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## HOME PERFORMANCE INDEX (HPI)

is Ireland's first national certification system for quality and sustainable residential development

### TECHNICAL MANUAL

VERSION 1.1



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# 1.0 INTRODUCTION



## 1.0. INTRODUCTION

This is the second published version 1.1 of the Technical Manual for the Irish Green Building Council (IGBC) Home Performance Index (HPI) for application to new residential development. It sets out an overview of the system, its structure, individual indicators and how they are assessed.

The HPI is the first national voluntary sustainable assessment system developed for the residential construction sector in Ireland. It was developed by the IGBC, and in particular by Neoma Lira and Pat Barry. The Environmental Protection Agency (EPA), under the Green Enterprise programme, funded its development by the IGBC in partnership with University College Dublin (UCD), with a view to bringing the system to the marketplace. Vivienne Brophy of the UCD Energy Research Group developed the technical manual. Danielle Townsend designed the HPI brand and Sinead Kenny designed this publication.

### 1.1 Modifications to Home Performance Index technical manual

The following modifications and additions have been made to version 1.0 of the Home Performance Index technical manual:

- Clarification on exemplary and innovation points
- Additional guidance and spreadsheets added in some sections, such as:
  - Ecology Calculator spreadsheet
  - Timber schedule spreadsheet
  - EPD schedule spreadsheet
  - VOC products spreadsheet
- EN 7.0 Waste Management – is split into two sub indicators:
  - EN 7.1 Waste management during construction - modified to include evidence of implementation of waste management plan
  - EN 7.2 Organic and Recyclable Waste storage- new sub indicator has been added
- EN 13.0 Local Ground and air pollution – new indicator added
- HW 4.1 Summer Comfort Risk of Overheating – updated to include CIBSE TM 59

### 1.2 Why a Home Performance Index system?

It is important that we address the issues of quality and sustainability to provide good quality housing and to future-proof Irish housing stock.

This is a voluntary framework for designing, assessing and certifying new residential design and construction, which in addressing performance criteria will facilitate all sectors of the housing chain to evaluate performance from their individual perspective:

- It provides homebuyers with performance data about the house they are purchasing and encourages them to seek exemplary performance
- It assists financial institutions to assess the quality of assets on which they are lending
- It allows those procuring new residential development, such as local authorities and housing associations, to set clearly measurable requirements for the performance of the development
- It facilitates investors to meet sustainability criteria when considering fund investment
- It rewards contractors and developers for their conscientious approach
- It encourages design teams to set targets early, at the design stage, and to work together as a team to achieve these

### 1.3 Is it only for new housing?

The system is designed for new housing only. However it is the intention that the HPI could be developed for existing housing to provide a way of measuring and improving the quality and sustainability of the existing stock.

## 1.4 How has the system developed?

The system methodology and technical manual have been developed through desk research, surveys, workshops and consultation with stakeholders in the construction industry, and testing and feedback from developers. Stakeholders with whom consultation took place are listed at the end of this publication.

The IGBC reviewed two projects funded by the European Commission FP7 Environment – OpenHouse and SuPerBuilding. The project consortium members included many of the stakeholders of sustainability certifiers in Europe, including: the Building Research Establishment (BRE), the Centre Scientifique et Technique du Bâtiment (CTSB) and the Deutsche Gesellschaft für Nachhaltiges Bauen (DGNB); organisations such as the Architects' Council of Europe (ACE); research institutes such as the Fraunhofer Institute; and private industry partners.

These projects set out to develop an open-source, pan-European sustainability assessment system for buildings based on European CEN standards, and to provide guidance on how these may be structured. These projects reviewed indicators within global assessment systems, such as Leadership in Energy and Environmental Design (LEED) and Building Research Establishment Environmental Assessment Method (BREEAM), but were not focused on residential development. Where appropriate, the recommendations from these projects were integrated into the HPI, including the recommendation to structure the assessment system around environmental, economic and social issue categories.

An extensive review of indicators in existing assessment and certification systems globally, including the Code for Sustainable Homes (UK), HQE (France), DGNB (Germany), HomeStar (New Zealand), LEED for Homes (USA), and Miljöbyggnad (Sweden) was carried out. This manual states the sources or inspirations of each indicator. In many cases the indicators are used in several different assessment systems but have been adjusted to an Irish benchmark, weighting or point system. The Sustainable Location category has been taken almost in its entirety from the OpenHouse project, with an adjustment to weight education facilities more highly.

The HPI indicators are included for their relevance to the Irish context. Ireland has particular cultural, quality and environmental challenges that are taken into consideration in the HPI.

However, most of the indicators included are commonly applied in European countries. The intention is that the scheme should be accessible, easy to understand and cost-effective to use, thus facilitating mainstream sustainability in the residential sector.

## 1.5 Level(s)

Level(s) was launched in September 2017 by the the European Commission as a common standardised way to report the sustainability of buildings and will be tested over the following two years.

IGBC together with World GBC were involved in the consultation on Level(s) and were part of a number of workshops leading to its development.

IGBC has carried out an initial crosswalk between the current version of Level(s) and HPI. This indicated that HPI is compatible with Level(s) and all indicators included in Level(s) appropriate to housing development are included in HPI at one of the levels of assessment.

IGBC will undertake further work in future versions of HPI to ensure closer correlation where appropriate.

# 2.0 SUMMARY OF ASSESSMENT SYSTEM



## 2.0 SUMMARY OF ASSESSMENT SYSTEM

The system is divided into three main categories based on the Environmental, Social and Economic pillars of sustainability. Two additional categories, Quality Assurance and Sustainable Location, reflect the planning and procurement processes.



The Environment category contains indicators that measure the ecological footprint of the development, including those for global warming potential, loss of biodiversity, impact on ecological systems, water usage, quantity of land consumed, and embodied impact of materials used in construction.

The Health and Wellbeing category contains indicators that relate directly to the user's everyday experience of the dwelling and how its performance affects their overall feeling of wellbeing.

The Economic category contains indicators that relate to occupant running costs and the long-term value stability of the dwelling, such as its capacity to adapt to changing family circumstances.

The Quality Assurance category contains indicators to assess the process of design and construction of the dwelling, and a testing regime to ensure that the design intention is achieved. This is particularly important, as there is considerable evidence in Ireland and across Europe of a gap between predicted and actual performance.

The Sustainable Location category contains indicators that measure how well the dwelling relates to existing transport infrastructure and the accessibility of amenities. It also assesses the key risks on the site, such as flooding.

### 2.1 Calculation, weighting and points

Points are awarded for each indicator and sub-indicator. For most indicators there are several levels of achievement, which means that points are scored when there is an improvement over the baseline, normally set at the minimum requirement of Irish Building Regulations where there is a relevant standard.

Following the recommendations of the OpenHouse and SuperBuilding projects, a point system has been utilised which allows greater interpolation between credits measuring from 1 to 100. A weighting system of 1 to 4 is then applied to the points.

#### 2.1.1 Exemplary and Innovation points 🏆

Exemplary and Innovation points are included:

- innovation points may be awarded where a developer can demonstrate to real innovation in areas not addressed by the scheme. These must be agreed in advance.
- for exemplary performance in key indicators such as water use and fabric efficiency.

## 2.2 Categories, indicators, sub-indicators, points and weighting

| <b>ENVIRONMENT – INDICATOR + SUB-INDICATORS</b>                 | <b>Max. Points</b> | <b>Weighting</b> |
|---|--------------------|------------------|
| EN 1.0: Land use*   | 100                | 1                |
| EN 2.0: Residential density*                                    | 100                | 2                |
| EN 3.0: Surface water run-off                                   | 100                | 1                |
| EN 4.0: Water consumption*                                      |                    | 3                |
| EN 4.1: Internal water use 🚰                                    | 100                |                  |
| EN 4.2: External water use                                      | 25                 |                  |
| EN 5.0: Ecology   | 100                | 1                |
| EN 6.0: Energy use*   | 100                | 4                |
| EN 7.0: Waste management  |                    | 2                |
| EN 7.1: Waste management during construction                    | 100                |                  |
| EN 7.2: Organic and Recyclable Waste storage                    | 100                |                  |
| EN 8.0: Responsible procurement of timber                       | 100                | 1                |
| EN 9.0: Environmental Product Declaration                       | 25                 | 2                |
| EN 10.0: Embodied impact of materials                           | 100                | 3                |
| EN 11.0: Transport impact (generated by SL)*                    | 100                | 4                |
| EN 12.0: Dwelling size adjustment factor                        | -100               | 1                |
| EN 13.0 Local air and ground pollution from combustion of fuels | 100                | 1                |
| <b>HEALTH AND WELLBEING – INDICATOR + SUB-INDICATORS</b>        |                    |                  |
| <b>HEALTH AND WELLBEING – INDICATOR + SUB-INDICATORS</b>        | <b>Max. Points</b> | <b>Weighting</b> |
| HW 1.0: Indoor air quality – ventilation*                       | 100                | 4                |
| HW 2.0: Daylighting*  | 100                | 3                |
| HW 3.0: Acoustic comfort  |                    |                  |
| HW 3.1: Airborne sound insulation – walls                       | 50                 | 2                |
| HW 3.2: Airborne sound Insulation – floors                      | 50                 | 2                |
| HW 3.3: Impact sound insulation – floors                        | 50                 | 2                |
| HW 4.0: Design for summer and winter comfort                    |                    |                  |
| HW 4.1: Summer comfort – risk of overheating                    | 75                 | 1                |
| HW 4.2: Winter comfort – radiant asymmetry                      | 50                 | 1                |
| HW 5.0: Low VOC specification and testing                       | 100                | 1                |
| HW 6.0: Walkable neighbourhood (generated by SL)                | 100                | 3                |

| <b>ECONOMIC – INDICATOR + SUB-INDICATORS</b>       | <b>Max. Points</b> | <b>Weighting</b> |
|--|--------------------|------------------|
| EC 1.0: Net Space Heat Demand* 🏆                   | 100                | 3                |
| EC 2.0: Energy costs*                              | 100                | 3                |
| EC 3.0: Transport costs (generated by SL )         | 100                | 3                |
| EC 4.0: Universal Design                           | 100                | 1                |
| EC 5.0: Smart monitoring of energy, heat and water | 150                | 1                |
| EC 6.0: Energy labelled goods                      | 100                | 1                |
| EC 7.0: Flood risk (generated by SL )              | 100                | 1                |

| <b>QUALITY ASSURANCE – INDICATOR + SUB INDICATORS</b>     | <b>Max. Points</b> | <b>Weighting</b> |
|---|--------------------|------------------|
| QA 1.0: Quality of the building shell – air Infiltration* | 100                | 2                |
| QA 2.0: Quality of the building shell – thermal bridging* |                    | 2                |
| QA 2.1: Thermal bridging adjustment                       | 100                |                  |
| QA 2.2: Photographic record                               | 50                 |                  |
| QA 2.3: Thermographic survey                              | 50                 |                  |
| QA 3.0: Construction team skills*                         | 100                | 1                |
| QA 4.0: Design team skills*                               |                    | 1                |
| QA 4.1: Design team quality                               | 100                |                  |
| QA 4.2: Design team planning                              | 25                 |                  |
| QA 5.0: Commissioning of services                         | 100                | 1                |
| QA 6.0: Consumer information and aftercare                | 100                | 1                |

**The score from the following indicator is integrated in the above categories**

| <b>SUSTAINABLE LOCATION – INDICATOR + SUB-INDICATORS</b> | <b>Max. Points</b> | <b>Weighting</b> |
|--|--------------------|------------------|
| SL 1.0: Options for transportation*                      |                    |                  |
| SL 1.1: Accessibility to train station                   | 20                 | 3                |
| SL 1.2: Accessibility of public transportation stop      | 20                 |                  |
| SL 1.3: Availability of low-emission transport 🏆         | 20                 |                  |
| SL 1.4: Availability of walking and bicycle paths        | 20                 |                  |
| SL 2.0: Access to amenities*                             |                    |                  |
| SL 2.1: Restaurants                                      | 20                 | 3                |
| SL 2.2: Local shops                                      | 20                 |                  |
| SL 2.3: Parks and open spaces                            | 20                 |                  |
| SL 2.4: Education facilities                             | 50                 |                  |
| SL 2.5: Public administration facilities                 | 20                 |                  |
| SL 2.6: Medical care facilities                          | 20                 |                  |
| SL 2.7: Sports facilities                                | 20                 |                  |
| SL 2.8: Leisure facilities                               | 20                 |                  |
| SL 2.9: Services   |                    |                  |
| SL 3.0: Risk at site – flooding*                         | 100                | 2                |

\* Mandatory assessment

🏆 Exemplary and Innovation points

The score is calculated automatically in the spreadsheet from the points entered in each section. The number of points is multiplied by the indicator weighting to give the overall score.

