Issue ID	Description	No. of credits available	Mandatory Elements
Pol 2	NO _x Emissions	3	No

Aim

To reduce the emission of nitrogen oxides (NO_x) into the atmosphere.

Assessment Criteria

Credits are awarded on the basis of NO_x emissions arising from the operation of space heating and hot water systems for each *Dwelling Type*, in accordance with the table below:

Criteria		
Dry NO _x level (mg/kWh)	Boiler class (BS EN 297: 1994)	Credits
≤ 100	4	1
≤ 70	5	2
≤ 40	–	3
Default Cases		
There are no default cases for this Issue		

No credits may be awarded for open flue heating or hot water systems.

Information required to demonstrate compliance

The following section details any relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage, for each *Dwelling Type*.

Schedule of Evidence Required	
To be read in conjunction with the Definitions and Calculations Sections below	
Design Stage	Post Construction Stage
<p>Text describing (on drawings or in specification*):</p> <p>Details of the primary and any secondary heating systems and flue type.</p> <p>Dry NO_x levels and/or Boiler Class of the primary and any secondary heating systems.</p> <p>Information on flue type must also be provided (e.g., open or balanced).</p> <p>*or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking.</p>	<p>Manufacturer's literature confirming the dry NO_x levels and/or boiler class of the primary and any secondary system.</p> <p>Hard copies or printouts from websites are sufficient.</p> <p>or</p> <p>A dated letter or email from the manufacturer confirming dry NO_x levels is also sufficient.</p>

Design Stage	Post Construction Stage
Design Stage – SAP2005 Worksheets.	As built, SAP2005 Worksheets if different from design stage SAP.
Calculation of dry NO _x or weighted average NO _x as in Calculation Procedures below.	Copies of purchase orders/receipts of heating system(s), and/or Evidence provided on the basis of an Assessor site survey.

Relevant Definitions

Dry NO_x Levels	The NO _x emissions (mg/kWh) resulting from the combustion of a fuel at 0% excess oxygen levels.
Boiler Class	An indication of a boiler's NO _x emissions. Boilers are classified on a scale of 1 to 5, with 1 indicating high NO _x emissions through to relatively low NO _x emissions for a class 5.
Boiler class (BS EN 297: 1994)	The relevant British Standard that defines and classifies boilers based on their NO _x emissions. Applies to boilers fitted with atmospheric burners of nominal heat input not exceeding 70 kW.
Design Stage – Final SAP2005 Worksheet	As defined in Ene 1
The As-Built – Final SAP2005 Worksheet	As Defined in Ene 1

Assessment Methodology

Design Stage

Use the Table 1 to estimate average NO_x.

1. Using the specification document or equivalent, determine the specification and NO_x emissions of all heating systems in the dwelling. If the heating system supplies less than 8% of the total, it can be ignored.
2. Confirm that the NO_x emissions stated are the same as those stated in the relevant manufacturer's literature (where this is available).

Confirm that the emissions stated are those estimated under normal operating conditions, i.e. dry NO_x levels.

If the mains electricity, assume 1200mg/RWh supplied.

3. If the figures are not stated in dry NO_x and/or in mg/kWh as required, apply any necessary conversion/correction factors required to convert the NO_x figure(s) stated for the heating system(s) accordingly. (See sections A & B in the *Calculation Procedures* section below for guidance).
4. For a super-insulated exemplar house, and any house with secondary heating consult the *Special Cases* section below for guidance on how to assess this Issue.
5. Where applicable, calculate the average NO_x emissions using the methodology detailed in section C of the *Calculation Procedures* section and *table 1* below.

Post Construction Stage

1. Where manufacturers details were provided at the design stage, verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction. Where changes have occurred the assessor should re assess the issue as set out above.
2. Where performance specifications only were supplied at the design stage, provide manufacturer's evidence confirming that the performance as set out under Design Stage above have been met.

Calculation Procedures

A: 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 mg/m³, ppm or wet NO_x. It should be noted that these conversion factors assume worst-case efficiencies and are likely to give conservative answer. This could have the effect of lowering the number of credits achieved.

1. 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 B below).
2. 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 B 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.

B: 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 % oxygen this emission was made.

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 this assessment, use the following conversion factors for the most frequently used rates supplied by manufacturers:

% excess O ₂	Conversion (c)
3%	× 1.17
6%	× 1.40
15%	× 3.54

Conversion factor $c = 20.9 / (20.9 - x)$

where $x = \% \text{ excess O}_2$ (NOT excess air) and 20.9 is the percentage of O₂ in the air.

C: Calculating the average NO_x emissions for dwelling types with more than one heating/hot water system

Where heat and hot water is provided by more than one system in a dwelling (i.e. there is a 'main' and 'secondary' systems) it may be necessary to calculate the total NO_x emissions for the combined systems. For the purposes of this assessment, this is only necessary when the secondary system satisfies more than 8% of the dwelling's combined total heating and hot water demand. Where this is not the case the secondary system can be discounted. The calculation procedure is detailed below in Table 1 of the *Checklists and Tables section* below.

Refer to the relevant SAP2005 Worksheet for the water heating and space heating demand for each house type.

D: Calculation Method for Combined Heat and Power (CHP)

Where CHP systems are present or specified, only the heat related emissions should be considered. The NO_x emissions should be allocated to heat and electricity in line with the respective power outputs using a NO_x emission rate for the electrical output that is equivalent to the current rate for grid electricity (see *note 3 of Checklists and Tables*), and allocating the

remaining NO_x to the heat output. The heat-related component only should then be compared to the credit scale. The following formula should be used to determine this:

$$X = (A - B) / C$$

Where:

X = NO_x emissions per unit of heat supplied (mg/kWh_{heat})

A = NO_x emissions per unit of electricity generated (mg/kWh_{elec})

Note: This is the NO_x emitted by the CHP system per unit of electricity generated and should be obtained from the supplier

Where data is provided in different units, or at a level of excess oxygen above zero, the manufacturer/supplier should be asked to convert this to comply with this Issue's requirements, alternatively the assessor may correct these using the factors above.

B = NO_x emissions per unit of electricity supplied from the grid (mg/kWh_{elec}).

Note: this should be assumed to be 1200mg/kWh_{elec}

C = Heat to Electricity Ratio of the CHP scheme

The above methodology determines the net NO_x emissions from CHP generated electricity compared to central generation of electricity and allocates this amount to the heat production. Where X is calculated to be negative it should be assumed to be zero.

Where the CHP system operates in conjunction with other heat sources the general approach outlined under the *Checklists and Tables* section below should be used to calculate the average NO_x emissions.

Checklists and Tables

Table 1: Calculation of average NO _x emission for a dwelling type.							
		Heating & Hot Water Demand (kWh/year)			NO _x Emission Rate for each System (mg/kWh)		
Water Heating	[1]		(51)	x	[4]	=	[7]
Space Heating (Primary)	[2]		(85)	x	[5]	=	[8]
Space Heating (Secondary)	[3]		(85a)	x	[6]	=	[9]
Total Energy Demand (kWh)	[10]						
Total NO _x emissions (mg) for Dwelling Type						[7]+[8]+[9]	= [11]

Notes

1. Secondary Heating
If a secondary heating system is specified, it must also be modelled in SAP2005. If the relevant SAP2005 Worksheets confirm that the secondary heating system supplies less than 8% of the total heating and hot water demand¹ for the dwellings, then it may be ignored in this Issue. If it supplies over 8%, then its Dry NO_x levels must be taken account of by calculating the average NO_x emissions for both systems running in parallel. (See the Calculation Procedures section for guidance on how to calculate average Dry NO_x levels).
2. Exemplar Dwellings
Where the heat load (i.e. energy required for heating and hot water) for a super insulated/exemplar dwelling is 8% of the fuel requirement for a Building Regulations Part L1A 2006 compliant dwelling of the same size and type, 1 credit can be awarded regardless of the primary fuel used. 2 credits can be awarded if this figure is 6% and 3 credits if it is 3%. Relevant SAP2005 Worksheets and calculations need to be provided to show this, for both the base case and the super insulated/exemplar case.
3. Electricity
If it is sourced from the national grid, the emissions are approximately 1200mg/kWh.

For any other system, or for clarification on how to estimate the NO_x emission, please contact BRE.

Common Cases of Non Compliance

None

Special Cases

None

Background

Nitrogen oxides (NO_x) are emitted from the burning of fossil fuels and contribute to both acid rain and to global warming in the upper atmosphere. NO_x formation, which is highly temperature dependent, arises when combusting natural gas. NO_x are believed to aggravate asthmatic conditions, react with the oxygen in the air to produce ozone, which is also an irritant and eventually form nitric acid when dissolved in water. When dissolved in atmospheric moisture the result is acid rain which can damage both trees and entire forest ecosystems.

Burners in domestic heating systems are a significant source of low-level NO_x, while power stations (and therefore electric heating) are a significant source of NO_x in the upper atmosphere. The amount of NO_x emissions varies from product to product. This credit rewards developers who include low-NO_x boilers or other low NO_x systems, such as renewables, in their schemes.

¹ The total heating and hot water demand is taken as the sum of SAP boxes 51, 85 and 85a.

References and Further Information

British Standards 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

Defra, National Emission Ceilings Directive: National Strategy to Combat Acidification, Eutrophication and Ground-level Ozone,

Department of the Environment, Scottish Development Department, Welsh Office, Department of the Environment for Northern Ireland, (1990). *The United Kingdom's Programme and National Plan for Reducing Emissions of Sulphur Dioxide (SO₂) and Oxides of Nitrogen (NO_x) from Existing Large Combustion Plants*.

Nitrogen Dioxide in the United Kingdom. Defra, (2004) Summary report also available on the National Atmospheric Emissions Inventory web site at www.naei.org.uk

Category 7 Health & Wellbeing

Issue ID	Description	No. of credits available	Mandatory Elements
Hea 1	Daylighting	3	No

Aim

To improve the quality of life in homes through good daylighting and to reduce the need for energy to light the home.

Assessment Criteria

Credits are awarded for the dwelling meeting the criteria below:

Criteria		Credits
Kitchens must achieve a minimum average daylight factor of at least 2%		1
All living rooms, dining rooms and studies (including any room designated as a home office under Ene 9 – Home Office) must achieve a minimum average daylight factor of at least 1.5%		1
80% of the working plane in kitchens, living rooms, dining rooms and studies (including any room designated as a home office under Ene 9 – Home Office) must have a view of the sky.		1
Default Cases		
None.		–

Information required to demonstrate compliance

The following section details any relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage, for each Dwelling Type.

Schedule of Evidence Required	
To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
Calculations and details as follows: <ul style="list-style-type: none"> calculations of average daylight factor using the method described in <i>Littlefair (1998) as set out in BS 8206-2</i> or a computer simulation method using this method details of the angle of visible sky, details of window glazing details of room surface areas 	Calculations as design stage or amended if details have changed AND Confirmation that the input parameters (i.e. size and shape of rooms; type, location and dimensions of windows) used in the daylight calculations have not changed, provided on the basis of an Assessor site survey or a check of 'as built' plans.

Design Stage	Post Construction Stage
AND Plans and sections showing: <ul style="list-style-type: none"> • room dimensions • position and dimensions of windows and other glazed areas 	
Where the values in <i>Littlefair (1998)</i> are not used, details from the manufacturer confirming the glass transmission factor and/or room surface reflectance values.	Confirmation by site inspection or copies of purchase orders/ delivery notes.
Where the View of the Sky is assessed provide: Drawings for each room (plans and sections) showing: <ul style="list-style-type: none"> • how the 'no-sky line' is plotted (See <i>Littlefair (1998)</i> for details) • room dimensions • windows and other glazed areas • external buildings and other potential obstructions 	

Relevant Definitions

Daylight Factor

The *daylight factor* is the daylight (illuminance) received at a point on the working plane within a room, expressed as a percentage of the daylight received on an outdoor unobstructed horizontal plane. This is based on an assumed overcast sky, approximated by the '*CIE overcast sky*'.

Average daylight factor

The *average daylight factor* is the mean daylight illuminance received at the working plane within a room, expressed as a percentage of outdoor illuminance on an outdoor horizontal plane. This is based on an assumed 'overcast' sky, as with the *daylight factor*.

Based on the following equation:

$$DF = \frac{M W \theta T}{A(1 - R^2)} \%$$

Where:

W = total glazed area of windows or rooflights

- A = total area of all the room surfaces (ceiling, floor, walls and windows)
- R = area-weighted average reflectance of the room surfaces
- M = a correction factor for dirt
- T = glass transmission factor
- θ = angle of visible sky (Figures 2 and 3)

Guide values for a typical dwelling with light-coloured walls are as follows:

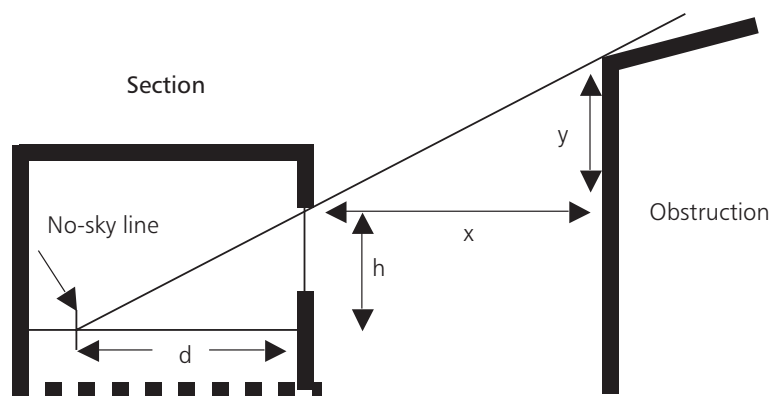
- R = 0.5
- M = 1.0 (vertical glazing that can be cleaned easily)
0.8 (sloping glazing)
0.7 (horizontal glazing)
- T = 0.7 (double glazing)
0.6 (double glazing with low-emissivity coating)
0.6 (triple glazing)
- θ = 65° (vertical glazing)

CIE

Confederation International d'Eclairage (CIE) is the international standards body for lighting.