**The total final score is calculated as follows:**

$$\text{Total score} = \sum \text{Environment} + \sum \text{Health \& Wellbeing} + \sum \text{Economic} + \sum \text{Quality Assurance} + \sum \text{Exemplary/innovation points}$$

### 2.2.1 How are the categories used?

The first three categories are for communication with the homebuyer about how the dwelling performs under *Environment, Health and Wellbeing and Economic* categories.

The Sustainable Location category scores are integrated and automatically transferred into the other relevant categories.

### 2.2.2 Mandatory indicators

Not all indicators must be assessed, but there are some indicators for which assessment is mandatory in all cases. For some of these mandatory indicators, a minimum performance level is required.

**a** Mandatory to assess, but without minimum performance level requirements

**b** Mandatory to assess **and** must meet minimum performance level requirements

| Mandatory criteria   | Assess only | Minimum requirement for different levels |                                 |                                 |
|--|-------------|--|---------------------------------|---------------------------------|
|  |             | Certified                                | Silver                          | Gold                            |
| EN 1.0: Land use   | x           | No                                       | No                              | No                              |
| EN 2.0: Residential density                                      | x           | No                                       | No                              | No                              |
| EN 4.0: Water consumption  | x           | Level 1                                  | Level 1                         | Level 1                         |
| EN 6.0: Energy use   | x           | A3                                       | A3                              | NZEB                            |
| EN 12.0: Dwelling size adjustment factor                         | x           | No                                       | No                              | No                              |
| EN 13.0: Local air and ground pollution from combustion of fuels | x           | Level 1                                  | Level 1                         | Level 1                         |
| HW 1.0: Indoor air quality                                       | x           | Level 1                                  | Level 1                         | Level 1                         |
| HW 2.0: Daylighting  | x           | Level 1                                  | Level 1                         | Level 1                         |
| EC 1.0: Net space heat demand                                    | x           | Level 1                                  | Level 1                         | Level 1                         |
| QA 1.0: Quality of building shell – air infiltration             | x           | Level 1                                  | Level 1                         | Level 2                         |
| QA 2.0: Quality of building shell – thermal bridging             | x           | Level 1                                  | Level 1                         | Level 2                         |
| QA 3.0: Construction team skills                                 | x           | CIRI registered Main Contractor          | CIRI registered Main Contractor | CIRI registered Main Contractor |
| QA 4.0: Design team skills                                       | x           | Registered Architect                     | Registered Architect            | Registered Architect            |
| SL 1.0: Options for transportation                               | x           | No                                       | No                              | No                              |
| SL 2.0: Access to amenities                                      | x           | No                                       | No                              | No                              |
| SL 3.0: Risk at site – flooding                                  | x           | Level 1                                  | Level 1                         | Level 1                         |

## 2.3 Assessment process

Where the developer seeks certification under this system, the project should be registered as early as possible in the design process. It is up to the client to decide who can best fulfill this function. However, they need to be suitably qualified and trained to submit the assessment, together with the evidence required to justify the targeted score. The evidence required is set out for each indicator in the manual. However, for the full roll-out of the scheme, those preparing the assessments will need training and accreditation under the HPI system to ensure that they understand how to prepare an assessment and provide all of the required evidence in the correct format. This will ensure that evidence is prepared in a consistent and complete manner for the auditors and certifiers and ensure that costs of certification can be kept to a minimum. A Professional Conduct Charter and quality assurance system will be operated by the IGBC. Training is provided on a regular basis for those seeking to become assessors.

Once the spreadsheet and associated evidence are submitted for IGBC Certification, this will be checked for compliance and completeness. As per the BER auditing system, sample assessments will be audited based on profiling of the project, assessor, client and design team, but the onus will be on the assessor to correctly interpret and assess the project.

The process therefore is as follows:

- 1 development is registered prior to construction;
- 2 assessment is completed by the designated assessor;
- 3 assessment is submitted with all the evidence required for each criteria to the certification body, via an online platform, with the appropriate fee;
- 4 assessment is reviewed for completeness and audited for compliance;
- 5 further information is sought, where missing;
- 6 certificate is issued, once information is complete and deemed compliant.

### 2.3.1 Suitably qualified assessors

A suitably qualified assessor is a construction professional who meets the following criteria:

- is a registered architect, engineer or surveyor
- has successfully completed the required training in the HPI system or is deemed competent by IGBC to carry out the assessment.

### 2.3.2 Evidence required

The onus is on the design team to provide clear evidence in support of each indicator for IGBC assessment. Only relevant information clearly identifying the points that have been achieved will be accepted. Where calculators are provided they should be used. Submitting excessive levels of drawings, specifications, or other documentation that is not specific to assessment will be considered in the same manner as if no evidence had been provided.

### 2.3.3 Award levels and branding

The levels of award will be set to reflect Good, Better and Best practice in Ireland. This means that not all criteria need to be assessed in order to achieve certification.

There are three levels of certification: Certified, Silver and Gold. For each level, mandatory performance standards in certain indicators must be achieved in addition to the required score.

| Certified | Silver | Gold  |
|-----------|--------|-------|
| ≥ 35%     | ≥ 50%  | ≥ 70% |

## 2.4 Indicators structure

In the manual, each indicator has been set out under the following headings:

- 1 **Intent** – Why it has been included in the system and its relevance for Irish residential development.
- 2 **Assessment Methodology** – How it is measured in the system.
- 3 **Calculation and Rating** – How the points are awarded according to different levels of achievement in each indicator.
- 4 **Evidence Required** – The type of evidence that needs to be submitted to prove that points awarded in the spreadsheet are correctly awarded.
- 5 **Guidance** – Basic guidance on how to meet the criteria, which will be developed over time

## 2.5 Scale of development

Certification can be achieved by targeting mandatory indicators only, which means that the level of assessment is greatly simplified. This is relevant to all scales of development. The wider assessment and higher levels of certification may be more appropriate to measure larger-scale housing development. Larger-scale developments also allow the cost of fuller assessment to be spread across a large number of units.







(Source: OPENHOUSE – adapted by OH from LEED, BREEAM, DGNB/BNB)

### 1 Intent

The intention is to:

- encourage more rational and efficient use of land in Ireland and the consolidation of existing settlement
- encourage regeneration within existing cities, towns and villages and discourage development sprawl
- encourage innovation in land use to build resilient communities and minimise climate change vulnerability
- encourage land use models adapted to the effect of rise in temperatures to ensure that coastal areas and flood plains are not being adversely affected
- encourage remediation of contaminated land and the restoration and improvement of previously developed lands
- preserve arable land to meet the future food needs of the growing population, whilst discouraging encroachment on valuable global ecosystems and destruction of carbon sinks.

### 2 Assessment methodology

The impact of the project on the environment can vary from a positive change, e.g. through remediation of brownfield sites, to a negative change, where there is depletion of prime farmland or ecological value of the site. Highest points are awarded where there is a positive impact brought about by the development. The use of greenfield sites for development is discouraged, unless some compensatory measures that improve the ecology of the site are provided.

### 3 Calculation and rating

|   |     |
|---|-----|
| Brownfield redevelopment of contaminated industry location  | 100 |
| Brownfield redevelopment of other types of sites  | 80  |
| Previously developed area or undisturbed greenfield with compensatory measures (green roofs or vegetated areas with native and adapted species) covering 50% of the site area | 50  |
| Undisturbed greenfield with compensatory measures (green roofs or vegetated areas with native and adopted species) covering 30% of the site area                              | 30  |

### 4 Evidence

Provide evidence of the condition of the site prior to development and after development.

Typical supporting evidence which can be submitted as follows:

- 1 The previous use of the area can be determined from site photographs prior to development, satellite photographs, Google maps, ecology reports, etc;
- 2 The previous contamination (i.e. the initial level of pollution) of the site or property can be determined based on available survey reports;
- 3 Identification of proposed compensatory measures. These must be specifically identified on drawings or in specification for development.

### 5 Guidance



(Source: OPENHOUSE – adapted by OH from LEED, BREEAM, DGNB/BNB)

### 1 Intent

The intention is to:

- encourage densities that assist the development of viable services and infrastructure and public transport systems, and that are conducive to walking communities
- achieve compliance with nationally stated objectives and recommended densities of Department of Housing Guidelines and appropriate Local Authority Development Plan.
- encourage more rational and efficient use of land and consolidation of existing settlement, discourage sprawl, thereby preserving land for global food production and preventing encroachment on and destruction of valuable global ecosystems.

### 2 Assessment methodology

Assessment is based on the calculated density of the development, with higher density awarded higher points. Density must be no less than the recommended density for the planning zone as set out in the relevant Development Plan, or no points can be awarded.

### 3 Calculation and rating

Two alternative calculations are allowed. The number of residences per hectare (HA) is to be provided where residential development only. Plot ratio calculations are to be provided for mixed-use development.

|  |     |
|--|-----|
| > 100 dwellings per HA for residential use only. Plot ratio > 2 for mixed-use development  | 100 |
| > 50 dwellings per HA for residential use only. Plot ratio > 1 for mixed-use development   | 75  |
| > 36 dwellings per HA for residential use only. Plot ratio > 0.8 for mixed-use development | 50  |
| Meets minimum density for planning zone or > 15 dwellings per HA                           | 10  |

### 4 Evidence

- 1 Excerpt from the relevant Local Authority Planning Approval documentation for the development, showing calculations of density or plot ratio submitted;
- 2 Evidence that the development complies at a minimum with recommended densities as set out in the appropriate Local Authority Development Plan for the zone where the development is located.

### 5 Guidance

Department of Environment guidelines:

<http://www.environ.ie/en/Publications/DevelopmentandHousing/Planning/FileDownload,19164,en.pdf>



(Source: adapted from Dublin City Council guidance on Sustainable Drainage Systems)

**1 Intent**

The intention is to:

- minimise volume and rate of water run-off from the site, which could impact flooding elsewhere
- encourage use of sustainable urban drainage system to ensure that the rate of water run-off is no greater than before development
- minimise any increase in the imperviousness of the site, as this can have major repercussions on the site and its surroundings through the increase of water run-off, which decreases resilience to flooding
- minimise the risk of pollution from hydrocarbon and other contaminants entering water courses.