No sky line

The no-sky line divides those areas of the working plane which can receive direct daylight from the sky, from those which cannot. It is important as it indicates how good the distribution of daylight is in a room. Areas beyond the no-sky line will generally look gloomy.



Working plane

The 'working plane' is a notional surface, typically at about desk or table height, at which daylight factor or the 'no-sky line' is calculated or plotted. For the calculations required here, it is at 0.85m above the floor.

Assessment Methodology

Design Stage

1. Verify that the evidence provided demonstrates that all the Assessment Criteria have been met.
2. Carry out a 'reasonableness check' on provided 'daylight factor' and 'view of the sky' calculations.
 - Check that the calculation **input** details, such as room dimensions, window type, sizes and locations and site layout are consistent with the specification and the drawings for the Dwelling Type.

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.
2. Check that the daylight and 'view of the sky' calculation **input** details, such as room dimensions, window type, sizes and locations and site layout have not changed by on site verification
3. Where changes have occurred seek revised calculations and check these as at the design stage. Check the final specification and drawings for the Dwelling Type.

Calculation Procedures

Daylight factor calculations (to be supplied by the developer/design team)

Calculation procedure for daylight factor and typical values as detailed in *Littlefair (1998)*

1. Any simple rectangular room with a continuous external obstruction or no obstruction can be modelled this way. Complicated external obstructions may also require the use of skylight indicators (Details in *Littlefair(1992)*). Individual trees can be ignored.
2. More complicated room shapes can be modelled using the BRE 'split-flux' method, computer software, or physical scale modelling. Contact BRE for guidance. In this case assume the same typical values for surface reflectivities, cleaning factors and glass transmission factors, as in *Littlefair(1998)*.
3. Where there are two types of room which form part of the same large space, for example, an open plan kitchen – dining room, calculate as one room, as there is no solid partition present to block the distribution of the daylight. Credits will then be awarded for the basis of the average daylight factor of the whole space. For example, if the space is used as a kitchen, a living room and a dining room, the same average daylight factor will be used when assessing all these areas against the levels set out above.

Plotting the no-sky line (to be supplied by the developer/design team)

Refer to *Littlefair (1998)*

Checklists and Tables

None.

Common Cases of Non Compliance

None.

Special Cases

Sun pipes:

As a general rule, sun pipes should be treated as roof lights i.e. if there are no obstructions use a θ of 180° . There are a wide range of light pipes on the market, with different reflective linings and some include lenses/mirrors etc. If no transmission factor is stated use $T = 0.5$ for a 1 m length pipe and $T = 0.25$ for a 2 m length pipe.

Background

People expect good natural lighting in their homes. Daylight makes an interior look more attractive and interesting, as well as providing light to work or read by and is also beneficial to health. Access to sunlight and daylight also helps to make a building energy efficient; effective daylighting will reduce the need for electric lighting, while winter solar gain can meet some of the heating requirements.

The quality and quantity of natural light in an interior depends both on the design of the interior environment (size and position of windows, depth and shape of rooms, colours of internal surfaces) and the design of the external environment (obstructing buildings and objects).

If obstructing buildings are large in relation to their distance from the room the distribution of light in the room will be affected, as well as the total amount received.

BS 8206 describes good practice in daylighting design and presents criteria intended to enhance the well-being and satisfaction of people in buildings, recognizing that the aims of good lighting go beyond achieving minimum illumination for task performance.

The Code awards credits for meeting the minimum average daylight factor suggested by *BS 8206-2*. The BS together with further guidance given in Littlefair(1998) is widely accepted as the authoritative guidance for use in daylighting the UK.

References and Further Information

BS 8206-2 Lighting for buildings. Code of practice for daylighting (1992)

BR209. P.J.Littefair, *Site layout planning for daylight and sunlight: a guide to good practice* (1998), BRE

IP4/92. *Site layout for sunlight and solar gain* (1992), BRE

BR 288. *Designing buildings for daylight*. James Bell and Bill Burt (1995)

CIBSE LG 10 Lighting Guide: Daylighting and window design (1999)

Issue ID	Description	No. of credits available	Mandatory Elements
Hea 2	Sound Insulation	4	No

Aim

To ensure the provision of improved sound insulation to reduce the likelihood of noise complaints from neighbours.

Assessment Criteria

Credits are awarded for achieving higher standards of sound insulation than those given in Approved Document E of the Building Regulations and demonstrating it by either using post-completion testing (called pre-completion testing in Approved Document E and in the text below) or Robust Details as follows:

Criteria	Credits
<p>A commitment to carry out a programme of pre-completion testing based on the <i>Normal programme of testing</i> described in Approved Document E for every group or sub-group* of houses or flats, and to achieve airborne sound insulation values that are at least 3dB higher, and impact sound insulation values that are at least 3dB lower, than the performance standards set out in the Building Regulations for England and Wales, Approved Document E (2003 Edition, with amendments 2004)</p> <p>OR</p> <p>A commitment to use constructions for all relevant building elements that have been assessed and approved by Robust Details Limited, and found to achieve the above performance standards</p>	1
<p>A commitment to carry out a programme of pre-completion testing based on the <i>Normal programme of testing</i> described in Approved Document E for every group or sub-group* of houses or flats, and to achieve airborne sound insulation values that are at least 5dB higher, and impact sound insulation values that are at least 5dB lower, than the performance standards set out in the Building Regulations for England and Wales, Approved Document E (2003 Edition, with amendments 2004).</p> <p>OR</p> <p>A commitment to use constructions for all relevant building elements that have been assessed and approved by Robust Details Limited, and found to achieve the above performance standards</p>	3
<p>A commitment to carry out a programme of pre-completion testing based on the <i>Normal programme of testing</i> described in Approved Document E for every group or sub-group* of houses or flats, and to achieve airborne sound insulation values that are at least 8dB higher, and impact sound insulation values that are at least 8dB lower, than the performance standards set out in the Building Regulations for England and Wales, Approved Document E (2003 Edition, with amendments 2004).</p> <p>OR</p> <p>A commitment to use constructions for all relevant building elements, that have been assessed and approved by Robust Details Limited, and found to achieve the above performance standards.</p>	4
Default cases	
1. Detached dwellings.	4
2. Attached dwellings where separating walls or floors only occur between non habitable rooms	3

* For the definition of groups and sub-groups, see Section 1 in the Building Regulations England and Wales, approved Document E (2003 Edition, with amendments 2004).

Table 1 (Checklists and Tables) of this document provides a summary of the performance standards required to achieve the credits.

Information required to demonstrate compliance

The following section details any relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage, for each Dwelling Type.

Schedule of Evidence Required To be read in conjunction with the Definitions and Calculations Sections below	
Design Stage	Post Construction Stage
<p>Text confirming (on drawings or in the specification*) a commitment to meet the relevant sound insulation performance levels (as outlined in the <i>Assessment Criteria</i> above).</p> <p>AND</p> <p>Where sound testing will be carried out:</p> <ol style="list-style-type: none"> 1. Details of the programme of pre-completion testing to be carried out, including the number of groups and sub-groups. Identification of specific plots to be tested should be undertaken by the building control body when construction is nearing completion. 2. Construction details for all separating walls/floors 3. A commitment to perform remediation work should any of the required tests fail and a commitment to re-testing to confirm that the performance levels have been achieved. 4. Confirmation that the acoustic consultancy is accredited by UKAS (or a European equivalent) or is covered by a 'deemed to satisfy' scheme. If a consultant has yet to be appointed a commitment to employ one who fulfils the accreditation/registration criteria will be sufficient. 	<p>As design stage</p> <p>AND</p> <p>Where sound testing has been carried out:</p> <ol style="list-style-type: none"> 5. Copies of the sound insulation field test results and/or a letter of confirmation that the required performance levels as detailed in the assessment criteria have been achieved. Information to be provided by an appropriate consultant. 6. Evidence that the acoustic consultant is UKAS accredited or covered by another scheme which is deemed to satisfy this requirement. <p>OR</p> <p>Where Robust Details have been used:</p> <ol style="list-style-type: none"> 1. Robust Details completed checklists for all relevant constructions.

Design Stage	Post Construction Stage
<p>OR</p> <p>Where Robust Details are used:</p> <ol style="list-style-type: none"> 1. Confirmation that the Robust Details chosen will achieve the required performance levels (as applicable), such as provided by the Robust Details website data sheets for all relevant construction details (www.robustdetails.com). 2. RDL registration details relating to the site (the Purchase Statement) <p>*or a letter of instruction to a contractor or a formal letter from the developer to the Code assessor giving the specific undertaking.</p>	

Relevant Definitions

Robust Details

Robust Details (RDs) are construction solutions which provide an alternative to pre-completion sound testing as a method of complying with Part E (Resistance to the passage of sound) of the Building Regulations (England and Wales). Robust Details must be approved by Robust Details Ltd (RDL) and the relevant site plots must be registered with RDL and built in accordance with the RD specification. To give a reasonable level of assurance that these details will achieve the required minimum standard RDL carry out random inspections during construction and random sound insulation tests after construction. Robust Details are deemed to be approved for Code credits only where the 90th percentile of results from the last 100 site test results indicate the required level of performance or better. It should be noted that not all RDs will achieve the higher performance levels required for Code credits. If in doubt check the list of currently approved details with RDL directly (0870 240 8210; www.robustdetails.com).

Approved Document E.

The Building Regulations for England and Wales Approved Document E: Resistance to the Passage of Sound, 2003 edition incorporating 2004 amendments.

Groups and Sub-groups

As defined in the Building Regulations for England and Wales Approved Document E: Resistance to the Passage of Sound, Section 1.

Appropriate Consultant	The acoustic consultancy carrying out the testing must be accredited by UKAS or a ‘deemed to satisfy’ scheme.
Deemed to satisfy scheme	A scheme covering acoustic consultants which is accredited under UKAS or a ‘European equivalent’ to cover the quality and consistency of testing carried out by its members. At the time of writing ANC are seeking such accreditation, and the ANC Registration Scheme for Part E field sound insulation testing is a ‘deemed to satisfy’ scheme.

Assessment Methodology

Design Stage

1. Verify that the evidence provided demonstrates that all the Assessment Criteria have been met.
2. For compliance through sound insulation testing:
 - Confirm that there is a clear distinction between any groups and sub-groups on the development, and that there is a commitment made to conduct a program of pre-completion testing, as set out in *ADE*. In addition confirm that there is a commitment to conduct remediation work should any test fail.

Note: Building Regulations England and Wales, Approved Document E sections 1.11 to 1.17 describe the grouping procedures to be followed. For example, houses and flats are usually considered as two separate groups, and if there are significant differences in construction type then the groups will need to be broken down into sub-groups.

- Confirm that the acoustic consultancy is accredited by UKAS (or a European equivalent) or is in a ‘deemed to satisfy’ scheme.
 - Confirm that evidence of the potential for the construction to meet the relevant performance standards has been provided (e.g. design statement from an acoustic consultant).
3. For compliance using Robust Details:
 - Confirm that the Robust Detail(s) specified comply with the sound insulation levels required at 90% confidence levels (see *Table 1 – Credit Summary – Improvements on Approved Document E* under *Checklists and Tables* below).

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction. Where changes have occurred the assessor should re-assess the issue as set out above.
2. Verify that specific Post Construction Stage evidence provided demonstrates that all the Assessment Criteria have been met.

Calculation Procedures

None.

Checklists and Tables

Table 1: Credit Summary – Improvement on Approved Document E

A commitment to achieve sound insulation values that are better, by the stated amount in Table 1, than the performance standards in Approved Document E (2003 Edition with amendments 2004).

Credits	Improvement on Approved Document E (dB)	
	Airborne sound $D_{nT,w} + C_{tr}$	Impact sound $L'_{nT,w}$
1	+3	-3
3	+5	-5
4	+8	-8

Common Cases of Non Compliance

None.

Special Cases

Testing should be between habitable rooms (eg. bedrooms; living rooms; and dining rooms). Non-habitable rooms include: kitchens (but not kitchen-dining rooms); bathrooms; and en-suites. If there are no habitable rooms with separating walls or floors no testing is needed. In such cases 3 credits can be awarded by default, to allow for the small amount of sound nuisance that can occur in such cases.

Where there are insufficient suitable separating walls or floors in a development to carry out the number of tests specified, all of the available suitable separating walls or floors should be tested. Where all the available suitable separating walls and floors have been tested this will be considered to be equivalent to the requirements in ADE, and credits will be awarded as appropriate.

Note: No more than two airborne and two impact sound insulation tests should be undertaken between a pair of houses or flats i.e. a maximum of two airborne sound insulation tests should be carried out on any separating wall and a maximum of two airborne and two impact tests on any separating floor. These tests must be carried out between different pairs of rooms.

Background

One of the most common causes for disputes between neighbours is noise. Environmental Health Officers in England and Wales received nearly 6000 noise complaints per million people in 2003/2004 from domestic premises. This accounts for 75% of all noise complaints received.