**2 Assessment methodology**

Based on calculation that demonstrates no greater outflow to the drainage system following development than that prior to development.

**3 Calculation and rating**

|  |     |
|--|-----|
| Peak surface water run-off to drainage system no greater than prior to development + designed water treatment train approach | 100 |
| Peak surface water run-off to drainage system no greater than prior to development   | 50  |

**4 Evidence**

- 1 Specification of sustainable urban drainage and attenuation;
- 2 Calculations for peak run-off for before and after development carried out by competent professional;
- 3 Specification of designed water treatment train in line with Dublin City Council Guidelines.

**5 Guidance**

Guidance can be found at Dublin City Council website at:

<http://www.dublincity.ie/main-menu-services-water-waste-and-environment-water-projects/sustainable-drainage-systems-suds-and>

Guidance on the treatment train concept can be found in the Greater Dublin Strategic Drainage strategy at the Greater Dublin Drainage website at:

<http://www.greaterdublindrainage.com>



(Source: adapted from UK Building Regulations 2010: Sanitation, Hot water safety and Water efficiency, AD G and Code for Sustainable Homes)

### 1 Intent

The intention is to:

- reduce the consumption of drinking water inside the home, through the design and specification of water-efficient fittings, appliances and recycling systems
- reduce the use of drinking water outside the home, through the recycling of rainwater
- reduce the impact of energy/carbon requirements for the treatment of potable water at utility level
- reduce the impact of energy requirements/carbon emissions associated with heating domestic water

### 2 Assessment methodology

Points are awarded based on the level of the reduction in water use. This is achieved through the specification of water-efficient sanitary ware and the collection and recycling of water.

### 3 Calculation and rating

The calculation procedures must be carried out in line with the Water Efficiency Calculator for New Dwellings, available on The Water Calculator at: <http://www.thewatercalculator.org.uk/>. This is used within the UK Building Regulations 2010: Sanitation, hot water safety and water efficiency, AD G.

#### EN 4.1: Internal Water Use

Points are awarded based on the calculated water use of the specified sanitary ware, and indicates water usage per person per day.

🏆100 Exemplary points available where the highest level is exceeded by 50%

|                             |     |
|-----------------------------|-----|
| Level 5: < 80 L/person/day  | 100 |
| Level 4: < 90 L/person/day  | 90  |
| Level 3: < 105 L/person/day | 75  |
| Level 2: < 110 L/person/day | 50  |
| Level 1: < 125L/person/day  | 0   |

#### EN 4.2: External Water Use

Points are awarded for the provision of a rainwater collection system for external use. This applies only to those developments where there is a use for the water, e.g. for external landscaping or gardens. The level of storage should be proportional to the household use.

The storage capacity for an individual home and garden must be a minimum of 210 litres, and for a multi-unit development with common landscaping it must be sufficient to provide 60% of the landscape irrigation requirements.

|   |    |
|---|----|
| Provision of external water collection system for garden and external use | 25 |
|---|----|

### 4 Evidence

- 1 Provide a completed Water Efficiency Calculation for internal potable water use for each dwelling type;
- 2 Provide a schedule of the sanitary ware, including exact specification and serial number of each item;
- 3 Provide written confirmation that the sanitary ware has been installed as per the

specification;

- 4 Provide specification and calculations for grey or rainwater harvesting system installed;
- 5 Provide a calculation of the water storage capacity for external irrigation.

## 5 Guidance

The points can be achieved through the application of water-efficient sanitary ware, and a rainwater collection system. Examples and FAQ can be found at <http://www.thewatercalculator.org.uk/faq>.

The IGBC is a scheme partner of the European Water Label, a voluntary labeling scheme for water use products, which has wide support from the industry.

For further information: <http://www.europeanwaterlabel.eu>



(Source: Open House – adapted by OH from BREEAM)

### 1 Intent

The intention is to:

- minimise the impact of the development on the site's existing ecology
- enhance the site's ecological value and biodiversity
- support the EU Biodiversity Strategy to halt the loss of biodiversity and ecosystems in Europe by 2020.

### 2 Assessment methodology

The assessment is based on the degree to which the development maintains existing biodiversity on the site or improves it. There are three ways of assessing the criteria for this indicator.

#### Calculation of change in ecological value

Development of an Ecology Report by a suitably qualified ecologist. Based on a site visit, the ecologist recommends measures for the protection and enhancement of the site's ecology, confirms implementation, and calculates the resulting change in ecological value of the site.

#### Previously developed sites

If there has previously been development on over 75% of the site area, i.e. with buildings/ carpark, etc. the design team is not obliged to engage an ecologist, provided that a Biodiversity Management Plan is developed.

#### Biodiversity Management Plan

A Biodiversity Management Plan is developed by the design team to illustrate how the impact of the development can be minimised, recommend measures to preserve existing ecosystems and to enhance the site's ecological value and biodiversity.

### 3 Calculation and rating

|   |     |
|---|-----|
| Change in ecological value $\geq$ 6   | 100 |
| Change in ecological value $\geq$ 5   | 90  |
| Change in ecological value $\geq$ 4   | 80  |
| Change in ecological value $\geq$ 3 <b>OR</b> Previously developed site with Biodiversity Management Plan | 60  |
| Change in ecological value $\geq$ 2   | 50  |
| Change in ecological value $\geq$ 1 <b>OR</b> Biodiversity Management Plan developed                      | 20  |
| Change in ecological value $\geq$ 0   | 10  |
| Change in ecological value $<$ 0  | 0   |

### 4 Evidence

- 1 The change in the ecological value should be calculated in the Ecology Calculator spreadsheet provided on registration of the project;
- 2 Provide a copy of an Ecology Report by a suitably qualified ecologist, to include: details and scope of the site survey; specification requiring the main contractor to implement the recommendations for protection and enhancement; and a site inspection report and photographic evidence confirming that the ecologist's recommendations have been implemented;
- 3 Where large mixed-use/multi-building developments are not fully completed but will be within 18 months, or where ecological measures are awaiting the appropriate planting season, provide a copy of the contract/specification or letter from the main contractor confirming when the planting will be completed;

4 For previously developed sites provide proof of the percentage of development of the site and a Biodiversity Management Plan Report must be provided.

## 5 Guidance



(Source: adapted from SEAI (Sustainable Energy Authority Ireland) Building Energy Rating (BER) system)

### 1 Intent

The intention is to:

- encourage the development of homes with very low energy use and carbon emissions;
- encourage the achievement of the national residential NZEB targets, which become mandatory in 2018 for public buildings and from 2020 for all buildings.

### 2 Assessment methodology

The existing BER system is used to assess the energy efficiency of the home, and also accounts for any contribution from renewable energy systems included in the development.

The points are awarded on a scale from minimum compliance with Building Regulations Part L Conservation of Fuel and Energy TGD (Technical Guidance Document) 2011 to Net Zero energy, where the development meets more than its own energy needs.

### 3 Calculation and rating

This is based on the BER achieved by the home. In order to achieve Gold certification it is mandatory for the homes to achieve the NZEB standard or achieve less than 45kWh/sq²/yr. Pending the publication of the revised part L in 2018, the definition of NZEB for projects registered under this version of the manual is taken from Technical Guidance Document L – Conservation of Fuel and Energy - Dwellings Part L 2011 as follows: “In order to achieve the acceptable primary energy consumption rate for a nearly zero energy dwelling, the calculated energy performance coefficient (EPC) of the dwelling being assessed should be no greater than the Maximum Permitted Energy Performance Coefficient (MPEPC). The MPEPC for a nearly zero energy dwelling is 0.30. To demonstrate that an acceptable CO2 emission rate has been achieved for a nearly zero energy dwelling, the calculated carbon performance coefficient (CPC) of the dwelling being assessed should be no greater than the Maximum Permitted Carbon Performance Coefficient (MPCPC). The MPCPC for a nearly zero energy dwelling is 0.35.”

|   |     |
|---|-----|
| Level 5: < 0kWh/m²/yr – Net Zero operational energy             | 100 |
| Level 4: < 25 kWh /m²/yr – A1                                   | 75  |
| Level 3: < 45 kWh/m²/yr – <u>or</u> meets Irish definition NZEB | 50  |
| Level 2: < 50 kWh /m²/yr – A2                                   | 25  |
| Level 1: < 75 kWh /m²/yr – A3                                   | 0   |

### 4 Evidence

FinalBER certificate, full BER detailed report, carried out by an SEAI-accredited assessor.

### 5 Guidance

Further guidance on BER available at: [http://www.seai.ie/Your\\_Building/BER/](http://www.seai.ie/Your_Building/BER/)

Further guidance on NZEB definition:

Building regulations Part L Conservation of Fuel and Energy - Dwellings <http://www.housing.gov.ie/housing/building-standards/building-standards>



(Source: DCCAE guidelines)

### 1 Intent

The intention is to:

- encourage site waste management to reduce the use of resources and embodied impacts in the construction of dwellings;
- encourage source separation of organic and recyclable household waste to facilitate recovery, recycling and reuse of materials.

### 2 Assessment methodology

This is based on the management of Construction and Demolition Waste (CDW) at the site and the design of the organic and recyclable waste storage area(s).

### 3 Calculation and rating

#### EN 7.1: Waste Management During Construction

##### 1 Development of CDW Management Plan

A compliant plan contains:

- Benchmark targets for resource (waste management) efficiency e.g. m<sup>3</sup> or tonnes of waste per type;
- Proposals for recycling of CDW including selective demolition techniques if appropriate;
- Procedures and commitments to prevent or reuse i.e. Specify waste minimisation actions relating to at least 3 waste groups and support them by appropriate monitoring of waste;
- Procedures to minimise hazardous waste;
- Monitoring, measuring and reporting of hazardous and non-hazardous site waste production by waste groups (according to the waste streams generated by the scope of the works); and
- Procedures for the training of staff on-site and allocation of waste management responsibilities to nominated staff;

##### 2. Implementation of C&D Waste Management Plan

Provide evidence that the measures described in the CDW Plan have been implemented.

##### 3. Waste Management final report from contractor

Provide a final report detailing waste and recycling data (i.e. quantities generated, collected, recycled, recovered, disposed, etc.) including details of the service providers (i.e. Waste collectors) over the lifetime of the project.

|   |     |
|---|-----|
| Development of C&D plan + Implementation of C&D plan + Final report | 100 |
| Development of C&D plan + Implementation of C&D plan                | 50  |
| Final report  | 25  |
| None  | 0   |

## EN 7.2: Organic and Recyclable Waste Storage

Design waste storage area according to the number of occupants in the house/multi-storey dwelling complex. Application of the following mandatory and voluntary criteria is required:

### Mandatory

1. Appropriately sized communal storage area to satisfy the three-bin system for the separate collection of mixed dry recyclables, organic waste and residual waste;
2. Waste storage areas in basement car parks are to be avoided where possible, but where provided, must have sufficient and safe area for the movement and collection of bins;
3. Provision in the layout for safe access for waste collectors to the storage area;
4. Proximity of and ease of access to waste storage areas for residents including access for disabled people;
5. Waste storage areas must be adequately ventilated to minimise odours and potential nuisance from vermin/flyes;
6. Waste storage areas should not present any safety risks to users and should be well-lit;
7. Waste storage areas should not be on the public street, and should not be visible to or accessible by the general public. Appropriate visual screening should be provided, particularly in the vicinity of apartment buildings.

### Voluntary

8. Consider installing signage for the residents in a number of languages and using visual symbols and logos;
9. In larger apartment schemes, consideration should also be given to the provision of separate collection facilities for other recyclables such as glass, plastics, textiles, etc.;
10. Consider providing capacity for washing down waste storage areas, with wastewater discharging to the sewer;

|   |     |
|---|-----|
| All mandatory items and at least 1 voluntary items have been achieved | 100 |
| 5 mandatory items and at least 1 voluntary items have been achieved   | 50  |
| 4 mandatory items and at least 1 voluntary have been achieved         | 25  |
| None  | 0   |

### 4 Evidence

- 1 CDW Management plan fully completed according to the template provided by the IGBC;
- 2 Dated photographs and reports showing the implementation of the measures described in the plan;
- 3 Reports from the waste contractor for the whole period of construction and final report with all the quantities, waste description, destinations, etc.
- 4 Design details i.e. drawings of the waste storage area including images of the completed area;
- 5 Provide plans and reports supporting waste related activities.

### 5 Guidance

Refer to IGBC's C&D Waste Management Plan template provided on registration of project;  
Full report "Organic Waste Management in Apartments" (2005-WRM-DS-23-M1) by RPS can be found at [https://www.epa.ie/pubs/reports/research/waste/ERTDI%20No71\\_WEB%20final-with-cover.pdf](https://www.epa.ie/pubs/reports/research/waste/ERTDI%20No71_WEB%20final-with-cover.pdf)

Full report "Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities" can be found at [http://www.housing.gov.ie/sites/default/files/publications/files/apartment\\_guidelines\\_21122015.pdf](http://www.housing.gov.ie/sites/default/files/publications/files/apartment_guidelines_21122015.pdf)



(Source: Open House – adapted by OH from DGNB/BNB)

**1 Intent**

The intention is to:

- encourage the sourcing of timber from sustainably managed sources
- support the European Commission in its goal to achieve sustainable sourcing of materials while promoting sustainable economic growth and development
- support the Roadmap to a Resource Efficient Europe

**2 Assessment methodology**

For all timber products used, the supplier must be able to certify the “controlled, sustainable cultivation of the forest of origin”. Certificates from the Forest Stewardship Council (FSC) or those accredited by the Programme for Endorsement of Forest Certification Schemes (PEFC) are acceptable.

**3 Calculation and rating**

If no wood products are used in the building, then this sub-indicator shall not be assessed.

|  |     |
|--|-----|
| Level 3: At least 80% of all timber and wood products is produced by sustainable forestry. This is verified by an FSC/PEFC certificate and a corresponding Chain of Custody (CoC) certificate. Quantification can be determined by an estimate based on the Bill of Quantities.                                | 100 |
| Level 2: At least 50% of all timber and wood products is produced by sustainable forestry. This is verified by an FSC/PEFC certificate and a corresponding CoC certificate. Quantification can be determined by an estimate based on the Bill of Quantities.   | 75  |
| Level 1: It can be verified that planning and tender documents emphasise the importance of ensuring that all wood products procured are produced by sustainable forestry. FSC/PEFC certificates and a corresponding CoC certificate are only required for wood products from tropical and subtropical timbers. | 50  |
| None   | 0   |

**4 Evidence**

The following documents will be needed to assess the building:

- 1 Certificate from the Forest Stewardship Council (FSC) or those accredited by the Programme for Endorsement of Forest Certification Schemes (PEFC) are acceptable **and**;
- 2 Certificate of Chain of Custody **or**;
- 3 Letter from the supplier confirming that all timbers provided to site meet the requirement for the quality level targeted;
- 4 Completed wood products schedule spreadsheet provided on registration of project. This should be signed by contractor confirming that all products have been incorporated.

**5 Guidance**

For further guidance on FSC Forest Management Certification and Chain of Custody Certification refer to <https://ic.fsc.org/en/certification>



(Source: LEED for New Construction V4)

### 1 Intent

The intention is to:

- reduce the embodied impacts of construction products and materials
- encourage the use of verified third-party environmental product information
- encourage manufacturers and suppliers to provide more specific information on the embodied impacts of their materials
- enable practitioners to carry out more accurate assessment of the embodied impacts of products.

### 2 Assessment methodology

This is based on the number of construction products used that have Environmental Product Declarations (EPDs) or third-party certification (Type III) product labels. They must meet one of the product-specific declarations below:

- 1 EPDs that conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
- 2 Industry-wide (generic) EPD: Third-party certification (Type III), including external verification, valued as one half of a product for purposes of point calculation.
- 3 Product-specific Type III EPD: Products with third-party certification (Type III), including external verification, valued as one whole product for purposes of point calculation.

### 3 Calculation and rating

|   |     |
|---|-----|
| Level 3: Use at least 10 permanently installed individual products, sourced from at least three different manufacturers, that meet one of the disclosure criteria above | 100 |
| Level 2: Use at least 7 permanently installed individual products, sourced from at least two different manufacturers, that meet one of the disclosure criteria above    | 70  |
| Level 1: Use at least 3 permanently installed individual products, sourced from at least two different manufacturers, that meet one of the disclosure criteria above    | 30  |

### 4 Evidence

- 1 Completed schedule of products used in dwelling with EPDs, provided on registration of project. A link to each EPD is to be provided. This should be signed by contractor confirming that all products have been incorporated into dwelling and no on site substitution has taken place.

### 5 Guidance

IGBC has established an EPD programme and data base for Ireland. For more information see [www.epdireland.org](http://www.epdireland.org)



(Source: OpenHouse, adapted by OH from DGNB/BNB)

**1 Intent**

The intention is to:

- encourage the calculation of embodied impact of housing construction
- ensure that as operational energy is reduced, the significant embodied impacts involved in construction materials and components are also reduced.

**2 Assessment methodology**

A calculation of embodied impact, according to EN 15978–2011, for the following elements. Points are awarded according to the number of stages assessed, and the number of Life Cycle Assessment (LCA) indicators used in the assessment.

**3 Calculation and rating**

If no wood products are used in the building, then this sub-indicator shall not be assessed.

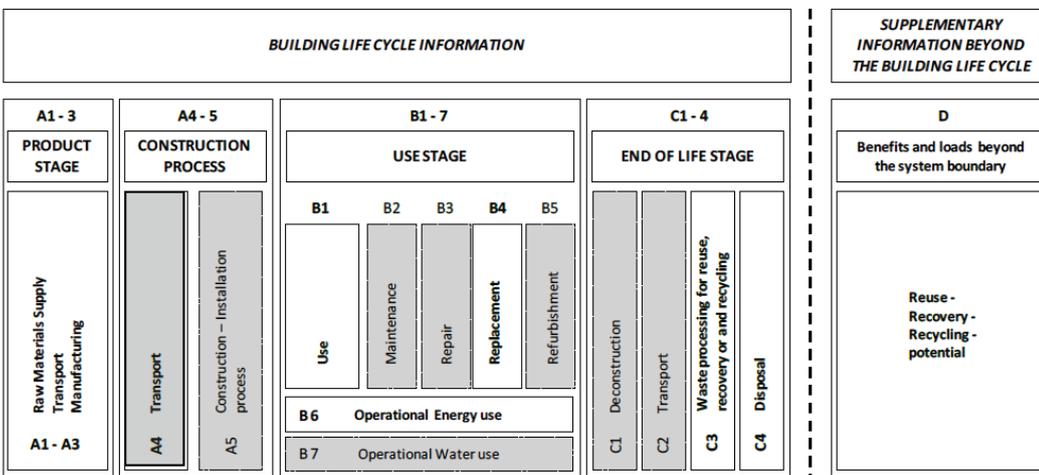


Figure 1: Building Life Cycle Phases according to FprEN 15978, adapted

**3 Calculation and rating**

Points are awarded according to the number of stages of Building Life Cycle measured, and the number of indicators used. The lowest level is A1–A3, Cradle to Gate, calculation of one indicator – Embodied Carbon (Global Warming Potential). Additional points are available for measuring the following indicators:

- Ozone Depletion Potential (ODP)
- Acidification Potential (AP)
- Eutrophication Potential (EP)
- Photochemical Ozone Creation Potential (POCP)

The following elements must be assessed:

- 1 Exterior walls and basement walls, including windows and coatings
- 2 Roof
- 3 Floor slab
- 4 Foundations
- 5 Interior walls.

|  |     |
|--|-----|
| 5 listed indicators for LCA Modules A1–A5                  | 100 |
| 5 listed indicators for LCA Modules A1–A3 (Cradle to Gate) | 90  |
| Embodied Carbon Modules A1–A5                              | 80  |
| Embodied Carbon Modules A1–A3 (Cradle to Gate)             | 70  |

#### 4 Evidence

- 1 Outputs of calculation in spreadsheet, separated into different elements
- 2 Name of LCA tool and database used
- 3 Name, experience and qualifications of person or company carrying out the calculation.

#### 5 Guidance

IGBC has partnered with One Click LCA to provide easy to use customised EN 15978 compliant software tools for Home Performance Index. These can be purchased as a single project licence or as annual licences with discounts for IGBC members: [https://www.oneclicklca.com/store/product/single-project-ireland-hpi/?lca\\_splash\\_shown=true](https://www.oneclicklca.com/store/product/single-project-ireland-hpi/?lca_splash_shown=true)

Embodied Carbon - Developing a client brief - UK Green Building Council: <https://www.ukgbc.org/sites/default/files/UK-GBC%20EC%20Developing%20Client%20Brief.pdf>

Free excel Active House calculator <http://www.activehouse.info/>



Assessed in **3.5: Sustainable Location**



(Source: adapted from LEED for Homes v4)

### 1 Intent

The intention is to:

- Design more compact homes to reduce energy consumption and environmental impacts from the construction and maintenance of larger homes.

### 2 Assessment methodology

Larger homes must offset some of their additional negative environmental impact by targeting higher points to achieve certification.

The assessment is undertaken on the internal floor area of the home. The baseline figures are founded on the more generous space standards originally proposed by some Local Authorities. Points are subtracted from the overall score in the environmental category based on the percentage level by which the house exceeds the baseline. This is calculated automatically within the spreadsheet once the area and number of bedrooms are entered on the assessment cover sheet, informed by the table below.

| Number of bedrooms | HPI baseline standard |
|--------------------|-----------------------|
| 1                  | 55m <sup>2</sup>      |
| 2                  | 90m <sup>2</sup>      |
| 3                  | 120m <sup>2</sup>     |
| 4                  | 150m <sup>2</sup>     |
| 5 or more          | 175m <sup>2</sup>     |

### 3 Calculation and rating

The number of points is automatically calculated once the spreadsheet is populated with the area and the number of bedrooms. These are then deducted from the overall Environmental Category score.

### 4 Evidence

Provide general arrangement drawings showing built areas and number of bedrooms and sizes.

### 5 Guidance

Refer to dwelling design in Quality Housing for Sustainable Communities, published by DECLG.



**1 Intent**

The intention is to:

- Minimise local air pollution from generation of NOX from the combustion of fuel, particularly in urban areas;
- To eliminate risk of ground pollution from onsite storage of hydrocarbons;
- To encourage a transition away from use of fossil fuels for heating or hot water.