The purpose of this credit is to encourage higher standards of sound insulation through a commitment to design and build constructions that exceed the minimum performance standards in Approved Document E of the Building Regulations.

Section 0: Performance, Approved Document E (2003 Edition with amendments 2004) '*Resistance to the passage of sound*' contains performance standards in terms of airborne and impact sound insulation for walls, floors and stairs that have a separating function.

To ensure that the design intent for sound insulation is achieved on site, sound insulation testing is covered by Regulation 20A of the Building Regulations (2000) or Regulation 12A of the Approved Inspector Regulations (2000). The normal way of satisfying Regulation 20A or 12A is to implement a programme of sound insulation testing, called pre-completion testing, according to the guidance set out in Section 1: Pre-completion testing, Approved Document E (2003 Edition with amendments 2004). This guidance describes the normal programme of testing, based on at least one set of tests for every 10 houses, flats or rooms for residential purposes in a group or sub-group.

From 1st July 2004, Robust Details have been introduced as an alternative to pre-completion testing for demonstrating compliance with Part E. Robust details have been developed for separating wall and floor constructions. These have been tested in the field against the performance standards in Approved Document E. The constructions are described in guidance produced by Robust Details Ltd (www.robustdetails.com). Not all RDs are able to meet levels of performance above ADE requirements in accordance with the Code criteria. Information on compliance is available from RDL on this issue if in doubt.

BS 8233:1999 – Sound Insulation and Noise Reduction for Buildings – Code of Practice – sets out guidance on good acoustic planning in section 7.6.1.3. The following principles are recommended for minimising disruption from noise in dwellings (see the standard for full details):

1. Keep services away from bedrooms in houses and flats;
2. Keep stairs, lifts and circulation areas in apartment buildings away from sensitive rooms such as bedrooms;
3. Corridors in apartment buildings should have acoustically absorbent ceilings. Carpets can also help to reduce disturbance in adjacent apartments;
4. Separating walls between bathrooms and sensitive areas should be designed to minimise acoustic transmissions;
5. Isolate pipework and ductwork from the building structure to avoid vibration being transmitted and all penetrations of services should be sealed.

References and Further Information

Department for Communities and Local Government. *Building Regulations Approved Document E – Resistance to the passage of sound* (2003 edition incorporating 2004 amendments).

Robust Details Limited.
www.robustdetails.com

The United Kingdom Accreditation Service.(UKAS).
www.ukas.com

Association of Noise Consultants (ANC).
www.association-of-noise-consultants.co.uk/

BS 8233:1999 – Sound insulation and noise reduction in buildings – Code of Practice.

Issue ID	Description	No. of credits available	Mandatory Elements
Hea 3	Private Space	1	No

Aim

To improve the occupiers' quality of life by providing an outdoor space for their use, which is at least partially private.

Assessment Criteria

Criteria	
	Credits
Where outdoor space (private or semi-private) has been provided that is: <ul style="list-style-type: none"> • of a minimum size that allows all occupants to sit outside • allows easy access by all occupants, including wheelchair users • accessible only to occupants of designated dwellings 	1
Default Cases	
None.	

Information required to demonstrate compliance

The following section details any relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage, for each Dwelling Type.

Schedule of Evidence Required	
To be read in conjunction with the Definitions and Calculations Sections below.	
Design Stage	Post Construction Stage
Plans will need to show that the open space is the minimum size and is accessible to wheelchair users with details (in drawings or specification clauses) of: <ul style="list-style-type: none"> • Level thresholds - accessible approaches in accordance with <i>Building Regulations Approved Document M</i> AND <ul style="list-style-type: none"> • Where a shared outdoor space is provided, details of the control arrangements for access. 	As design stage AND Photographic evidence, OR Evidence provided on the basis of an Assessor site survey.

Relevant Definitions

Minimum Size	<p>Minimum space requirements :</p> <ul style="list-style-type: none"> • Private space: 1.5 m²/bedroom • Shared space: minimum 1m²/bedroom
Easy access by all occupants	Access for wheelchair users should conform to the <i>Building Regulations Approved Document M</i> .
Accessible only to occupants of Designated dwellings.	The space must be designed in a way that makes it clear that the space is only to be used by occupants of designated dwelling(s). This could be achieved by using the buildings themselves, fencing, planting or other barrier to seal off the space.
Outdoor space	<p>An outdoor space could be:</p> <ul style="list-style-type: none"> • a private garden • a communal garden or courtyard • balconies • roof terraces • patios <p>The space should be adjacent or in close proximity to the dwelling.</p>

Assessment Methodology

Design Stage

Measure the area of the outdoor space and check it is of sufficient size for the number of bedrooms

Post Construction Stage

Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.

Calculation Procedures

Checklists and Tables

There are no Checklists or Tables for this Issue.

Common Cases of Non Compliance

1. “Juliet” balconies generally do not comply with the criteria as they are normally too small.
2. Conservatories and other enclosed areas do not comply with the criteria.

Special Cases

None.

Background

The availability of external space around and close to the home is one of the key aspects affecting the occupiers’ quality of life.

For occupants of flats, many of whom are located in city centres, there is often no easy access to outside space, especially that which is relatively private. Therefore the availability of a shared garden, balcony or roof terrace will be of great benefit to those occupiers.

‘It seems important that the open space directly connected to dwellings should be demonstrably private, no matter what tenure arrangements apply, and that the territorial rights of the occupiers should be clearly marked.

Gardens and balconies are popular but only if they are a reasonable size. A flat located near the centre of a city may be preferred to a house with a garden away from the centre, even for a proportion of families with older children, especially if a usable balcony is available.’

New Metric Handbook, Section 2.09, p302

‘Intuitively, we all understand the benefits of open space: a walk, a breath of fresh air, a change of scene. We know we feel better for it and research from Japan goes to show that good neighbourhood green spaces promote longer life expectancy for local people.’

CABE – The Value of Public Space

References and Further Information

Architectural Press. *New Metric Handbook – Planning and Design Data*, Section 2.09, (1999)

CABE – The Value of Public Space
www.cabe.org.uk

Building Regulations Approved Document M (2004), Department for Communities and Local Government

The Stationery Office, Accessible thresholds in new housing: guidance for house builders and designers (2006)

Issue ID	Description	No. of credits available	Mandatory Elements
Hea 4	Lifetime Homes	4	No

Aim

To encourage the construction of homes that are accessible to everybody and where the layout can easily be adapted to fit the needs of future occupants.

Assessment Criteria

Criteria	
	Credits
Where all the principles of Lifetime Homes have been complied with	4
Default Cases	
None.	

Information required to demonstrate compliance

The following section details any relevant documents and calculations required to award credits at both Design Stage and Post Construction Stage, for each Dwelling Type.

Schedule of Evidence Required	
To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction stage
Completed Lifetime Homes checklist for Points 1–16, signed by developer or a letter of instruction to a contractor/supplier or a formal letter from the developer to the EcoHomes assessor giving the specific undertaking.	Completed as-built Lifetime Homes checklist for Points 1–16, signed by developer.

Relevant Definitions

Lifetime Homes

Developed in 1991 by a group of housing experts who came together as the Joseph Rowntree Foundation Lifetime Homes Group. The scheme involves the incorporation of 16 design features that together create a flexible blueprint for accessible and adaptable housing in any setting.

The criteria covered are listed in Checklist 1 below

Assessment Methodology

Design Stage

1. Confirm that the developer/designer has completed the Lifetime Homes checklist

Post Construction Stage

1. Confirm that the developer/designer has completed an as-built Lifetime Homes checklist
2. Verify that developer confirms that the Lifetimes Homes criteria have been met

Calculation Procedures

None

Checklists and Tables

The Lifetime Homes checklist should be used (by the developer/designer) to check whether the Assessment Criteria have been met.

Checklist – Lifetime Homes
<p>Access to the dwelling (Lifetime Home standards 1–5)</p> <p>1) Car Parking</p> <p>Where car parking is adjacent to the home, it should be capable of enlargement to attain 3.3m width.</p> <ul style="list-style-type: none">• This can be a standard car parking space (2400mm wide) with a path or grass verge (no less than 900mm wide) running alongside.• The 900mm extension can also be achieved by sharing space between dwellings. <p>2) Access from Car Parking</p> <p>Where a car parking space is provided, the distance from the car parking space to the home should be kept to a minimum and should be level or gently sloping.</p> <p>However, where the topography prevents this, a maximum gradient of 1: 12 is permissible on an individual slope of less than 5 metres or 1: 15 if it is between 5 and 10m, and 1: 20 where it is more than 10m.* Paths should be a minimum of 900mm width</p> <p>3) Approach</p> <p>The approach to all entrances should be level or gently sloping (as defined above)</p> <p>4) External Entrances</p> <p>All entrances should be illuminated, have level access over the threshold and have a covered main entrance, i.e. a canopy or an open porch.</p>

5) Communal Stairs

Communal stairs should provide easy access and, where homes are reached by a lift, the lift should be fully accessible.

- The restricting dimensions for communal stairs are as follows:
 - Uniform rise not more than 170mm
 - Uniform going not less than 250mm
 - Handrails extend 300mm beyond top and bottom step
 - Handrail height 900mm from each nosing to the top of the handrail
- The minimum dimension for lifts are as follows:
 - Minimum clear landing entrances of 1500x1500mm
 - Minimum internal dimensions of 1100x1400mm
 - 800mm minimum clear opening width
 - Lift controls located between 900 and 1200mm from the floor and 400mm from the lifts internal front wall
 - Preferably controls should have a tactile indication of each floor level

General standards of accessibility within the dwelling (Lifetime Homes standards 6, 7, 11, 14, 15 and 16)

6) Doorways & Hallways

All doorways and hallways should be sufficiently wide to provide easy access to all rooms

- Internal doorways and hallways that conform to the dimensions specified in the table below will be acceptable:

Doorway clear opening width (mm)	Corridor/passageway width (mm)
750 or wider	900 (when approach is head on)
750	1200 (when approach is not head on)
775	1050 (when approach is not head on)
900	900 (when approach is not head on)

- There should be 300mm nib or wall space to the side of the leading edge of the doors on entrance level.
- The front door should have a clear opening width of 800mm, with a 300 nib to the side of the leading edge
- Other external doors should conform to dimensions specified for internal doors

7) Wheelchair Accessibility

There should be space for turning a wheelchair in dining areas and living rooms and adequate circulation space for wheelchairs elsewhere.

- Space for a turning circle of at least 1500mm in diameter or
- Space for a turning ellipse of at least 1700x1400mm.

14) Bathroom Layout

The bathroom should be designed for ease of access to the bath, WC & wash basin.

- Sufficient space should be provided so that a wheelchair user could use the bathroom.
- A minimum gap between the WC and any obstacle of 750mm would provide sufficient space for side access to the WC.
- A space 700mmx1100mm adjacent to the bath would provide sufficient access, preferably at the tap end.
- A space 700mmx1100mm adjacent to the front of the sink would provide sufficient access.

15) Window Specification

Living room window glazing should begin no higher than 800mm from the floor level and windows should be easy to open/operate.

- People should be able to see out of the window whilst seated and wheelchair users should be able to open at least one window in each room.
- Glass in windows below 800mm will need to be safety glass (Approved Document N)

16) Fixtures & Fittings

Switches, sockets, ventilation and service controls should be at a height usable by all.

- Fixtures and fittings should be between 450 and 1200mm above the floor level.

Potential future adaptability of the dwelling (Lifetime Homes standards 8, 9, 10, 12 and 13)

8) Entrance level Living Room

The living room should be at entrance level.

9) Entrance Level Bedspace

In houses of two or more storeys, there should be space on the entrance level that could be used as a convenient bed space.

- Single storey homes, at ground level or accessible by a lift, already comply
- Applies to homes of two or more storeys above ground floor if accessible by a lift
- Space for a temporary or movable partition would provide some additional privacy

10) WC

In houses with three bedrooms or more there should be a wheelchair accessible toilet at entrance level with drainage provision enabling a shower to be fitted in the future. In houses with two bedrooms the downstairs toilet should conform at least to Part M.

- Dwellings with three or more bedrooms or on one level:
 - A wheelchair user must be able to close the door from within the closet and achieve side transfer to at least one side of the WC.
 - A minimum of 1100mm clear space from the front of the WC bowl is required
 - Drainage and service provision enabling a shower to be fitted at any time, must be within the closet or adjacent to the WC
- Dwellings on two levels with two or fewer bedrooms:
 - In small two bedroom dwellings where the design has failed to achieve the fully accessible WC, the Part M standard WC will meet this standard
 - The space between the front of the WC bowl and the opposite wall/door should be a minimum of 750mm.
 - The distance from the central line of the cistern and the adjoining wall should be a minimum of 450mm.
 - Where oblique access is provided, there should be a minimum of 250mm to the side of the door.
 - The WC door should open outward.

11) Bathroom & WC Walls

Walls in the bathroom and WC should be capable of taking adaptations such as handrails.

- Wall reinforcements (if required) should be located between 300 and 1500mm from the floor
- Also applies to all additional WCs

12) Lift Capability

The design should incorporate provision for a future stair lift and a suitably identified space for a through the floor lift from the ground floor to the first floor, for example to a bedroom next to the bathroom.

- There must be a minimum of 900mm clear distance between the stair wall (on which the lift would normally be located) and the inside edge of the opposite handrail.
- Unobstructed 'landings' are needed at top and bottom of stairs.
- Joists should be trimmed for a through-the-floor lift.
- Structural openings should be approximately 1500mmx1000mm.
- Floor structure should be no more than 350mm deep.

13) Main Bedroom

The design and specification should provide a reasonable route for a potential hoist from a main bedroom to the bathroom.

- Most timber trusses are capable of taking a hoist and tracking. Access through the loft to the trusses is advisable in case trusses require strengthening.

- Technological advances in hoist design mean that a straight run is not required.
- An 1100 wide knock out panel between the main bedroom and the bathroom would comply.
- Where a bathroom is en-suite, a knock-out panel above the door would be required.

Common Cases of Non Compliance

None

Special Cases

None

Background

In 1991 the Lifetime Homes concept was developed by a group of housing experts who came together as the Joseph Rowntree Foundation Lifetime Homes Group. The scheme involves the incorporation of 16 design features that together create a flexible blueprint for accessible and adaptable housing in any setting and add the built-in flexibility that make homes easy to adapt as peoples' lives change.

'Lifetime Homes' is currently a voluntary standard. Some elements of the standards were introduced into the Building Regs Part M in 1999.

Lifetime Homes will be suitable for older people and for the vast majority of disabled people, as well as non-disabled people, they will have a wider market of potential buyers and residents, most likely increasing their value and the ease with which they can be re-sold.

"The Chartered Institute of Housing in Northern Ireland & the Joseph Rowntree Foundation conducted a comparative study into the cost of meeting Building Regulations and Lifetime Home standards. The additional cost of building Lifetime Homes ranged from £165 to a maximum of only £545 per dwelling, depending on the size, layout and specification of the property. In addition, Lifetime Homes bring about many savings and cost benefits in adaptations and flexibility in use as well as increasing the marketability of the property."

References and Further Information

Lifetime Home Standards
www.lifetimehomes.org.uk

Joseph Rowntree Foundation. Lifetime Homes. 2006
www.jrf.org.uk/housingandcare/lifetimehomes/

Meeting Part M and designing Lifetime Homes
1.0 *Edited by Caitriona Carroll, Julie Cowans and David Darton*
www.jrf.org.uk/bookshop/details.asp?pubID=181

Category 8 Management

Issue ID	Description	No. of credits available	Mandatory Elements
Man 1	Home User Guide	3	No

Aim

To recognise and encourage the provision of guidance to enable home owners/occupiers to understand and operate their home efficiently and to make the best use of local facilities.

Assessment Criteria

Credits are awarded for the provision of a simple user guide which covers information relevant to the ‘non-technical’ tenant/owner on the operation and environmental performance of their home, as follows:

Criteria	
	Credits
A stand-alone Home User Guide, compiled using <i>Checklist Man 1 Part 1</i> together with information that the guide is available in alternative accessible formats.	2
Where the guide also covers information relating to the site and its surroundings, compiled using <i>Checklist Man 1 Part 2</i> .	1
Default Cases	
None	

Information Required to Demonstrate Compliance

Schedule of Evidence Required	
To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
<p>Text* confirming that a Home User Guide will be:</p> <ol style="list-style-type: none"> supplied to all dwellings within the development. be developed to the required standards (as a minimum including a list of contents showing that the guide will cover all of the issues required in <i>Checklist Man 1 – Home User Guide</i>). 	<ol style="list-style-type: none"> Confirmation that the Home User Guide has been supplied to all home/s. A final copy of the Home User Guide covering all the issues required in <i>Checklist – Home User Guide</i>. The Guide should also contain a statement confirming that it will be available in an alternative format upon the request of the first home occupier.

Design Stage	Post Construction Stage
<p>3. available in an alternative format upon request by the first home occupier.</p> <p>* specification clause or a letter from the developer to the Code assessor confirming the specific undertaking.</p>	

Relevant Definitions

Non-Technical Tenant/ Occupier The home user with limited or no knowledge of the technical and running issues associated with their home. As such, all information provided should be simple to follow and understand.

Alternative Formats For the purpose of this assessment, alternative formats are considered to be Braille, large print or audio cassette/CD.

Home Information Packs (HIP) From June 2007, anyone selling a property must provide potential buyers with a Home Information Pack. Every Pack will include an Energy Performance Certificate (EPC). Packs will also include information such as searches and other legal documents. A Home Condition Report can also be included in the Packs on a voluntary basis. The Home User Guide is provided in addition to the HIP.

Energy Performance Certificate (EPC) This states a home's performance rating. It is calculated using the UK Standard Assessment Procedure (SAP) for dwellings which gives an energy efficiency rating based on fuel costs and an environmental impact rating based on carbon dioxide (CO₂) emissions.

Home Condition Report (HCR) This contains information about the physical condition of the property on which sellers, buyers and lenders will be able to rely legally as an objective and authoritative report.

Assessment Methodology

Design Stage

1. Check that confirmation has been provided that the guide assembled with the Checklist will be supplied to all homes.
2. Check whether additional local information from the Checklist will also be provided.

Post Construction Stage

1. Check that a Home User Guide conforming to Checklists Parts 1 and 2 has been provided

Calculation Procedures

None.

Checklists and Tables

Checklist – Home User Guide: Part 1 – Operational Issues

The list below indicates the type of information that should be included.

a. Environmental strategy/ design and features

- Details of any specific environmental/energy design strategy/features including an overview of the reasons for their use (e.g. environmental and economic savings) and how they should best be operated (where they are not passive features such as insulation). Strategies/ features could include passive solar design, super insulation, energy efficient timber windows, heat recovery systems, solar hot water systems, photovoltaics, passive vents or the use of certified timber. (Each dwelling will in any case be issued with a copy of the Code Certificate)

b. Energy

- Information as described in the Building Regulations ADL1a (requirement note c) i.e. Sufficient information about the building, the fixed building services and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable in the circumstances.
 - A way of complying would be to provide suitable set of operating and maintenance instructions aimed at achieving economy in the use of fuel and power in a way that householders can understand. The instructions should be directly related to the particular system(s) installed in the dwelling.
 - The Instructions should explain to the occupier how to operate the system(s) efficiently. These should include: the making of seasonal adjustments to control settings and what routine maintenance is needed to enable operating efficiency to be maintained at a reasonable level through the service live(s) of the system(s).
- Details of any renewable system(s) and how it/ they operate(s).
- Details of low energy light fittings, their use and their benefits, e.g. how much energy they save compared to traditional light fittings and what this can mean in terms of reduced energy bills.
- General information on energy efficiency

c. Water Use

- Details of water saving measures and tips
- External water use and efficiency, e.g. the use of water butts or other type of rain water recycling systems.

d. Recycling and Waste

- Information on the location and use of any recycling bins.

- Information on the location and use of any compost bins.
- Information about the Local Authority collection scheme (if applicable).
- If the home is not covered by a Local Authority collection scheme, details and location of communal recycling bins/ skips/ facilities.

e. Sustainable DIY

- Environmental recommendations for consideration in any home improvement works, such as the use of low VOC products or the purchase of certified timber.

f. Emergency Information

- Information on smoke detector(s)

g. Links, References and Further Information

- Include references/ links to other information including websites, publications and organisations providing information on how to run the home efficiently and in the best environmentally sound way. As a minimum, this should include links to:
 - The Energy Saving Trust good practice guidance (*www.est.org.uk/myhome*)
 - The Local Authority
 - The company responsible for the construction of the property
 - The company responsible for the management of the home (where applicable)
- In all instances both an address/ telephone contact number and a web link will need to be provided.

h. Provision of Information in Alternative Formats

- Include details of the procedure for obtaining a copy of the guide in alternative formats. This should include the contact details of the person/ organisation responsible for producing the guide.

Checklist – Home User Guide: Part 2 – Site and Surroundings

a. Recycling and Waste

- Information on what to do with waste not covered by the standard weekly Local Authority collection scheme for example fridges/ freezers, computer equipment, batteries and other potentially hazardous equipment. In some areas the Local Authority will collect these items. If this is the case details and information of such a collection.

1. Information and location of local recycling facilities and waste tips.

b. Public Transport

- Details of local public transport facilities including maps and timetables and the location of nearby bus stops and/ or train/tube stations.
- Details of cycle storage and cycle paths in the area including, if available, cycle path network maps for the whole town/ local area.

- Details of car parking and information on available park and ride, car sharing schemes and/ or car pools/ car hire in the area.
- Details on how to get to local amenities in the area by public transport or cycling

c. Local amenities

- The location of food shops, post boxes, postal facilities, bank/cash points, pharmacies, schools, medical centres, leisure centres, community centres, places of worship, public houses, children's play areas, outdoor open access public areas.

AND

- other local amenities such as places of interest/ cultural value, areas of beauty/ wildlife/ conservation, allotments etc.

d. Responsible Purchasing

- Include information about the purchasing of
- Low energy/ low water White goods
- Electrical equipment, including light fittings and bulbs
- Timber products from sustainable sources
- Organic food procurement/ food growing/ local produce/ local food provision, e.g. farmers markets, organic box schemes etc

e. Emergency Information

- Contact details for emergency services including:
- location of local minor injuries clinics and A&E departments
- location of nearest police/ fire station

f. Links, References and Further Information.

- This should include references/ links to other information including websites, publications and organisations providing information on how to reduce the environmental impact in terms of transport, the use of local amenities, responsible purchasing etc. Such links/ references may include links to:
 - Sustrans (for cycle networks, www.sustrans.org.uk)
 - the local authority (including information about recycling and waste tips)
 - local transport providers (e.g. bus or train companies)
 - local amenities
- In all instances both an address/ telephone contact number and a web link will need to be provided.

Common Cases of Non Compliance

None.

Special Cases

None.

Background

The Building Regulations Part L1A requires on handover the provision of information on the operation and maintenance of the heating and hot water systems and any mechanical ventilation and/or cooling system. The aim is that this information will eventually form part of the Home Information Pack.

The Code for Sustainable Homes additionally requires a 'Home User Guide' that contains the necessary details about the everyday use of the home 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 home may be used inappropriately, leading to the dissatisfaction of occupants and the waste of resources.

References and Further Information

UK Building Regulations Part L1a (2006) Section 3: Criterion 5 – Operating and Maintenance Instructions

www.planningportal.gov.uk/uploads/br/BR_PDF_AD11A_2006.pdf

Home Information Pack (HIP)

www.homeinformationpacks.gov.uk

Home Condition Report (HCR)

www.homeinformationpacks.gov.uk

Energy Performance Certificate (EPC)

www.communities.gov.uk

Energy Saving Trust

www.est.org.uk/myhome

UK water companies

www.water.org.uk

WRAP – The Waste and Resource Action Plan

www.wrap.org.uk

Recycle now

www.recyclenow.com

Local authority websites/ information through:
www.direct.gov.uk/D11/Directories/LocalCouncils
www.outwood.com/localgov
www.info4local.gov.uk

General Travel Information
www.traveline.org.uk

Sustrans
www.sustrans.org.uk

Rail Information/ Enquiries
www.nationalrail.co.uk

Coach Information/ Enquiries
www.nationalexpress.co.uk

Issue ID	Description	No. of credits available	Mandatory Elements
Man 2	Considerate Constructors Scheme	2	No

Aim

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

Assessment Criteria

Credits are awarded where there is a commitment to comply with best practice site management principles as follows:

Criteria	
	Credits
Where there is a regular audit under a nationally or locally recognised independent certification scheme such as certification under the Considerate Constructors Scheme.	1
Where the commitments is to go significantly beyond best practice including a regular audit under a nationally or locally recognised independent certification scheme such as, or comparable to the Considerate Constructors Scheme and a CCS score above 32.	2
Default Cases	
None.	

Information Required to Demonstrate Compliance

Schedule of Evidence Required	
To be read in conjunction with the relevant definitions and calculations section below.	
Design Stage	Post Construction Stage
<p>Text * confirming a commitment from the contractor, or on the contractor (if not yet appointed) to comply with:</p> <ol style="list-style-type: none"> The Considerate Constructors Scheme and achieve formal certification under the scheme and a pass score. <p>OR</p> <ol style="list-style-type: none"> An equivalent local or nationally recognised independent scheme and achieve formal certification under the scheme 	<p>As design stage AND</p> <p>For Considerate Constructors:</p> <p>A copy of the Considerate Constructors Certificate AND the Considerate Constructors Monitors report highlighting the total score and the sub scores in each section</p>

Design Stage	Post Construction Stage
<p>Where an alternative scheme is used, the independent scheme assessor should complete <i>Checklist – Compliance with an Alternative Scheme. Available from BRE</i></p> <p>NOTE: Assessor should seek confirmation from BRE that an alternative scheme is acceptable prior to formal submission of an assessment</p> <p>* specification clause, a letter of instruction from the developer to a contractor or a formal letter from the contractor to the developer and/or the Code assessor giving the specific undertaking.</p>	<p>For an alternative scheme:</p> <p>A copy of the alternative scheme’s Certificate of Compliance or equivalent documentary evidence (from an independent third party assessor) confirming that all the mandatory elements items plus 50 or 80% (as applicable) respectively of the optional items have been achieved.</p>

Relevant Definitions

Considerate Constructors Scheme (CCS)

The Considerate Constructors Scheme is a UK certification scheme that encourages the considerate management of construction sites. The scheme is operated by the Construction Confederation and points are awarded in increments of 0.5 over the following eight sections:

- Considerate
- Environmentally Aware
- Site Cleanliness
- Good Neighbour
- Respectful
- Safe
- Responsible
- Accountable

To achieve certification under this scheme a score of at least 24 is required

Alternative scheme

The use of an alternative scheme may demonstrate compliance by fulfilling the criteria stated in *Checklist – Alternative Scheme. Available from BRE. Any such scheme must be approved by BRE prior to assessment. This can be achieved by submitting a completed checklist.*

Best practice

Achieving a score of at least 3 in every section, and a total score between 24 and 31.5, of the Considerate Constructors Scheme’s Code of Considerate Practice indicates that a site is being managed in accordance with best practice.