**2 Assessment methodology**

This is based on minimising the potential for local pollution of ground and air from the combustion of fuels on site.

**3 Calculation and rating**

This is based on the type of fuel used for generation of heating or hot water on site and the level of NOx emissions. Where biomass is used, the combustion device must be such that it cannot be used to burn any other form of fuel such as coal or turf, and must remain fully sealed to the room at all times. Given the high NOX emissions from the burning of biomass these are not recommended for use in urban areas.

|   |     |
|---|-----|
| Level 3: There is no combustion of fuels on site for heating or hot water   | 100 |
| Level 2: Dedicated biomass boiler $\leq 200\text{mg/kWh NOx}$ is used and the location is defined as rural or gas boiler $\leq 40\text{mg/kWh NOx}$ | 25  |
| Level 1: No storage or combustion of hydrocarbons on site   | 0   |

**4 Evidence**

Specification of systems used for heating and hot water generation including NOx emissions.

**5 Guidance**









(Source: adapted from Building Regulations Part F TGD Ventilation 2009)

**1 Intent**

The intention is to:

- ensure good indoor air quality throughout the house with consistent supply of fresh air under all weather conditions
- prevent discomfort from draughts caused by uncontrolled ventilation
- limit the moisture content of the air so that it does not contribute to condensation and mould growth
- limit the concentration of harmful pollutants in the air within the house
- balance good levels of fresh air with heat loss due to ventilation.

**2 Assessment methodology**

This is based on different levels of quality in ensuring adequate ventilation, with highest points awarded where it can be demonstrated that there is a guaranteed flow of air under all weather conditions.

**3 Calculation and rating**

This is based on three progressive quality levels, with the highest level achieving maximum points.

|   |     |
|---|-----|
| <b>Level 3:</b> Designed mechanically assisted ventilation system in compliance with Part F TGD (with commissioning certificate for each dwelling), with air monitoring system for CO <sub>2</sub> that alerts occupant where CO <sub>2</sub> exceeds safe thresholds of 5000ppm. | 100 |
| <b>Level 2:</b> Designed mechanically assisted ventilation system in compliance with Part F TGD (with commissioning certificate for each dwelling) with humidity-activated monitoring system that alerts occupant where humidity levels indicate non-functioning of system.       | 75  |
| <b>Level 1:</b> Designed mechanically assisted ventilation system in compliance with Part F TGD (with commissioning certificate for each dwelling).   | 50  |

**4 Evidence**

- 1 Written specification of installed ventilation system;
- 2 Supporting drawings or photographs;
- 3 Certification of commissioning for each dwelling.

**5 Guidance**

Building Regulations Part F TGD Ventilation 2009

Check list and commissioning sheet for domestic ventilation systems.



(Sources: Code for Sustainable Homes, HQE, Miljöbyggnad)

### 1 Intent

The intention is to:

- promote good daylighting and thereby reduce the need for energy to light the home
- improve quality of life and mental wellbeing by providing visual delight and daylighting in at least part of the dwelling.

### 2 Assessment methodology

This is based on a calculation of daylight factor in the home.

### 3 Calculation and rating

|   |     |
|---|-----|
| <b>Level 4:</b> At least one of the living/kitchen spaces achieves average 3% daylight factor, with other living spaces achieving 2% and bedrooms achieve average 1.5% daylight factor. | 100 |
| <b>Level 3:</b> Living spaces achieve average 2% daylight factor, and bedrooms achieve average 1.5% daylight factor   | 70  |
| <b>Level 2:</b> Living Room /Kitchen achieve average 1.5% daylight factor, and bedrooms achieve average 1.5% daylight factor  | 20  |
| <b>Level 1:</b> No calculation but all living spaces/bedrooms have window aperture area > 10% of floor area   | 10  |

### 4 Evidence

Copy of calculations to demonstrate:

- 1 Average daylight factor as calculated in BS 8206-2:2008 – Lighting for buildings. Code of Practice for daylighting, or computer simulation or scale model measurements
- 2 Position of the no-sky line and percentage of area of the working plan that receives direct light from the sky
- 3 Confirmation from the developer/design team that the calculations accurately reflect the dwelling as designed.

### 5 Guidance

Available calculation tools:

IGBC excel based calculator tool provided on registration of the project;

Velux software available at: [http://viz.velux.com/daylight\\_visualizer/download](http://viz.velux.com/daylight_visualizer/download)

IES software available at:

<https://www.iesve.com/software/ve-for-engineers/module/FlucsDL/468>

Calculation method: refer to BS 8206-2:2008 – Lighting for buildings. Code of Practice for daylighting, available at:

<http://shop.bsigroup.com/ProductDetail/?pid=00000000030157088>

Refer to: “Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice” by Paul Littlefair, 1998, and 2011.



(Source: OpenHouse, adapted by OH from DGNB/BNB and BREEAM, with reference to Building Regulations 2014 TGD Part E Sound)

### 1 Intent

The intention is to:

- ensure that houses and apartments are built to maximise acoustic comfort and provide privacy between homes
- reduce noise transfer to effect change in the perception of urban dwelling, and thereby encourage better use of land and resources.

### 2 Assessment methodology

Noise transfer between dwellings is a key consideration in respect of amenity and privacy, as the internal ambient noise within habitable rooms can be considerable due to external noise intrusion (such as traffic noise) and internal noise sources (such as mechanical services, along with reverberation from common areas within buildings). In response, credits are awarded depending on the performance of: (i) sound insulation; (ii) indoor ambient noise level.

#### 2. 1 Airborne and impact sound insulation

Building Regulations 2014 Technical Guidance Document E – Sound outlines the performance requirements for airborne and impact sound insulation of partition walls and floors between units. Sound insulation testing, undertaken by a competent tester, is required to demonstrate that the construction of the partition/floor complies with those requirements. Testing must be conducted in accordance with the guidance and procedures outlined in Appendix A of TGD E.

A minimum number of individual sound tests are required to ensure accuracy, with the aggregate number referred to as a ‘set of tests’. The table below summarises the number of individual sound insulation tests required for specific dwelling types.

| Type of Test                        | Number of Tests required for each test    |                                |
|-------------------------------------|---|--------------------------------|
|                                     | Attached Houses (including single-storey) | Apartments and duplex dwelling |
| Airborne tests of separating walls  | 2   | 2                              |
| Airborne tests of separating floors | 0   | 2                              |
| Impact tests of separating floors   | 0   | 2                              |

The extent of testing depends on the number of dwellings, the type of dwellings (houses or apartments) and the variety of construction on any development. Refer to TGD E for guidance.

### 3 Calculation and rating

#### HW 3. 1 Airborne and impact sound insulation

|  |    |
|--|----|
| Airborne sound insulation values are at least 8dB greater than <i>TGD-E Sound Performance Levels</i> | 50 |
| Airborne sound insulation values are at least 5dB greater than <i>TGD-E Sound Performance Levels</i> | 25 |
| Airborne sound insulation values are at least 2dB greater than <i>TGD-E Sound Performance Levels</i> | 15 |

### HW 3.2 Airborne sound insulation – floors

|  |    |
|--|----|
| Airborne sound insulation values are at least 8dB greater than <i>TGD-E Sound Performance Levels</i> | 50 |
| Airborne sound insulation values are at least 5dB greater than <i>TGD-E Sound Performance Levels</i> | 25 |
| Airborne sound insulation values are at least 2dB greater than <i>TGD-E Sound Performance Levels</i> | 15 |

### HW 3.3 Impact sound insulation

|   |    |
|---|----|
| Impact sound insulation values are at least 8dB less than <i>TGD-E Sound Performance Levels</i> | 50 |
| Impact sound insulation values are at least 5dB less than <i>TGD-E Sound Performance Levels</i> | 25 |
| Impact sound insulation values are at least 2dB less than <i>TGD-E Sound Performance Levels</i> | 15 |

## 4 Evidence

- 1 A copy of the test results for each unit tested, indicating the performance achieved
- 2 Evidence that the tester has the necessary qualifications and competency to carry out test

## 5 Guidance

Building Regulations 2014 Technical Guidance Document E – Sound, available at:  
<http://www.environ.ie/>

BS 8233:2014 Guidance on sound insulation and noise reduction for buildings, available from:  
<http://shop.bsigroup.com/>

ISO 16283-1: 2014 Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 1: Airborne sound

ISO 16283-2:2015: Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 2: Impact sound

Refer to: DEHLG Planning Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (2009).



Source: adapted from CIBSE TM59:2017 and SEAI DEAP

**1 Intent**

The intention is to:

- ensure that homes are designed to avoid a risk of overheating in summer months
- ensure that homes are resilient to temperature extremes due to climate change over their lifetime
- ensure that homes are designed for comfort in winter by avoiding radiant asymmetry from extensive areas of cold surfaces, and ensure that heating systems can work effectively and efficiently.

**2 Assessment methodology**

This is based on an assessment and calculation of the risk of overheating. There are a number of compliance paths with different levels of rigour. These include Appendix P in the DEAP methodology, PHPP methodology or and full dynamic simulation. In all cases evidence must be provided to illustrate the mitigation of heat gain during the summer by adequate opening vents, including at least one secure vent capable of dissipating daytime heat during periods of vacancy

**3 Calculation and rating**

**HW 4.1: Summer comfort – risk of overheating**

|   |     |
|---|-----|
| Level 3: Dynamic simulation calculation demonstrating that the internal resultant temperature in all occupied rooms does not exceed an operative temperature of 26°C for more than 3% of the annual occupied annual hours | 100 |
| Level 2: Static calculation in PHPP or other software that temperature does not exceed 25°C for more than 5% of the occupied period   | 75  |
| Level 1: DEAP appendix P calculation that demonstrates no more than Medium risk (Internal temperature > 22°C)   | 50  |
| No overheating calculation has been carried out   | 0   |

**HW 4.2: Winter comfort – radiant asymmetry**

This is based on minimising difference between radiant internal surfaces within a room and ambient temperatures. Glazing is now the main surface where there can be a significant difference in cold weather leading to perceived discomfort, particularly when sitting near a window with lower U values. Excessive levels of glazing in certain areas will create difficulties in achieving a comfortable temperature across different rooms. It is assumed that all opaque surfaces will meet the requirement due to backstop values set out in TGD Part L 2011.

|  |    |
|--|----|
| Level 2: Whole window calculation including frame < 1.1w/m <sup>2</sup> /k; for sliding door <1.4w/m <sup>2</sup> /k | 50 |
| Level 1: U value, centre of pane glazing for windows < 1.1w/m <sup>2</sup> /k  | 25 |

**4 Evidence**

- 1 Evidence of calculations from methodology used
- 2 Evidence that completed dwelling complied with inputs, e.g. specification of secure openings, during summer period.
- 3 Glazing specification for windows.
- 4 Area calculations of glazing for each room.

## 5 Guidance

The guidance for the DEAP calculation can be found at DEAP Manual as "Appendix P: Assessment of internal temperature in summer". Page 88: [http://www.seai.ie/Your\\_Building/BER/BER\\_Assessors/Technical/DEAP/DEAP\\_2009/DEAP\\_Manual.pdf](http://www.seai.ie/Your_Building/BER/BER_Assessors/Technical/DEAP/DEAP_2009/DEAP_Manual.pdf)

Design methodology for the assessment of overheating risk in homes CIBSE TM59: 2017



(Source: Home Quality Mark)

**1 Intent**

The intention is to:

- ensure good indoor air quality and avoid negative impact on occupant health from Volatile Organic Compounds (VOCs) contained in construction materials and finishes.