Alternative schemes demonstrate this where in addition to meeting all the mandatory requirements, 50% of the optional items in *Checklist Man 2 – Compliance with an Alternative Scheme* are addressed.

Significantly beyond best practice

BRE consider that achieving a total score of between 32 and 40 of the Considerate Constructors Scheme's Code of Considerate Practice indicates that a site is being managed significantly beyond best practice.

Alternative schemes demonstrate this where in addition to meeting all the mandatory requirements, 80% of the optional items in *Checklist Man 2 – Compliance with an Alternative Scheme* are addressed.

Assessment Methodology

Design Stage

1. Confirm contractor's commitment as above.
2. Where the site is being assessed using an alternative scheme, the details of the alternate scheme should be checked to confirm that it covers equivalent items by completing *Checklist Man 2 – Compliance with an Alternative Scheme* under *Checklists and Tables* (available from BRE). This checklist sets out a number of mandatory items and a wider range of issues equivalent to those in the Considerate Constructors Scheme. In addition to the mandatory issues, 50% of these issues must be achieved to be equivalent to certification under the CCS and 80% must be achieved for best practice.

Post Construction Stage

1. Where the site has been assessed using the Considerate Constructors Scheme, confirm that certification of compliance has been issued and check the final score on the monitor's report.
2. Where the site has been assessed using an alternative scheme, confirm that all the mandatory items and 50 (or 80%) of the optional items (as applicable) have been achieved, using the information given by the third party certifier of the alternative scheme and comparing it to the items in *checklist Man 2 – Compliance with an Alternative Scheme*.

Calculation Procedures

There are no calculations required for this Issue.

Checklists and Tables

Checklist – Compliance with an Alternative Scheme

Available from BRE on request.

Issue ID	Description	No. of credits available	Mandatory Elements
Man 3	Construction Site impacts	2	No

Aim

To recognise and encourage construction sites managed in a manner that mitigates environmental impacts.

Assessment Criteria

Credits are awarded where there is a commitment and strategy to operate site management procedures on site as follows:

Criteria	Credits
Procedures that cover 2 or more of the following items: a. Monitor, report and set targets for CO ₂ production or energy use arising from site activities; b. Monitor and report CO ₂ or energy use arising from commercial transport to and from site; c. Monitor, report and set targets for water consumption from site activities; d. Adopt best practice policies in respect of air (dust) pollution arising from site activities; e. Adopt best practice policies in respect of water (ground and surface) pollution occurring on the site; f. 80% of site timber is reclaimed, reused or responsibly sourced.	1
Where there are procedures that covers 4 or more of the items listed above.	2
Default Cases	
None	

Information required to Demonstrate Compliance

Schedule of Evidence Required To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
Text* confirming: 1. A commitment to meet the specific requirements of each item (to be achieved) in <i>Checklist – Construction Site Impacts</i> 2. Details of how each requirement will be met. * specification clause, a letter of instruction to a contractor or a formal letter from the developer to the Code assessor giving the specific undertaking.	As design stage AND Formal company/organisational/ site documentation (from the developer or contractor) confirming: 1. The name or job title of the individual/ stakeholder having responsibility for ensuring compliance with each requirement. 2. That all the specific requirements of <i>Checklist – Construction Site Impacts</i>

Design Stage	Post Construction Stage
	<p>have been adhered to (for the different items as appropriate). This should include evidence such as (as applicable):</p> <ol style="list-style-type: none"> a. Measurement/ consumption records b. Target records c. Graphs comparing consumption with targets d. Delivery records e. Site procedures for minimising air/ dust and water pollution. f. CoC certificates for site timber/ purchase orders confirming reused/ reclaimed timber

Relevant Definitions

None.

Assessment Methodology

Design Stage

1. Check that there is a firm commitment to adhere to *Checklist – Construction Site Impacts* under *Checklists and Tables*.
2. Where at least two items fully meet the checklist criteria, award one credit; where at least four items fully meet the checklist criteria, award two credits.

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction. Where changes have occurred the assessor should reassess the Issue as set out above.
2. Verify that specific Post Construction evidence provided demonstrates that all the Assessment Criteria have been met.

Calculation Procedures

There are no calculations required for this Issue.

Checklists and Tables

Checklist – Construction Site Impacts

Commitment to monitor, report and set targets for CO₂ production or energy use arising from site activities

1. Confirmation is required that monthly measurements of energy use will be recorded and displayed on site.
2. Appropriate target levels of energy consumption must be set and displayed (targets could be annual, monthly, or project targets).
3. As a minimum monitoring must 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.
4. The design/site management team is to nominate an individual who will be responsible for the monitoring and collection of data.

Note:

Targets for energy consumption during the construction process can be set using DTT's Environmental KPI benchmarks. These documents do not specify targets but facilitate projects in setting appropriate targets (see references section of main credit for further details).

5. The Code does not require targets to be met but is encouraging the process of setting, monitoring and reporting against targets.
6. Appropriate target levels of energy consumption must be set and displayed (targets could

Commitment to monitor and report CO₂ or energy arising from commercial transport to and from the site

1. Confirmation is required that a site monitoring system will be in place to monitor and record deliveries. This system will need to record:
 - The number of deliveries,
 - The mode of transport,
 - The kilometres/miles travelled for all deliveries.
 - 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.
2. This information can then be used to estimate a total figure for kg of CO₂ for the project. The Code 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.

3. If the design team or contractor confirms that the project is aiming to achieve the “Construction Site Transport” ‘measures for traffic movements and distances’ (published April 2003, see references) then this aspect has been achieved automatically. The information obtained for this item can also be used to satisfy the DTT’s Environmental KPI on transport.
4. The design/site management team is to nominate an individual who will be responsible for the monitoring and collection of data.

Note:

Please see *Tables 1–4* below on monitoring site transport CO₂

Commitment to monitor, report and set targets for water consumption arising from site activities

1. Compliance is demonstrated by the design / site management team confirming, in writing, that monthly measurements of water consumption will be recorded and displayed on site.
2. Appropriate target levels of water consumption must be set and displayed (targets could be annual, monthly or project targets).
3. As a minimum monitoring must 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.
4. The design/site management team is to nominate an individual who will be responsible for the monitoring and collection of data.

Note:

5. Targets for water consumption during the construction process can be set using DTT’s Environmental KPI benchmarks. These documents do not specify targets but facilitate projects in setting appropriate targets (see *References and Further Information* for details).

The Code does not require targets to be met but is encouraging the process of setting, monitoring and reporting targets.

Commitment to adopt best practice policies in respect of air (dust) pollution arising from site activities

1. Confirmation is required of the site’s procedures to minimise air / dust pollution. This can include
 - ‘dust sheets’,

- regular proposals to damp down the site in dry weather,
 - covers to skips etc.
2. The site team must indicate how this information is disseminated to site operatives.

Note:

DTI/BRE publications ‘Control of Dust from Construction and Demolition Activities’ and Pollution Control Guide Parts 1–5 provide good practice guidelines on construction related pollution (see *References and Further Information* for details).

Commitment to adopt best practice policies in respect of water (ground and surface) pollution occurring on the site

1. Confirmation is required of the site’s procedures to minimise water pollution following best practice guidelines outlined in the following documents.
- 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

The site team must also indicate how this information is disseminated to site operatives.

80% of site timber is reclaimed, reused or responsibly sourced

1. 80% of timber used during construction, including formwork, site hoardings and other temporary site timber used for the purpose of facilitating construction, is to be procured from sustainably managed sources, independently certified by one of the top two levels as set out in the Responsible Sourcing of Materials Issues (Mat 2 and Mat 3) in the Materials section.
2. Re-used timber from off site can be counted as equivalent but reusable formwork only complies if it meets the above criteria.

This credit can be awarded where all the timber used is reclaimed timber

Tables 1–4: Assessor Information for Monitoring on Site Transport CO₂

Table 1: Standard road transport fuel conversion factors					
Fuel used	Total units used	Units	x	kg CO ₂ per unit	Total kg CO ₂
Petrol		litres	×	2.30	
Diesel (inc. low sulphur)		litres	×	2.63	
Compressed Natural Gas		kg	×	2.65	
Liquid Petroleum Gas		litres	×	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 2: 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 Petrol Car Max. 1.4 litre engine.		miles	×	0.26	
		km	×	0.16	
Medium Petrol Car Max. 1.4–2.1 litre engine.		miles	×	0.30	
		km	×	0.19	
Large petrol car above 2.1 litres		miles	×	0.35	
		km	×	0.22	
Average Petrol Car		miles	×	0.29	
		km	×	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 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 and under		miles	×	0.26	
		km	×	0.16	
Large diesel car over 2.0 litres Petrol Car Max. 1.4–2.1 litre engine.		miles	×	0.31	
		km	×	0.19	
Average Diesel Car		miles	×	0.27	
		km	×	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 4: Freight road mileage Conversion Factors							
Type of lorry	Total km travelled	X	Litres fuel per km	x	Fuel conversion factor	Total kg CO ₂	Type of lorry
Articulated		X	0.35	×	Petrol	2.30	
				×	Diesel	2.63	
				×	LPG	1.49	
Rigid		X	0.40	×	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.

Common Cases of Non Compliance

None.

Special Cases

None.

Background

Construction sites are responsible for significant impacts, especially at a local level. These arise from disturbance, pollution and waste. Impacts such as energy and water use are also significant (although minor in relation to the overall impacts of the building).

Pollution

Construction has the potential for major pollution, largely through pollution to air (through dust emission), and to water (via watercourses and ground water). BRE publishes guidance on construction site dust management, whilst the Environment Agency publishes guidance on water pollution control measures. There are significant statutory requirements in this area under environmental health legislation and the Environmental Protection Act. The Environment Agency and local Environmental Health Officers police these issues.

Energy

Energy management on site has been a key focus for the Construction Confederation, and they have published specific guidance (referenced below) to help achieve this. 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 under the Code to promote the process of setting, monitoring and achieving targets. However, the Code does not set targets, as these are project specific. For guidance on setting targets refer to DTI's Construction Industry KPI Pack, this series of documents guides the reader through how to set targets for their own projects.

References and Further Information

Sustainability Action Plan (or Achieving Sustainability in Construction Procurement);
Government Construction Client's Panel (GCCP), Office of Government Commerce (OGC)

DTI Construction Industry KPI Pack, includes Methods of Measurement, Handbook, KPI Wall Chart, 2006

www.kpizone.com

“Construction Site Transport”, April 2003. *Measures for traffic movements and distances*, BRE and DTI.

www.bre.co.uk/pdf/constructiontraffic.pdf

Guidelines for Company Reporting on Greenhouse Gas Emissions, Annex 6 Transport conversion tables, DEFRA 2002, annexes updated July 2005.

www.defra.gov.uk/environment/business/envrp/gas/envrpgas-annexes.pdf

COPERT II Computer programme to Calculate Emissions from Road Transport – Methodology and Emissions Factors. Technical report No 6, 1999.

<http://reports.eea.eu.int/TEC06/en>

Good Practice Guide (GPG) 273 – Computerised Routing and Scheduling for Efficient Logistics

NERA Report on lorry track and environmental costs – DETR 1999

<http://www.dft.gov.uk>

PPG 1 – *General guide to the prevention of pollution*. Environment Agency

PPG 5 – *Works in, near or liable to affect watercourses*. Environment Agency (update due Spring 2007)

PPG 6 – *Working at demolition and construction sites*. Environment Agency (update due Spring 2007)

Control of Dust from Construction and Demolition Activities; BRE (Feb 2003)

Pollution Control Guide Parts 1–5; BRE (2003)

The Carbon Trust

www.thecarbontrust.co.uk/energy

Issue ID	Description	No. of credits available	Mandatory Elements
Man 4	Security	2	No

Aim

To encourage the design of developments where people feel safe and secure; where crime and disorder, or the fear of crime, does not undermine quality of life or community cohesion.

Assessment Criteria

Credits are achieved by complying with Section 2 – Physical Security from ‘*Secured by Design – New Homes*’, as follows:

Criteria	
	Credits
Where an Architectural Liaison Officer (ALO) or Crime Prevention Design Advisor (CPDA) from the local police force is consulted at the design stage and their recommendations are incorporated into the design of the dwelling (an actual <i>Secured by Design</i> Certificate is not required).	2
Default Cases	
None	

Information Required to Demonstrate Compliance

Schedule of Evidence Required	
To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
<p>Text* confirming :</p> <ol style="list-style-type: none"> 1. That an ALO/CPDA has been appointed to provide advice EARLY in the design stage to ensure that the requirements of <i>Section 2 – Physical Security</i> of <i>Secured by Design – New Homes</i> are met. 2. That the advice of the ALO/CPDA will be followed. 3. Location and details of all recommended/ specified security features such as external lighting, door/ window locks etc. and their third party certification levels (if applicable). <p>* specification clause, a letter of instruction to a contractor or a formal letter from the developer to the Code assessor giving the specific undertaking.</p>	<p>Confirmation from the ALO/CPDA that all of their recommendations have been incorporated in the design, and that the site meets the standards required in <i>Section 2 – Physical Security</i> of <i>Secured by Design – New Homes</i>.</p> <p>Although not required by this credit, where ‘<i>Secured by Design</i>’ certificate has been issued, this will be deemed to satisfy.</p>

Relevant Definitions

Secured by Design (SBD) This is a police initiative to encourage the building industry to adopt crime prevention measures in the design of developments to assist in reducing the opportunity for and fear of crime, creating a safer and more secure environment. *Secured by Design* is owned by the *Association of Chief Police Officers (ACPO)* and has the support of the Home Office Crime Reduction & Community Safety Group and the Planning Section of Communities and Local Government.