**2 Assessment methodology**

This is based on a test carried out post-construction to measure the levels of formaldehyde in the indoor air and on an evaluation of the specification of low-VOC paints.

**3 Calculation and rating**

|   |    |
|---|----|
| A test is carried out post-construction and before occupation that demonstrates that the concentration of formaldehyde in indoor air does not exceed 0.1mg/m <sup>3</sup> (100µg/m <sup>3</sup> ) | 50 |
|---|----|

The test method is applicable to the measurement of formaldehyde in indoor air over the range from 0,001 mg/m<sup>3</sup> to 1,0 mg/m<sup>3</sup> for a sampling period of between 24 and 72 hours. For sampling periods of 24 hours, the applicable concentration range is 0,003 mg/m<sup>3</sup> to 1 mg/m<sup>3</sup>, and for 72 h it is 0,001 mg/m<sup>3</sup> to 0,33 mg/m<sup>3</sup>.

|  |    |
|--|----|
| All paints and varnishes specified meet the requirements of the EU Ecolabel for VOCs and SVOCs | 50 |
|--|----|

**4 Evidence**

- 1 Test results from independent and qualified tester, in accordance with ISO 16000-4:2011 Determination of formaldehyde-diffusing sample method. Provide a copy of the indoor air quality test results that includes documentation of the concentration levels and identifies the testing method used.
- 2 Confirmation that all paints and varnishes used internally meet the requirements of the EU Ecolabel provided through documentation from contractor and from site inspection report.
- 3 Complete the list with all paints and varnishes in the VOC limits HPI document provided on registration of the project.

**5 Guidance**

For testing method refer to:

[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=5221](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=5221)

For EU Eco label refer to:

<http://ec.europa.eu/environment/ecolabel/the-ecolabel-scheme.html>



Assessed in **3.5: Sustainable Location**







(Source: SEAI, DEAP and PHPP)

**1 Intent**

The intention is to:

- encourage a fabric-first approach, ensuring that the homeowner benefits from reduced heating costs
- ensure that developments maximise orientation for free heating, and minimise heat loss from the building fabric
- encourage attention to detail to minimise thermal bridging and heat loss due to uncontrolled ventilation.

**2 Assessment methodology**

This is based on fabric energy efficiency calculation in either Building Regulations TGD L, DEAP or PHPP software. This is calculated in DEAP in the *Net space heat demand* tab. The calculated figure should be taken from the *Heating Season (October – May)* field.

**Dwelling Energy Assessment Procedure (DEAP)**

**Net space heat demand**

Internal heat capacity of dwelling [MJ/K]

For calculation of adjusted temperature due to intermittent heating

Length of one unheated period [h]

Number of unheated periods per week

Solar gains and heat use

| Solar gains         | Jan  | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov  | Dec  |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Solar gains [kWh/d] | 2.44 | 3.96 | 5.20 | 6.23 | 7.20 | 7.13 | 6.78 | 6.47 | 5.70 | 4.60 | 3.09 | 2.24 |
| Solar gains [W]     | 102  | 165  | 217  | 260  | 300  | 297  | 283  | 270  | 238  | 192  | 129  | 93   |
| Total gains [W]     | 608  | 671  | 722  | 765  | 806  | 803  | 788  | 776  | 744  | 698  | 635  | 599  |

| Heat use         | Jan  | Feb  | Mar  | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov  | Dec  |
|------------------|--|------|------|-----|-----|-----|-----|-----|-----|-----|------|------|
| Heat loss [W]    | 1215   | 1198 | 1072 | 962 | 734 | 523 | 355 | 380 | 540 | 785 | 1030 | 1156 |
| Heat use [kWh]   | 462  | 369  | 293  | 197 | 79  | 21  | 4   | 6   | 30  | 135 | 305  | 426  |
| Heat use [kWh/y] | Heating season (October - May) <input type="text" value="2267"/> |      |      |     |     |     |     |     |     |     |      |      |
| Full year        | <input type="text" value="2328"/>                                |      |      |     |     |     |     |     |     |     |      |      |

[Click to view full details](#)

**3 Calculation and rating**

There are two different sets of benchmarks which recognise that detached and semi-detached houses have a higher surface fabric heat loss area than mid-terrace housing and apartments. This allows slightly higher heat loss for detached and semi-detached houses.

100 exemplary points can be awarded where fabric quality verified by additional certification such as Passive House standard

| Net space heating demand – DEAP ≤ | Semi-detached/ detached | Mid terrace/ apartment | Points |
|-----------------------------------|-------------------------|------------------------|--------|
| Level 3                           | 17 kWh/m <sup>2</sup>   | 10 kWh/m <sup>2</sup>  | 100    |
| Level 2                           | 27 kWh/m <sup>2</sup>   | 20 kWh/m <sup>2</sup>  | 75     |
| Level 1                           | 37 kWh/m <sup>2</sup>   | 30 kWh/m <sup>2</sup>  | 50     |

**4 Evidence**

Detailed report from DEAP.

## 5 Guidance

For DEAP, refer to: Building Regulations 2011 TGD Part L – Conservation of Fuel and Energy:  
[http://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/Development andHousing/BuildingStandards/FileDownload%2C27316%2Cen.pdf](http://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/Development%20andHousing/BuildingStandards/FileDownload%2C27316%2Cen.pdf)

For PHPP, refer to: [http://www.passiv.de/en/05\\_service/02\\_tools/02\\_tools.htm](http://www.passiv.de/en/05_service/02_tools/02_tools.htm)  
[http://www.passivehouse-international.org/index.php?page\\_id=188](http://www.passivehouse-international.org/index.php?page_id=188)



(Source: Tipperary Energy Agency, with reference to DEAP)

### 1 Intent

The intention is to:

- provide transparent information on the likely energy costs of the home. These are based on the calculated costs for heating, hot water and electricity, including electrical plug load requirements, and the usable contribution from renewable energy systems, including any available feed in tariffs.

### 2 Assessment methodology

This is based on the calculation of energy costs using a standardised cost calculator with national energy costs for different fuel mixes. A specific spreadsheet has been developed for use in HPI to calculate costs.

### 3 Calculation and rating

Points are awarded according to bands of costs for energy use. Benchmark levels are based on the number of bedrooms in the dwelling. The cost benchmarks have been developed for 1, 2, 3, 4 and 5+ bedrooms, using the baseline figures for dwelling size in indicator EN 12.0: Dwelling size adjustment factor.

| Benchmarks        |      |        |        |        |        |        |
|-------------------|------|--------|--------|--------|--------|--------|
| Bedrooms          | 1    | 2      | 3      | 4      | 5+     | Points |
| Quality level 3 ≤ | €212 | €249   | €420   | €489   | €558   | 100    |
| Quality level 2 ≤ | €486 | €665   | €913   | €1,080 | €1,223 | 50     |
| Quality level 1 ≤ | €759 | €1,082 | €1,405 | €1,671 | €1,888 | 10     |

### 4 Evidence

Completed cost calculator spreadsheet and DEAP detailed report.

### 5 Guidance

For the DEAP detailed report, refer to:

[http://www.seai.ie/Your\\_Building/BER/BER\\_Assessors/Technical/DEAP/DEAPv321\\_Release\\_notes.pdf](http://www.seai.ie/Your_Building/BER/BER_Assessors/Technical/DEAP/DEAPv321_Release_notes.pdf)



Assessed in **3.5: Sustainable Location**



(Source: Adapted from NDA Universal Design Homes)



**1 Intent**

The intention is to:

- ensure resource- and space-efficient design that balances area efficiency with long-term flexibility
- raise awareness and inspire people to think differently about the benefits of universally designed homes.
- The criteria selected have been based on the four key principles of the Universal Design system: integrated into the neighbourhood; easy to approach, enter and move about in; easy to understand, use and manage; and flexible, cost-effective and adaptable over time.

**2 Assessment methodology**

Points are awarded according to the checklist below.

|   |
|---|
| <b>1 HOME LOCATION AND APPROACH</b>   |
| a Provide accessible car parking and good set down points / communal parking close to the home  |
| b Provide a dropped kerb for ease of access onto the pavement   |
| c Provide ease of access to home’s front door – ensure that paving within the property boundary is firm, non-slip and non-reflective              |
| <b>2 ENTERING AND MOVING AROUND</b>   |
| a Provide lighting to illuminate the door, the home number and location of the entry system, separate to a P.I.R. light or general external light |
| b Provide porches or shelters at front doors for improved weather protection at the door  |
| c Provide different colours to front doors for visual contrast and wayfinding   |
| d Provide different colours to exteriors – wayfinding and breakup of uniformity   |
| e Plant at front door with scents and sounds to help guidance to door   |
| f Provide wider doors, both external and internal   |
| g Provide an entrance door with a clear width of between 800mm and 850mm  |
| h Entrance and hallway in the home: provide space for storing outdoor wear, coats, shoes and bags   |
| i Entrance and hallway in the home: provide additional storage space for a buggy and/or shopping trolley  |
| j Entrance and hallway in the home: provide opening (slabbed over) in first floor for future installation of platform lift                        |

### 3 SPACES FOR LIVING

- a Living room: ensure there is a living space at the same level as the entrance to the home
- b Living room: identify a location for a bed space at entrance level
- c Living room: the living space should be capable of functioning normally, even with the bed space in use
- d Living room: flexible space in living rooms for social interaction
- e Dining room: locate the dining area within or immediately adjacent to the kitchen
- f Dining room: if the dining table is in the living room, provide a table for occasional eating in the kitchen
- g Kitchens: design the home so that the kitchen is not the main thoroughfare through the home
- h Kitchens: split-level counters in kitchen to allow people of different statures ease of use – discuss with tenant prior to installation to check if this is required
- i Kitchens: provide 1200–1500mm between opposing work surfaces
- j Kitchens: provide colour or tonal contrast on worktop/counter edges, for handles and controls, between floor finish and walls, switches or sockets and their backgrounds
- k Kitchens: ensure switches and sockets are clearly visible and within reach
- l Entry-level toilet: ensure all walls are constructed to be strong enough to take fittings and rails
- m Entry-level toilet: make downstairs WC a shower wet room – provide below-floor drainage and a drainage point. Provide level access for a future shower installation, with only very slight falls to the drain position
- n Entry-level toilet: tank floor and walls up to a height of 2000mm. Ensure ceiling plasterboard and light fittings are moisture-resistant.
- o Bedrooms: locate the bathroom immediately adjacent to the main bedroom, with a full-height door or 'soft spot' between them, for future installation of a door
- p Bedrooms: provide 'hard spots' in the ceiling at the main bedroom and at the main or adjacent bathroom, or continuous between the main bathroom and an adjacent bathroom, to allow the ceiling construction to support future installation of a hoist-track
- q Bathrooms: all walls are constructed to be strong enough to take fittings and rails
- r Bathrooms: provide the potential for a hoist-track to be installed, supported by the ceiling construction
- s Bathrooms: tank floor and walls up to a height of 2000mm. Ensure ceiling plasterboard and light fittings are moisture-resistant
- t Bathrooms: ensure that provision is made for future adaptation to a shower room, for example by providing a capped outlet for future installation of a floor drain and tanking of walls and floors
- u Bathrooms: locate the bathroom immediately adjacent to the main bedroom, with a full-height door or 'soft spot' between them

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#### 4 ELEMENTS AND SYSTEMS

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- a Sockets, light switches and window sills at levels that are within easy reach and view for everyone
  - b Avoid locating any fittings less than 500mm from an internal corner
  - c Install two- or three-way switching as necessary
  - d Provide light switches to the bottom and top of stairs
  - e Details like lever door handles and taps that are easier to use for everyone, especially young children
  - f Provide power supply to internal doors, above and beside window heads and at skirting level to allow for future automatic devices, such as assisted door openers, ceiling hoists and automatic curtain/blind opening
  - g Easy control and use of systems and the capability to integrate smart energy efficiency, security systems, assistive technologies and entertainment systems
  - h Choice of materials and colour with fittings and finishes that are easy to use and maintain and are attractively and smartly designed
  - i Optimised use of natural light, ventilation and energy efficiency
- 

### 3 Calculation and rating

|                                  |                  |
|----------------------------------|------------------|
| Total available on the checklist | Up to 100 points |
|----------------------------------|------------------|

#### 4 Evidence

- 1 Completed checklist signed by design team professional. This checklist is provided on registration of the project.
- 2 Plans and drawings
- 3 Photographs of each item selected in the checklist

#### 5 Guidance

Refer to: Universal Design Guidelines for Housing in Ireland, available at:  
<http://universaldesign.ie/News-events/News/Universal-Design-Guidelines-for-Homes-in-Ireland.pdf>



### 1 Intent

The intention is to:

- provide occupants with easy-to-understand information on their energy and water use, and to pinpoint where heavy energy or water use is occurring
- allow occupants to use electricity when it is most cost-effective in the future (dependent on the introduction of smart energy tariffs).

### 2 Assessment methodology

This is based on the provision of information on energy and water consumption to occupants, via interactive home monitors or smart phone/tablet, to allow better control of energy and water use. Points are awarded according to the checklist spreadsheet.

Points are awarded according to the level of information provided to the occupant

#### Advanced control of heating

- Enhanced controls for heating systems (e.g. Climote, Nest)

#### Electricity monitoring

- Smart electricity meter that provides cost information on daily, weekly and monthly rates, different cost tariffs, etc.

#### Heat and hot water

- Information on costs and energy use in kWh for gas, oil and electrical (for hot water and heating) usages

#### Monitoring of water use

- Water monitor

#### Integrated dashboard

- All of the above information is integrated onto one platform

### 3 Calculation and rating

This is assessed on the main Home Performance Index spreadsheet checklist.

|                                  |                  |
|----------------------------------|------------------|
| Total available on the checklist | Up to 100 points |
|----------------------------------|------------------|

### 4 Evidence

- 1 Completed checklist;
- 2 Specification of monitoring systems installed in dwelling, and technical data sheets.

### 5 Guidance

For specification refer to: Suppliers' data sheets



### 1 Intent

The intention is to:

- promote the provision or purchase of energy-efficient appliances in the home, encouraging the reduction of CO<sub>2</sub> emissions.

### 2 Assessment methodology

Credits are awarded where the performance requirements (set out in the spreadsheet: A+++, A++, A+) have been met. Confirm the EU Energy Efficiency Labeling Scheme rating for specified appliances covered by the assessment criteria. Where appliances are not being provided, confirm that EU Energy Efficiency Labeling Scheme Information will be provided. Please note that in 2017-2019 the rating scale is changing to a simpler A, B, C rating with the A+++, A++, A+ system to be phased out. This may mean A+++ will become A, A++ will become B, and A+ becomes C.

### 3 Calculation and rating

Use the calculator in the assessment spreadsheet to calculate the points awarded to obtain

| Appliance description  | Rating                  |
|--|-------------------------|
| Fridge and freezer <b>OR</b> fridge-freezer  | A+++/A++/A+/A           |
| Washing machine and dishwasher   | A+++/A++/A+/A           |
| Tumble dryer <b>OR</b> washer-dryer<br>(Where a dedicated and ventilated drying space is provided in lieu of a tumble dryer or washer dryer then assume A has been achieved) | A+++/A++/A+/A           |
| Oven or hobs   | A+++/A++/A+/A           |
| EU Energy Efficiency Labelling Scheme Information is provided to each dwelling in place of a tumble dryer or a washer dryer  | Yes/No                  |
| <b>Total available on the checklist</b>  | <b>Up to 100 points</b> |

### 4 Evidence

Schedule of appliances provided with the dwelling.

### 5 Guidance

Refer to EU Energy Labeling Directive at:

<https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficient-products>



Assessed in **3.5: Sustainable Location**







(Source: Building Regulations TGD Part L)

### 1 Intent

The intention is to:

- encourage careful quality construction to minimise heat loss due to air infiltration
- avoid damage to building structure over its lifetime due to interstitial condensation.

### 2 Assessment methodology

This is based on the results of an air tightness test taken upon completion by a trained air tightness assessor certified by NSAI or INAB. The procedure for testing is specified in BS EN ISO 9972:2015 “Thermal performance of buildings: determination of air permeability of buildings: fan pressurization method” or in ISO/IEC 17025:2005 “General requirements for the competence of testing and calibration laboratories”.

The test is to be carried out for each dwelling or apartment block. For those also seeking Passive House certification, 0.6 ach/hour @Pa n50 is deemed to comply with the highest level.

### 3 Calculation and rating

|   |     |
|---|-----|
| Level 3: $\leq 1.0 \text{ (m}^3/\text{hr)m}^2 \text{ @ Pa q50 reading}$ | 100 |
| Level 2: $\leq 2.0 \text{ (m}^3/\text{hr)m}^2 \text{ @ Pa q50 reading}$ | 50  |
| Level 1: $\leq 3.0 \text{ (m}^3/\text{hr)m}^2 \text{ @ Pa q50 reading}$ | 10  |

### 4 Evidence

- 1 Test certificate for each dwelling or building and report from air tightness assessor, stating residential unit number and result.
- 2 Evidence that tester is NSAI- or INAB-certified.

### 5 Guidance

Refer to: TGD L 2011 – Limiting Thermal Bridging and Air Infiltration, ACD Introduction.  
<http://www.environ.ie/sites/default/files/migrated-files/en/Publications/Development and Housing/BuildingStandards/FileDownload%2C18749%2Cen.pdf>



(Source: Building Regulations TGD Part L and BREEAM –Thermographic survey)

**1 Intent**

The intention is to:

- encourage the careful detailing of building junctions to minimise thermal bridging and resultant heat loss
- encourage proper assessment of condensation risk at junctions
- encourage a record of all ‘as built’ details by creating a full digital photographic record of all junctions
- encourage post-completion thermographic imaging as a quality assurance measure and to allow remediation of any defects.

**2 Assessment methodology**

This is based on the degree of rigour in the assessment of the thermal bridging adjustment factor and the condensation risk assessment. Evidence is to be provided where Y factor thermal adjustment figures below 0.15 are inputted into DEAP. Each level requires an appropriate level of rigour of design, calculation and oversight.

The Y factor for thermal bridging in dwellings can be calculated from a combination of manufacturers’ assessed details, detail catalogue values and bespoke calculations.

**3 Calculation and rating**

**QA 2.1. Thermal bridging adjustment**

|   |     |
|---|-----|
| <b>Level 3:</b><br>Thermal bridge adjustment $\leq 0.025$ Y factor + calculation + competent oversight* | 100 |
| <b>Level 2:</b><br>Thermal bridge adjustment $\leq 0.04$ Y factor + calculation + competent oversight*  | 85  |
| <b>Level 1:</b><br>Thermal bridge adjustment $\leq 0.08$ Y factor <u>or</u> use acceptable details      | 25  |

**QA 2.2 Photographic record**

A full digital photographic record of all thermal bridge junctions during construction. The digital photographic record should clearly identify the location of the junction within the dwelling by following the Passive House (or similar) photographic protocol.

|                                       |    |
|---------------------------------------|----|
| Full photographic record of junctions | 50 |
| No photographic record                | 0  |

**QA 2.3 Thermographic imaging**

This is based on a thermographic survey carried out on the completed building envelope by a Level 1 PCN-certified thermographer with construction experience.

|   |    |
|---|----|
| Thermal imaging with report has been carried out on completion by a Level 2 PCN-certified thermographer | 50 |
| No thermal imaging report   | 0  |

**4 Evidence**

- 1 Calculations of Y factor signed by relevant member of the design team and/or NSAI-registered thermal bridge assessor, where bespoke calculations are carried out.
- 2 Signed confirmation from contractor that building junctions have been constructed in accordance with details, acceptable detail sheets or a relevant building control ancillary certificate.

- 3 Evidence that a full digital photographic record of all thermal bridge junctions has been prepared according to the Passive House photographic protocol or similar.
- 4 Report and thermal imaging survey carried out by certified minimum level 1 PCN-certified thermographer with construction related experience.

### 5 Guidance

Refer to: TGD L 2011 – Limiting Thermal Bridging and Air Infiltration, ACD Introduction.  
[http://www.environ.ie/sites/default/files/migrated-files/en/Publications/Development and Housing/BuildingStandards/FileDownload%2C18749%2Cen.pdf](http://www.environ.ie/sites/default/files/migrated-files/en/Publications/Development%20and%20Housing/BuildingStandards/FileDownload%2C18749%2Cen.pdf)

All design professionals and site operatives engaged in the installation of insulation, such as bricklayers and carpenters, should have had at least awareness training through programmes such as the Foundation Energy Skills course ([www.qualibuild.ie](http://www.qualibuild.ie)) and be registered on the

Minimum Performance Level 1 required - Main Contractor registered with Construction Industry Register Ireland (CIRI)



(Source: OpenHouse, adapted by OH from DGNB/BNB, LEED, BREEAM, SuPerBuildings) and DGNB)

**1 Intent**

The intention is to:

- minimise the gap in performance between design and construction by ensuring that members at all levels of the construction team are engaging in continual professional development and are able to deliver quality low-energy construction
- encourage all construction trades and operatives on site to engage in upskilling/training
- encourage better communication and systems thinking on site.

**2 Assessment methodology**

This is based on the use of CIRI-registered contractors and sub-contractors, to ensure engagement in continuous professional development at all levels. Points are awarded based on the degree to which the construction team can demonstrate that they have purposely engaged with improving the level of quality and training of every site operative: tradesmen, plasterers, bricklayers, carpenters, electricians and plumbers.

**3 Calculation and rating**

|   |     |
|---|-----|
| Level 2 – Maximum available points from skills calculator | 100 |
| Level 1 – Mandatory main contractor on the CIRI register  | 0   |

**4 Evidence**

Evidence can be provided as follows to show compliance with each level

- 1 Completed Construction Team assessment spreadsheet. This is provided on registration of the project.
- 2 Provide CIRI registration number for each registered contractor on site and relevant work package. These should be filled in the assessment sheet.
- 3 Sample contract showing that QualiBuild training or equivalent for all site operatives has been made a contractual requirement for the contractor
- 4 Sample subcontract showing that QualiBuild training has been made a contractual requirement for any sub-contractors on site.

**5 Guidance**

All of the construction team need to be trained in low-energy construction if passive or low-energy standards are to be achieved cost-effectively.