SBD Section 2 – Physical Security To be awarded a Secured by Design award, the ALO/CPDA must be satisfied that the criteria of both Section 1 – *The Development – Layout & Design*, and Section 2 – *Physical Security* are met. The requirements of Section 1 are beyond the remit of the Code and for this issue, only the requirements of Section 2 must be met.

Assessment Methodology

Design Stage

Check that an ALO/CPDA has been appointed and that the developer confirms their advice will be followed

Post Construction Stage

Check that the letter from the ALO/CPDA confirms compliance with *Secured by Design* Section 2 (i.e. the development is *SBD-Part Compliant*) or the developer has been awarded a SBD certificate which indicates compliance with both Sections 1 and 2 of *Secured by Design*.

Calculation Procedures

None.

Checklists and Tables

None.

Common Cases of Non Compliance

None.

Special Cases

None.

Background

“Safety and security are essential to successful, sustainable communities. Not only are such places well-designed, attractive environments to live and work in, but they are also places where freedom from crime, and from the fear of crime, improves the quality of life.

Sustainable communities are communities which succeed now, economically, socially and environmentally, and respect the needs of future generations. They are well-designed places where people feel safe and secure; where crime and disorder, or the fear of crime, doesn't undermine quality of life or community cohesion.”

(from *Safer Places – The Planning System & Crime Prevention*, ODPM)

'Secured by Design' is a free certification scheme run by the police, who provide an Architectural Liaison Officer to give advice to a developer.

The *'Secured by Design'* award does not signify that premises are crime proof, but that they have been subjected to a minimum standard of security that, in the experience of the police service and other agencies, can significantly reduce the risk of crime. Local conditions may require additional or alternative measures.

References and Further Information

Secured by Design

www.securedbydesign.com

Secured by Design – New Homes Guidance

www.securedbydesign.com/pdfs/sbd_new_homes.pdf

Safer Places – The Planning System & Crime Prevention, ODPM

www.communities.gov.uk

Guide to Security Standards for Doors and Windows (May 2002) prepared with the support of LPCB, Secured by Design and BSIA, and is available from www.securedbydesign.com/pdfs/standards_doors_2002.pdf

BS 7950:1997 *Specification for enhanced security performance of windows for domestic applications.*

PAS 24-1:1999 *Enhanced security performance requirements for door assemblies. Single and double leaf, hinged external door assemblies to dwellings.*

British Standards Online (PAS24-1 and BS7950)

www.bsonline.bsi-global.com/server/index.jsp

Category 9 Ecology

Issue ID	Description	No. of credits available	Mandatory Elements
Eco 1	Ecological Value of Site	1	–

Aim

To encourage development on land that already has a limited value to wildlife, and discourage the development of ecologically valuable sites.

Assessment Criteria

Credits are awarded where the site is defined as land of inherently low ecological value in accordance with the following criteria:

Criteria	Credits
<p>Where the <i>development site</i> is confirmed as land of inherently <i>low ecological value</i></p> <p>EITHER</p> <ul style="list-style-type: none"> ● By meeting the criteria for <i>low ecological value</i> (using <i>Checklist Eco 1 – Land of Low Ecological Value</i> under <i>Checklists and Tables</i> below) <p>OR</p> <ul style="list-style-type: none"> ● By being confirmed by a <i>Suitably Qualified Ecologist</i>. <p>OR</p> <ul style="list-style-type: none"> ● Where an independent ecological report of the site, prepared by a <i>Suitably Qualified Ecologist</i>, states that: <ul style="list-style-type: none"> – The <i>construction zone</i> is of low or insignificant ecological value <p>AND</p> <ul style="list-style-type: none"> – Any land of ecological value outside the <i>construction zone</i> but within the <i>development site</i> will remain undisturbed by the construction works. 	1
<p>Default Cases</p> <p>None.</p>	

Information required to demonstrate compliance

Schedule of Evidence Required To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
<p>Where using the checklist:</p> <p>Plans of the site and surrounding area prior to development, identifying any features, both built and ecological.</p> <p>AND</p> <p>Site visit report from the design team/ assessor confirming details adequate to meet <i>Checklist Eco 1</i> (including photographs).</p> <p>Where a Suitably Qualified Ecologist is appointed:</p> <p>A copy of the ecologists report or a detailed letter, confirming that:</p> <ul style="list-style-type: none"> • the ecologist meets the requirements of a <i>Suitably Qualified Ecologist</i>; • the <i>construction zone</i> is of <i>low ecological value</i>; • all land outside the <i>construction zone</i> will remain undisturbed by the construction works in areas of ecological value. <p>AND</p> <p>Text describing (on drawings or in the specification*) or illustrations identifying the <i>construction zone</i> and how any areas of ecological value outside the <i>construction zone</i> will remain undisturbed in accordance with the ecologists recommendations.</p> <p>* or a letter of instruction to a contractor/ supplier or a formal letter from the developer to the Code assessor giving the specific undertaking.</p>	<p>1. Confirmation (where relevant) that any land of ecological value outside the <i>construction zone</i> was adequately protected during construction works including:</p> <ul style="list-style-type: none"> • as built site plans identifying features present • assessor site visit report

Relevant Definitions

Development Site	The <i>development</i> site is the whole site up to and including the boundary.
Construction Zone	The <i>construction zone</i> includes any land used for buildings, hard standing, landscaping, site access and any land where construction work is carried out (or land is being disturbed in any other way), 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, temporary storage and buildings will be located it must be assumed that the <i>construction zone</i> is the <i>development site</i> .
Low Ecological Value	Land defined as having low ecological value using <i>Checklist Eco 1 – Land of Low Ecological Value</i> found in <i>Checklists and Tables</i> below OR defined by a <i>Suitably Qualified Ecologist</i> to have low or insignificant ecological value.
Suitably Qualified Ecologist	<p>A <i>Suitably Qualified Ecologist</i> is defined as an individual that:</p> <ul style="list-style-type: none">• Holds a degree or equivalent qualification (e.g. N/SVQ level 5) in ecology or a related subject.• 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. Examples of relevant experience are: ecological impact assessments; Phase 1 and 2 habitat surveys; and habitat restoration.• Is covered by a professional code of conduct and subject to <i>peer-review</i>. <p><i>Peer review</i> is defined as the process employed by a professional body to demonstrate that potential or current full members maintain a standard of knowledge and experience required to ensure compliance with a code of conduct and professional ethics.</p> <p>Full members of the following organisations, who meet the above requirements are deemed to be <i>Suitably Qualified Ecologists</i>:</p> <ul style="list-style-type: none">• Association of Wildlife Trust Consultancies (AWTC)• Chartered Institution of Water and Environmental Management (CIWEM)• Institute of Ecology and Environmental Management (IEEM)

- Institute of Environmental Management and Assessment (IEMA)
- Landscape Institute (LI)

Ecological Features

Ecological Features are defined in *Checklist Eco 1 – Land of Low Ecological Value*, found in *Checklists and Tables* below and include trees, hedges, ponds, streams, rivers, marshes, wetlands, meadows, species rich grassland, heathland and heather.

Assessment Methodology

1. Where using *Checklist Eco 1 – Land of Low Ecological Value*, verify that the answer to all questions in *Section 1* is 'No' and that 'Yes' has been answered to at least one question in *Section 2*.
2. Where a *Suitably Qualified Ecologist* has been appointed, confirm that the ecologist's report verifies that the *construction zone* is of low or insignificant value and that any land of ecological value outside of the *construction zone* will remain undisturbed by the construction works. Confirmation must also be provided that the ecologist meets the definition of a *Suitably Qualified Ecologist*, as defined above.

Calculation Procedures

There are no calculations required for this Issue.

Checklists and Tables

Eco 1 – 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 site. If YES is recorded against any question in Section 1 then the site cannot be defined as having <i>land of low ecological value</i> and the credit cannot be awarded. If NO is recorded 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, consisting of heather and/or scrub present on site?	YES <input type="checkbox"/>	NO <input type="checkbox"/>

Section 2: Type of land to be used for the new buildings, hardstanding, landscaping or for site access¹

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, the *development site* can be defined as having *land of low ecological value* and the credit can be awarded. (The assessor **MUST** check that these agree with the site drawings.)

- | | | | |
|-----|---|------------------------------|-----------------------------|
| 2.1 | Does the <i>development site</i> consist of land which is entirely within the floor plan(s) 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>development site</i> consist of land which is entirely covered by other constructions such as sporting 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>development site</i> consist of land which is contaminated by industrial or other waste to the extent that it would need decontamination before building? | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| 2.4 | Does the <i>development site</i> consist of land which is a mixture of either existing building, hard surfaces and/or contaminated land? | YES <input type="checkbox"/> | NO <input type="checkbox"/> |
| 2.5 | Does 80% of the land within the <i>development site</i> comply with statements 2.1, 2.2 or 2.3 and the remaining 20% of the ground area of the building extend into land which has been either; Used for single-crop arable farming for at least 5 years, OR
Consists of regularly cut lawns and sports fields | YES <input type="checkbox"/> | NO <input type="checkbox"/> |

Common Cases of Non Compliance

Where there are existing features of ecological value within the *construction zone* then this credit cannot be achieved.

A site that consists of buildings, hard surfaces, car parking or other such construction which has been derelict for more than two years cannot achieve the credit unless it can be verified by a *Suitably Qualified Ecologist* that the site is of low or insignificant ecological value.

Special Cases

None.

¹ Including any other land where construction work is carried out (or land being disturbed in any way) plus a 3m boundary in either direction around these areas.

Background

Wherever possible there is a benefit in development being restricted to land that already has a limited value to wildlife. The ecological value of a site is affected by previous uses and the presence of ecological features such as trees, hedges, watercourses, wetlands, meadows, etc. Therefore, the reuse of existing sites will help to slow down the destruction of natural habitats and the wildlife they support, as well as preventing loss of land used for agriculture, parkland, etc.

Wherever homes are constructed, there is always a risk that however environmentally benign the building or development itself is, it may present a threat to local ecology or areas of natural beauty. The principle here is to minimise the damage to existing local ecology and then, where possible, to enhance it.

Damage can be minimised either by selecting a site of low ecological value or by developing a site in a way that protects the most important ecological features. House building need not reduce the ecological value of the site; it may enhance it in many cases. There will always be some temporary disturbance to the local ecology, but wildlife will return once construction is complete, provided an appropriate habitat is provided.

Whilst it may be an attractive option to build on and revitalise a previously derelict site, care must be exercised if it has been derelict for some time. The site may be inhabited by rare, protected or locally important species and, therefore have high, but hidden ecological value.

References and Further Information

Association of Wildlife Trust Consultancies (AWTC) – Please contact the current chairman of the Association who will provide details of your local advisor.
www.awtc.co.uk/contact.htm

Chartered Institution of Water and Environmental Management (CIWEM) – 15 John Street, London, WC1N 2EB. Tel: 020 78313110 Fax: 020 74054967 admin@ciwem.org www.ciwem.org

The Institute of Ecology and Environmental Management (IEEM) – 45 Southgate Street, Winchester, Hampshire SO23 9EH.
www.ieem.co.uk

Institute of Environmental Management and Assessment (IEMA) – St Nicholas House, 70 Newport, Lincoln, LN1 3DP. Tel 01522 540069. Fax 01522 540090. E-mail info@iema.net
www.iema.net.

The landscape Institute (LI) – The Chartered Institute of the UK for Landscape Architects, 33 Great Portland Street, W1W 8QG
www.l-i.org.uk

Department of the Environment, Transport and the Regions. *Digest of Environmental Statistics*, No 19, Vol 2.

British Standard BS5837: 2005 'Trees in relation to Construction'
www.bsi-global.com

The Hedgerows Regulations 1997. London: Office of Public Sector Information (formerly The Stationery Office)

RSPB Good Practice Guide for Prospective Developments – Available from the RSPB.
www.rspb.org.uk

Environmental Good Practice on Site (CIRIA C502)
Environmental Good Practice – Working on Site (CIRIA C503)
Working with Wildlife Site Guide (CIRIA C567)
www.ciria.org.uk

The Environment Agency
www.environment-agency.gov.uk

The Local Biodiversity Action Plan
www.ukbap.org.uk

Issue ID	Description	No. of credits available	Mandatory Elements
Eco 2	Ecological Enhancement	1	–

Aim

To enhance the ecological value of a site.

Assessment Criteria

Where there is a commitment to enhance the ecological value of the development site in accordance with the following criteria:

Criteria	
	Credits
Where a <i>Suitably Qualified Ecologist</i> has been appointed to recommend appropriate ecological features that will positively enhance the ecology of the site. AND Where the developer adopts all key recommendations and 30% of additional recommendations.	1
Default Cases	
None	

Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
<p>A copy of the ecologists report which:</p> <ul style="list-style-type: none"> clearly outlines the key and additional recommendations; confirms that the ecologist meets the requirements set out in the definition of a <i>Suitably Qualified Ecologist</i>; confirms that the ecologist made a site visit prior to the commencement of initial site preparation works; and This should be supplied in the format outlined in BRE's 'Code for Sustainable Homes Ecology Report Template' available from BRE. 	<p>Confirmation that what was agreed at design stage has been implemented:</p> <ul style="list-style-type: none"> Plans showing both proposed and implemented recommendations <p>OR</p> <ul style="list-style-type: none"> Purchase orders and/or photographic evidence of completed features <p>OR</p> <ul style="list-style-type: none"> Assessor site visit report confirming that the recommendations have been implemented (including photographic evidence).

Design Stage	Post Construction Stage
<p>Text describing (on drawings and in the specification*) or illustrations showing:</p> <ul style="list-style-type: none"> • how the key recommendations and 30% of additional recommendations will be incorporated into the design; and • the planting schedule. <p>* or a letter of instruction to a contractor/ supplier or a formal letter from the developer to the EcoHomes assessor giving the specific undertaking.'</p>	

Relevant Definitions

Suitably Qualified Ecologist

As defined for *Eco1 – Ecological Value of Site*.

Recommendations

Recommendations are defined as measures adopted to enhance the ecology of the site, which may include:

- the planting of native species;
- 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 the avoiding clearance/ works at key times of the year (e.g. breeding seasons); or
- 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.

Assessment Methodology

Design Stage

1. The assessor must confirm that a Suitably Qualified Ecologist has been appointed to provide a report detailing key and additional recommendations for enhancing the ecology of the site and that:
 - a. the report has been prepared using BRE's 'Code for Sustainable Homes Ecology Report Template' available from BRE (2007);

- b. the ecologist meets all the requirements as stated in the definition of a *Suitably Qualified Ecologist*;
- c. the ecologist made a site visit prior to the commencement of initial site preparation works;
- d. recommendations are based on the existing site ecology, determined from the site visit;
- e. the site visit was made at appropriate times of year when plant and animal species were evident.

Where there has been no site visit prior to initial site preparation, this is only acceptable where *Eco1 – Ecological Value of the Site* has been achieved and evidence provided to achieve *Eco1* has been passed on to the Ecologist as a basis for the ecological report. This evidence must be in accordance with the information required to demonstrate compliance as detailed in *Eco1*.

Post Construction Stage

1. Verify that the details provided at the Design Stage are still valid and that no changes have occurred during construction. Where changes have occurred the assessor should re-assess the Issue as set out above.
2. Verify that specific Post Construction Stage evidence provided demonstrates that all the Assessment Criteria have been met.

Calculation Procedures

There are no calculations required for this Issue.

Checklists and Tables

There are no checklists or tables for this Issue.

Common Cases of Non Compliance

The credit cannot be achieved where the developer/client has confirmed a commitment to comply with all current EU and UK legislation relating to protected species and habitats applicable to the development site but no ecological enhancement is proposed.

Where enhancement has been made to an area/areas outside of the site boundary and unconnected to the site and no enhancement has been made within the site boundary, the credit cannot be awarded.

Where ecological features have been designed in to the development to enhance the ecology of the site but they are not recommendations from a *Suitably Qualified Ecologist*, the credit cannot be awarded.

Special Cases

None.

Background

In many cases it is possible to improve the ecological value of the site. However, this requires careful consideration of the existing and neighbouring features in addition to careful selection of plant species and habitats. This is an area of specialist expertise and requires input from experts at both site master planning and detailed design stages.

References and Further Information

Ecology in BREEAM and the Code – guidance for ecologists and assessors, 2007
www.breeam.org.uk/extranet

British Standard BS5837: 2005 ‘Trees in relation to Construction’
www.bsi-global.com

Environmental Good Practice on Site (CIRIA 502)
www.ciria.org.uk

Working with Wildlife Site Guide (CIRIA 502)
www.ciria.org.uk

Working with Wildlife Site Guide (CIRIA C567)
www.ciria.org.uk

The Environment Agency
www.environment-agency.gov.uk

Biodiversity By Design, TCPA (2004)

Grant G., *Green Roofs and Facades*, BRE (2006)

Issue ID	Description	No. of credits available	Mandatory Elements
Eco 3	Protection of Ecological Features	1	No

Aim

To protect existing ecological features from substantial damage during the clearing of the site and the completion of construction works.

Assessment Criteria

Where there is a commitment to maintain and adequately protect features of ecological value during site preparation and construction works in accordance with the following criteria:

Criteria	Credits
Where all existing features of ecological value on the development site potentially affected by the works, are maintained and adequately protected during site clearance, preparation and construction works.	1
<p>Default Cases</p> <p>The credit can be awarded by default where the site has been classified as having <i>low ecological value</i> in accordance with <i>Eco 1 – Ecological Value of the Site</i> and no features of ecological value have been identified.</p> <p>If a <i>Suitably Qualified Ecologist</i> has confirmed a feature can be removed due to insignificant ecological value or poor health/condition (e.g. diseased trees which require felling, either for health and safety and/or conservation reasons), the credit can be achieved provided all other features are adequately protected in accordance with the ecologist's recommendations.</p>	

Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
<ul style="list-style-type: none"> Site visit report from the design team including photographs confirming ecological features; AND Plans of the site and boundary identifying ecological features prior to construction; Written evidence of a requirement to remove for health and safety and/or conservation reasons from an appropriate statutory body 	<p>Where the site is complete, confirmation that what was agreed at design stage was implemented, including:</p> <ul style="list-style-type: none"> photographic evidence of features protected; OR a copy of the assessor's site visit report; <p>OR</p> <p>Where the whole site is not complete, evidence of protected measures in place such as:</p>

Design Stage	Post Construction Stage
<p>OR (if relevant)</p> <p>A copy of the ecologist's report confirming:</p> <ul style="list-style-type: none"> • That they meet the requirements of a <i>Suitably Qualified Ecologist</i> • The ecological features present • recommendations for protecting ecological features <p>AND (if relevant)</p> <p>Text describing (on drawings and in the specification*) or illustrations showing, how ecological features will be protected.</p> <p>* or a letter of instruction to a contractor/supplier or a formal letter from the developer to the Code assessor giving the specific undertaking.</p>	<p>1. photographic evidence of protective measures in place; OR</p> <p>2. a copy of the assessor's site visit report.</p>

Relevant Definitions

Suitably Qualified Ecologist

As defined for *Eco1 – Ecological Value of Site*.

Ecological Features

As defined for *Eco1 – Ecological Value of Site*.

Protection of trees

The provision of physical barriers to prevent damage to existing trees. This includes barriers to prohibit works or storage near the tree trunk (the distance between tree trunk and the protective barriers must be at least the distance of the branch spread or half the height of the tree – whichever is the greater). Trees should also be protected from direct impact and from severance or asphyxiation of the roots.

Protection of hedges and natural areas

The provision of physical barriers to prevent damage to existing hedges and natural areas. If such areas are remote from site works or storage, construction activity should be prevented in their vicinity.

Protection of watercourses and wetland areas

The provision of physical barriers (e.g. bunds and cut off ditches), and site drainage to ensure no site run off damages the local water courses. Specialist advice should be obtained from the Environment Agency, English Nature or specialist ecological consultants.

Assessment Methodology

Design Stage

1. Confirm that a report has been prepared on ecological features in accordance with the *Information Required to Demonstrate Compliance*, together with details of ecological protection to be carried out prior to the start of any preliminary construction or preparation works, (e.g. site clearance or the erection of temporary site facilities).
2. Where there are no ecological features to protect and the credit is being awarded by default, evidence provided must demonstrate this and that *Eco1 – Ecological Value of the Site* has also been awarded.
3. The assessor must check that the developer/client has confirmed compliance with all current EU and UK legislation relating to protected species and habitats applicable to the development site. This is in addition to the protection of ecological features as set out above.

Post Construction Stage

1. Confirm that the features identified at design stage have been successfully protected.

Calculation Procedures

None

Checklists and Tables

None.

Common Cases of Non Compliance

Credits cannot be awarded for the re-location of ecological features.

Where ecological features, (as defined above), have not been protected, points cannot be awarded, even where the developer/client has confirmed a commitment to comply with all current EU and UK legislation relating to protected species and habitats applicable to the development site.

Special Cases

None.

Background

Construction sites often contain existing ecological features that need to be protected from damage (both direct and indirect). Such damage can be caused by impacts, fires, pollution, soil compaction, changes in the water table, etc. Steps need to be taken to minimise the risk of such damage.

Protecting the ecological features on site can ensure that the local 'wild' areas are sustained. Maintaining native species can lead to reduced maintenance and reduced risk of liabilities under wildlife legislation, as well as increasing and maintaining the aesthetic qualities of a development.

Good practice dictates that ecological features need to be linked to reach their full potential, therefore links to features external to the site should be made whenever possible. Knowledge of existing species movements, and predictions of potential new species movements is required to fully integrate and support ecological features and their associated species.

References and Further Information

Pollution Prevention Guideline (PPG06): *Working at construction and demolition sites*
Pollution Prevention Guideline (PPG05): *Works in, near, or liable to effect watercourses*
www.environment-agency.gov.uk

British Standard BS5837: *'Trees in relation to construction'* BSI (2005)
www.bsi-global.com

Environmental good practice on site (CIRIA C502)
Environmental good practice – Working on site (CIRIA C503)
Working with wildlife site guide (CIRIA C567) 2005
www.ciria.org.uk

RSPB Good Practice Guide for Prospective Developments
www.rspb.org.uk

The Local Biodiversity Action Plan
www.ukbap.org.uk

Issue ID	Description	No. of credits available	Mandatory Elements
Eco 4	Change of Ecological Value of Site	1	–

Aim

To reward steps taken to minimise reductions and to encourage an improvement in ecological value .

Assessment Criteria

Points are awarded where the resulting change in ecological value, calculated using the ‘Change in Ecological Value Calculator’ is as follows:

Criteria	Credits
The ecological value before and after development is measured, and the overall change in species per hectare is:	
• Minor negative change: between –9 and –3	1
• Neutral: between –3 and +3	2
• Minor enhancement: between +3 and +9	3
• Major enhancement: greater than +9	4
Default Cases	
None	

Information required to demonstrate compliance

Schedule of Evidence Required	
To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
Scaled drawings showing: <ul style="list-style-type: none"> • Site layout; • The existing site survey, clearly indicating natural and built features on both the site and land surrounding the site before the proposed development; • Landscape and plot categories (in accordance with the <i>Assessment Methodology</i>) with a list of site areas provided. 	Where the ecological value of the site has changed: <ul style="list-style-type: none"> • As built drawings highlighting areas of positive and/or negative ecological change; OR <ul style="list-style-type: none"> • Photographic evidence showing areas of positive and/or negative ecological change;

Design Stage	Post Construction Stage
<p>If the advice of an ecologist is sought, the following must also be provided:</p> <p>A copy of the ecologists report confirming that:</p> <ul style="list-style-type: none"> • the ecologist meets the requirements of a <i>Suitably Qualified Ecologist</i> • the report provides the species/hectare of any proposed planting schemes. <p>Text describing (on drawings and in the specification*) or illustrations showing, how the ecologists recommendations for any proposed planting schemes will be implemented.</p> <p>* or a letter of instruction to a contractor/supplier, or a formal letter from the developer to the Code assessor giving the specific undertaking.</p>	

Relevant Definitions

Suitably Qualified Ecologist As defined for *Eco1 – Ecological Value of Site*.

Definitions of Landscape types applicable to Table 2:

Pastoral Mainly grasslands used for grazing purposes.

Arable Land dominated by cereals and other arable crops, as well as intensively managed grasslands.

Marginal upland Areas that are on the periphery of upland and are dominated by mixtures of low-intensity agriculture, forestry and semi-natural vegetation.

Upland Land generally above a height suitable for mechanised farming and frequently dominated by semi-natural vegetation.

Urban Mosaic A complex mix of habitats located within cities, towns, or villages, which will include; buildings, hard standing, pockets of disused land and scrub, and areas of managed green spaces, such as gardens, allotments, and parkland.

Parkland Parkland can be characterised as being accessible to the public and will usually be fairly intensively managed spaces, consisting of a matrix of grassland (grazed or mown) with scattered trees at

various densities and areas of dense planting. This landscape type is to be used only when no other landscape type in *Table 2* predominates.

Derelict Land The ecological value of derelict sites (*Table 2, Checklists and Tables*) is time dependant; a linear scale has been used to determine intermediate values between zero ecological value at 1 year from dereliction/demolition to a value at 30 years based on marginal upland figures. This presents a worst case figure which can be amended on the advice of a *Suitably Qualified Ecologist*.

Definitions of Vegetation plot types applicable to Table 2:

Crops/weeds	Mostly highly disturbed vegetation of arable fields and their boundaries; includes cereal and vegetable crops.
Tall grassland/herb*	Typical vegetation of overgrown lowland field boundaries, stream sides, ditches and roadside verges.
Fertile grass	The bulk of agriculturally improved grasslands, intensive pasture and silage crops; but also includes mown areas of improved grasslands for recreational and amenity purposes, as well as re-sown roadside verges.
Infertile grass*	A diverse group of semi-improved and semi-natural grasslands; includes acidic to basic, wet to dry grasslands, and tall-herb vegetation mainly present in the lowlands; often found on stream sides and roadside verges.
Lowland wooded*	Includes wooded vegetation of hedges and broadleaved woods in the lowlands.
Upland wooded*	A varied group of acidic vegetation types usually associated with upland woods, including: semi-natural woodland; conifer plantations; bracken; and wooded stream-sides.
Moorland grass/mosaic*	Typically grazed moorland vegetation, including extensive upland acidic and peaty grassland; and species-rich but very localised flushes.
Heath/bog*	Mostly heather moorland, blanket bog and upland heath, but also lowland heath and raised bog.
'Wildlife' garden planting*	Garden planting that uses native species and those that have a known attraction or benefit to local fauna, based on the advice of a suitably qualified ecologist.

Assessment Methodology

Design Stage

1. Calculate the change in ecological value of the development site by comparing the estimate diversity of plant species before and after construction using the method described in *Calculation Procedures* below.

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.

Calculation Procedures

Before Development

1. Select the most appropriate landscape type from *Table 2 (Checklists and Tables)* using the descriptions provided in *Relevant Definitions*. This will be based on the typology of the land surrounding the site and is likely to be the same throughout the development. In some cases however, it may differ, such as when a disused site is developed as part of a master plan for a mixed-use development. Typical of this would be a new town development (e.g. Milton Keynes), or the development of an inner-city derelict site.
2. Select all of the plot types from *Table 2 (Checklists and Tables)* which are applicable to the development site and calculate the area of each of these plot types. It is important to ensure the appropriate vegetation plot types for the site and their areas are correctly defined.

Where areas of ‘garden planting (typical)’ and ‘wildlife garden planting’ are present, these will always record a score of zero, unless a *Suitably Qualified Ecologist* has been appointed, whereby they will make the distinction between ‘typical’ and ‘wildlife’ garden planting species and record ‘actual’ species numbers.

Enter the following details into *Table 1a* the name of each plot type, its area and the number of species per plot type (from *Table 2, Checklists and Tables*). Follow the prompts to calculate the total average number of species before development.

Where a *Suitably Qualified Ecologist* has been appointed and an ecological site survey has been conducted, the habitat types, their areas and number of species per habitat type can be entered directly into *Table 1a* as an alternative to using the figures provided in *Table 2 (Checklists and Tables)*.

Table 1a: Calculation of the Ecological Value of the Site Before Development				
Plot Type	Area of Plot Type [m ²]		Species [No.] (from Table 2 or a SQE*)	Species x Area of Plot Type
		×		=
		×		=
		×		
		×		=
		×		=
		×		=
		×		=
		×		=
		×		=
		×		=
		×		=
		×		=
(1) Total site area =		(2) Total Σ species \times area =		
Species/hectare before development: Total Σ species \times area of plot type / Total site area = (2)/(1) =				

After Development

- Repeat steps 1–2 above
- Enter the following details into *Table 1b*: the name of each plot type, plot area and number of species per plot type (from *Table 2, Checklists and Tables*). Follow the prompts to calculate the total average number of species after development.
- Where areas of ‘garden planting (typical)’ or ‘wildlife garden planting’ are proposed, these will always record a score of zero unless a *Suitably Qualified Ecologist* has been appointed, whereby they will make the distinction between ‘typical’ and ‘wildlife’ garden planting species and record ‘actual’ species numbers.

Where a *Suitably Qualified Ecologist* has been appointed, an ecological site survey has been conducted and new habitat types/planting schemes have been recommended, their areas and number of species per habitat type can be entered directly into *Table 1b*.

Where new habitats are to be created or floral species are to be planted as part of a landscape design, only those species which are native or have a known attraction to local wildlife can be included in the calculations based on the advice and recommendations of a *Suitably Qualified Ecologist*.

Where ‘extensive green roofs’ are designed by a SQE, add this to ‘wildlife garden’ and subtract the area from ‘Building’

The species value figures in *Table 2 (Checklists and Tables)* are figures given for an existing, well established site. It takes many years before the ecological value of a specific

landscape type is established naturally. It is therefore not possible to assume that for example a newly developed urban parkland has between 13.8 and 17.6 species just after construction without the expert knowledge of a *Suitably Qualified Ecologist*. However, if the homes are to be built on an existing urban parkland and part of the site is left undisturbed the ecological value of that part of the site can be assumed unchanged. If an urban parkland is being created on part of the site the number of species on this part of the site will need to be confirmed by a *Suitably Qualified Ecologist* (taken from actual number of indigenous species being planted) rather than assuming that the new parkland will immediately have a species value of 11.6 (assuming fertilisers are going to be used).

Table 1b: Calculation of the Ecological Value of the Site After Development				
Plot Type	Area of Plot Type [m ²]		Species [No.] (from Table 2 or a SQE*)	Species x Area of Plot Type
		×		=
		×		=
		×		=
		×		=
		×		=
		×		=
		×		=
		×		=
		×		=
		×		=
		×		=
(1) Total site area =		(2) Total Σ species \times area		
Species/hectare before development:				
Total Σ species \times area of plot type / Total site area = (2)/(1) =				
* SQE = Suitably Qualified Ecologist				

Total no. of species after development		Total no. of species before development		Total change in species
	–		=	

5. Calculation of the Change in Ecological Value

The average number of species for the site before development is calculated by multiplying the area of the different plot types and the equivalent number of ‘species’ for those plot types (values taken from *Table 2* or given by a *Suitably Qualified Ecologist*), adding these values and then dividing with the area of the whole site. The same procedure is carried out after the development, and the two values are compared to establish the change.

$$Species_{\text{Before development}} = \frac{\sum_1^n (\text{Area plot type } N \times \text{Species plot type } N)}{\text{Total site area}}$$

$$Species_{\text{After development}} = \frac{\sum_1^m (\text{Area plot type } M \times \text{Species plot type } M)}{\text{Total site area}}$$

$$Species_{\text{Change}} = Species_{\text{After development}} - Species_{\text{Before development}}$$

Where:

n = total number of types of plots before development

m = total number of types of plots after development

Checklists and Tables

Ecological Value

Table 2 below provides default values to be used when calculating the change of ecological value of the site. This information is based on national figures from the Countryside Survey prepared for the Digest of Environmental Statistics No 20, 1998 (DEFRA).

The actual number of species may be used to replace any of the figures in *Table 2* below, provided that a *Suitably Qualified Ecologist* has been appointed and has reported actual species values in accordance with the *Calculation Procedure* above.

Table 2: Average Number of Species per Landscape and Vegetation Plot Type for Existing Habitats

Plot Type	Landscape Type									
	Arable	Pastoral	Marginal upland	Upland	Existing building/hard landscaped areas	Urban Mosaic	Industrial derelict land <1 years	Industrial derelict land <10 years	Industrial derelict land <20years	Industrial derelict land ≥ 30 years
Crops weeds	5.4	8.3	-	-	0	-	-	-	-	-
Tall grassland/herb	12.7	15.0	-	-	0	17.6	0	6.3	15.8	21.1
Fertile grassland	11.6	12.7	15.3	-	0	11.6	0	4.6	11.5	15.3
Infertile grassland	17.1	17.6	21.1	-	0	17.6	0	6.3	15.8	21.1
Lowland wooded	12.9	12.5	-	-	0	13.8	-	-	-	-
Upland wooded	-	12.7	13.8	20.4	0	13.8	-	-	-	-
Moorland grass/mosaic	-	2.0	20.4	21.0	0	-	-	-	-	-
Heath/bog	-	-	14.3	20.0	0	-	-	-	-	-
Hard landscaping	0	0	0	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0	0	0	0
Garden planting (typical)	tbe	tbe	tbe	tbe	tbe	tbe	-	-	-	-
Wildlife garden planting	tbe	tbe	tbe	tbe	tbe	tbe	-	-	-	-

' - 'insufficient data to produce national averages, as not all vegetation plot types are found in all landscape types. Values are data from: DEFRA "Digest of Environmental Statistics" No. 20. HMSO, 1998
 Tbe: To be evaluated by a Suitably Qualified Ecologist – otherwise assume 0

Common Cases of Non Compliance

6. There are no Common Cases of Non Compliance for this Issue.

Special Cases

7. There are no Special Cases for this Issue.

Background

Any development of land will potentially affect its ecological value. This section of the Code is designed to reward steps taken to minimise reductions in ecological value and to encourage improvement. This is done by comparing the value of a site before and after development and making a direct comparison in terms of plant species, (which is used as a proxy for biodiversity). The method takes account of the local landscape type and the different habitats that exist to calculate an average value for the site.

Eco 4 and the Environment KPIs

The Construction Industry's Environmental Key Performance Indicator (KPI) on 'Area of Habitat Retained/Created', adopts the same approach as the credit above. It subtracts the area of ecologically valuable habitat after development from that before development, and expresses the change as a percentage of total site area. The difference between this credit and the KPI, is that the KPI does not assign specific ecological values to habitat types (for simplicity).

In the KPI approach both the vegetation groups marked * above, and derelict urban/industrial land with a more diverse number of species fall into the category of 'ecologically valuable habitat'. This makes it possible to also use the figures derived for this credit, to determine the project's KPI score.

References and Further Information

Countryside Survey 2000

www.cs2000.org.uk

Environment Agency

www.environment-agency.gov.uk

Government Planning Department

www.communities.gov.uk

Construction Industry Key Performance Indicators

www.kpizone.com

Environment Key Performance Indicator Handbook & Wall Chart

Constructing Excellence; DTI

Department of the Environment, Transport and the Regions. *Digest of Environmental Statistics*, No 19, Vol 2 (now published online by DEFRA)

Issue ID	Description	No. of credits available	Mandatory Elements
Eco 5	Building Footprint	1	–

Aim

To promote the most efficient use of a building's footprint by ensuring that land and material use is optimised across the development.

Assessment Criteria

Credits are awarded where the ratio of combined internal floor area of all dwellings on the site to their footprint (as measured by the total ground floor internal area) is as follows:

Criteria	
	Credits
For houses: Where the Net Internal Floor Area: Net Internal Ground Floor Area ratio is greater than 2.5:1 OR For blocks of flats: Where the Net Internal Floor Area: Net Internal Ground Floor Area is greater than 3:1 OR for a combination of houses and flats , a ratio of total net Internal Floor area : total ground floor area greater than the area weighted average of the two ratios above	1
For houses: Where the Net Internal Floor Area: Net Internal Ground Floor Area ratio is greater than 3:1 OR For block of flats: Where the Net Internal Floor Area: Net Internal Ground Floor Area is greater than 4:1 OR OR for a combination of houses and flats, a ratio of total Net Internal Floor Area : Total Ground Floor Area greater than the area weighted average of the two ratios above	2
Default Cases None.	

Information required to demonstrate compliance

Schedule of Evidence Required To be read in conjunction with the relevant definitions and calculations sections below.	
Design Stage	Post Construction Stage
General layout and elevations including dimensions for: <ul style="list-style-type: none"> • each code dwelling type • all other buildings with permanent foundations, such as bin/cycle stores, garages etc. • the site plan. Calculation of the building footprint ratio.	Confirmation of the final 'as built' plans by the developer. AND/OR, Evidence provided on the basis of an Assessor site visit report.

Relevant Definitions

Net Internal Floor Area

The area of all habitable spaces. This includes the area taken up by halls, stairwells, cupboards, internal partitions, habitable loft space and basements.

For semi-detached or terraced dwellings, this excludes the area of the party walls.

For flats, the floor area includes the party walls and separating walls to common areas.

Where residential accommodation is constructed above other occupied space such as shops or offices (garages or car parking would not be included), these areas can be counted as part of the Floor Area but ONLY the area directly beneath the residential space can be counted.

Net Internal Ground Floor Area

The area that the dwelling (and any other outbuildings with permanent foundations that are associated with the dwelling) imprints on the ground.

This is measured for this issue, as the total net internal floor area of the ground floor.

In blocks of flats, this also includes the area taken up by party walls and separating walls to common areas, with the exception of party walls to adjoining buildings.

For staggered dwellings, the footprint area equals the total internal net floor area of the floor with the largest plate

- Areas that normally count towards the footprint include conservatories, garages, permanent outhouses, communal garages or storage rooms and any other permanent buildings used by the occupants.
- Areas that will **NOT** normally count towards the footprint include hard landscaping, semi-enclosed external spaces, pergolas and carports.
- Garden sheds will not count unless they are built on a permanent solid foundation and are fitted out as habitable space with heating, lighting and power.
- If a dwelling is raised above ground level on columns or other structures (OR if it is situated above another occupied area such as a shop or office), the Footprint Area should be assumed to be the area that the dwelling would have imprinted had it been constructed at ground level (i.e. for the net internal ground floor area of the lowest floor of the dwelling).
- Where commercial premises form the ground floor under a block of flats, the footprint is the area that the flats would have imprinted on the ground had they been constructed at ground level, measured for as the total net internal floor area of the first floor of the block of flats.

Habitable loft space and basements

The definition of a habitable loft space or basement is a heated space, with safe access by a permanent stairway or other means of entrance which complies with the requirements of relevant national Building Regulations AND where the space is ‘finished’ with floor, walls, lighting and electric sockets.

Other occupied space

Other occupied spaces include shops and offices.

Garages or car parking would not be included in this definition.

Assessment Methodology

Design Stage

1. Verify that the evidence provided demonstrates that all the Assessment Criteria have been met.
2. Calculate the Floor area: Footprint ratio for each code dwelling type. Note that any outbuildings such as permanent garages and cycle stores need to be taken into account in the footprint area.

Post Construction Stage

1. Verify that the evidence provided at the Design Stage is still valid and that no changes have occurred during construction.

Calculation Procedures

None

Checklists and Tables

None

Common Cases of Non Compliance

Two storey dwellings will not achieve the credit criteria unless a habitable loft space or basement is provided.

Special Cases

None.

Background

Land available for development will become increasingly expensive as land resources come under pressure. Use of 'greenfield' sites is already being limited and developers are likely to experience hostility from the local community. To make best use of the available land and other resources, including materials and energy, it is important to ensure effective use of the building footprint by maximising the useable space.

References and Further Information

CIRIA

www.ciria.org.uk

Government Planning Department

www.communities.gov.uk