Current approved courses in low-energy construction for building operatives and tradesmen are:

Qualibuild Foundation Energy Skills (FES) programme at <http://www.qualibuild.ie/>

Passive House Tradesman programme at <http://www.passivehouseacademy.com/>

Refer to: CIRI register at <https://www.ciri.ie>

Refer to: Construction Workers Skills register at: <https://www.constructionworkerskillsregister.ie>



(Source: OpenHouse, adapted by OH from DGNB/BNB, LEED, BREEAM, SuPerBuildings, and DGNB)

### 1 Intent

The intention is to:

- encourage clients to appoint qualified professionals who have appropriate knowledge and skills throughout all phases of design and construction
- ensure that proper attention is given to aesthetic design, urban design and place making
- ensure that technical skills are integrated into the early design phase and throughout the developed design and construction detailing
- encourage upskilling amongst design professionals and the reduction of the performance gap between design and constructed dwellings.

### 2 Assessment methodology

This is based on assessing the overall skills of the design team when tendering professional design services, to ensure that they have the appropriate skills to deliver quality planning and sustainable, energy-efficient design. This is assessed using the score sheet of qualifications and skills within the design team. The preference is that every member of the core design team has had basic awareness level training. Sustainable design can only be fully integrated into a development when all the principle designers understand the fundamentals of sustainable energy-efficient design.

### 3 Calculation and rating

#### QA 4.1: Design Team Skills

|                          |     |
|--------------------------|-----|
| Maximum points available | 100 |
|--------------------------|-----|

To achieve the highest level, it is required that the lead designer, project architect, project engineer, quantity surveyor, etc. must have upskilled – irrespective of their level of seniority – as they hold the key responsibility for the quality of the scheme.

#### QA 4.2: Design Team Planning

|   |    |
|---|----|
| Design team has met at least three times during the project to set and review HPI targets: once at early design stage; once at pre-tender/pre-construction stage; and once at construction stage. Minutes are available for all these meetings indicating the process | 25 |
| No planning meetings  | 0  |

### 4 Evidence

- 1 Assessment of design team through list of qualifications;
- 2 Confirmation from client that each of the design team have performed the designated role on the project;
- 3 Completed Design Team Skills spreadsheet, provided on registration of the project.

### 5 Guidance

One design team member may provide several of the functions, provided that he/she has the relevant professional qualifications in each area listed and is performing that role on the project. Specialist training should be relevant to the particular role of the project team member. Points are awarded based on relevancy of training to residential construction. Where it states project architect, engineer or QS, qualifications are not transferable within a design office.



(Source: Openhouse, adapted by OH from DGNB/BNB, BREEAM, LEED)

### 1 Intent

The intention is to:

- make sure that heating, ventilation and renewable systems are properly commissioned, to ensure that they are working at maximum efficiency.

### 2 Assessment methodology

This is based on the level of commissioning carried out by a suitably qualified professional following completion.

### 3 Calculation and rating

|  |     |
|--|-----|
| Where third-party commissioning of ventilation, heating systems and renewable systems is carried out on completion <b>and</b> once 12 months have elapsed since occupation | 100 |
| Where third-party commissioning of ventilation, heating systems and renewable systems is carried out on completion   | 50  |

### 4 Evidence

- 1 Confirmation from developer that third-party commissioning of all services has or will take place;
- 2 Qualifications of commissioner of the services.

### 5 Guidance

Refer to: Openhouse Indicator 5.8 Commissioning and DGNB 2009, Indicator 51, Commissioning



(Source: Code for Sustainable Homes)

### 1 Intent

The intention is to:

- provide information to homeowners on how to best manage their home to reduce the environmental impact during its operation, and to ensure that integrated systems, such as heating and ventilation, are maintained and run correctly
- provide support to homeowners for a period after they move into their homes.

### 2 Assessment methodology

This is based on the level of information provided to the homeowners on how to operate their home. This can be either by a printed home user guide or an online user guide. It must be specific to the home and the type of systems installed. This should be provided in concise plain language that is accessible to all users, and training within the home is recommended for tenants or owners where necessary. The user guide should cover any feature necessary for the homeowner to understand and which is required to operate the home to maximum efficiency or to maintain the environmental benefit of the strategy.

| Item                     | Information to be included in guide   |
|--------------------------|---|
| Ventilation              | <ul style="list-style-type: none"> <li>• Introduction to importance of ventilation for indoor air quality and moisture control</li> <li>• Description of installed ventilation system</li> <li>• How the system works and operation details</li> <li>• Maintenance requirements – filters, etc. where relevant, and where to get them</li> <li>• Contact details, in case problem arises with system; links to manufacturer manuals.</li> </ul> |
| Renewable energy systems | <ul style="list-style-type: none"> <li>• Description of installed system</li> <li>• How the system works and operation details</li> <li>• Maintenance requirements</li> <li>• Contact details, in case problem arises with system; links to manufacturer manuals.</li> </ul>  |
| Heating systems          | <ul style="list-style-type: none"> <li>• Introduction and expected costs based on standard usage</li> <li>• Description of installed system</li> <li>• How the system works and operation details</li> <li>• How to programme and maintain maximum efficiency throughout the year</li> <li>• Maintenance requirements</li> <li>• Contact details, in case problem arises with system; links to manufacturer manuals.</li> </ul>                 |
| Smart metering           | <ul style="list-style-type: none"> <li>• Description of installed system</li> <li>• How the system works and operation instructions</li> <li>• Contact details, in case problem arises with system; links to manufacturer manuals.</li> </ul>   |
| Water efficiency         | <ul style="list-style-type: none"> <li>• Description of water efficiency measures and any issues the homeowner may experience. Information on standard water usage and how this relates to water bills</li> <li>• Description of specific measures installed, e.g. low flow taps, aerators, etc.</li> <li>• Maintenance requirements</li> <li>• Contact details, in case problem arises with system; links to manufacturer manuals.</li> </ul>  |

| Item        | Information to be included in guide   |
|-------------|---|
| Maintenance | <ul style="list-style-type: none"> <li>• Maintenance programme of the dwelling where this is the responsibility of the owner</li> <li>• Refer to gutters, downpipes, drainage</li> <li>• Any specific maintenance of external walls or windows – frequency, etc.</li> </ul> |

### 3 Calculation and rating

|  |    |
|--|----|
| Manual includes the list of topics above and is provided either in print or online | 40 |
| Additional points are awarded if any of the following are achieved.                |    |
| Manual is available either in print and online for at least 5 years                | 20 |
| Manual carries Plain English mark or equivalent                                    | 20 |
| Initiation training provided for new occupants in home                             | 20 |

### 4 Evidence

Confirmation, in the form of a letter from the developer or in the specification, that:

- 1 The guide will:
  - a Be supplied to all dwellings within the development
  - b Be developed to the required standard
  - c Include the website location for the manual
- 2 Evidence that initiation training in the use of both active and inactive systems (ventilation, heating, etc) will be provided to all tenants and home purchasers in home.

### 5 Guidance

Guidance on writing simply is available from the National Adult Literacy Agency. They can also provide certification that the manual is written in Plain English.

<http://www.simplyput.ie>







(Source: Open House, adapted by OH from BREEAM, DGNB/BNB, and LEED)

### 1 Intent

The intention is to:

- encourage the location of development close to existing transport, but also to encourage the inclusion of alternative transportation modes in new development
- define the effective shortest distance in metres from the assessed home to local public means of transportation

### 2 Assessment methodology

This is based on the distance (in metres) to access the nearest option of public transportation, such as a bus or train. Low-emission transportation options that replace existing higher-emission means of transport (e.g. electric buses replacing fossil-fuelled buses or bicycle schemes replacing other transportation modes) are encouraged, so a separate sub-indicator is assigned to them.

The following sub-indicators will be assessed:

- Accessibility of the nearest train station
- Accessibility of the nearest public transport stop (bus, rail/tram)
- Availability of low-emission transport options: city bicycle scheme, car club scheme, charging point for electric/hybrid vehicles, electric/hybrid bus lines
- Availability of walking and cycle paths

### 3 Calculation and rating

While the site can be assessed before development, the points are awarded based on the actual provision following completion of the development. This allows for availability to be improved as part of the development, by providing cycle ways or alternative transport options and by creating pedestrian ways to existing amenities.

#### SL 1.1: Accessibility of the nearest train station

Accessibility of the nearest train station from assessed home

|              |    |
|--------------|----|
| < 300 m      | 20 |
| 300 – 500 m  | 15 |
| 500 – 800 m  | 10 |
| 800 – 1200 m | 5  |
| > 1200 m     | 0  |

#### SL 1.2: Accessibility of the nearest public transport stop

Accessibility of the nearest public local transport stop from assessed home

|              |    |
|--------------|----|
| < 150 m      | 20 |
| 150 – 300 m  | 15 |
| 300 – 500 m  | 10 |
| 500 – 1000 m | 5  |
| > 1000 m     | 0  |

### SL 1.3: Availability of low-emission transport options

Accessibility of low-emission transport options: city bicycle scheme, car club scheme, charging point for electric/hybrid vehicles, electric/hybrid bus lines within 1km of assessed home.

🏆 100 exemplary points may be added in the Environment category for each dwelling provided with a vehicle e-charging point, or where communal car parking is provided when all car spaces are wired for e-charging and at least 25% of the car spaces are provided with an e-charging point.

|           |    |
|-----------|----|
| 4 options | 20 |
| 3 options | 15 |
| 2 options | 10 |
| 1 options | 5  |
| 0 options | 0  |

### SL 1.4: Availability of walking and bicycle paths

Accessibility of walking and cycle paths

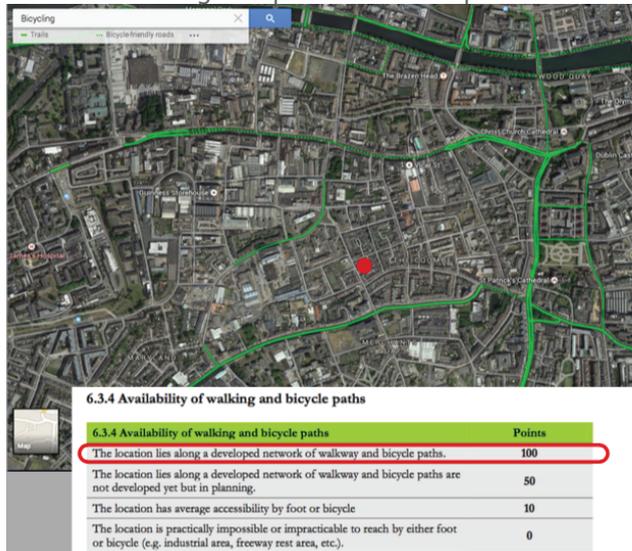
|  |    |
|--|----|
| The location lies along a developed network of walkways and bicycle paths                                    | 20 |
| The location lies along a developed network of walkways. Bicycle paths are not developed yet but in planning | 15 |
| The location has standard accessibility by foot or bicycle   | 5  |
| The location is practically impossible or impracticable to reach by either foot or bicycle                   | 0  |

## 4 Evidence

- 1 Google maps or similar showing distances from home to various services
- 2 Evidence of any measures included as part of the development that are not visible on Google maps, e.g. letter of commitment from car club, plans of proposed pedestrian and cycle routes, photographs of e-charging stations.

## 5 Guidance

You can use Google maps as in the example below



**6.3.4 Availability of walking and bicycle paths**

| 6.3.4 Availability of walking and bicycle paths   | Points |
|---|--------|
| The location lies along a developed network of walkway and bicycle paths.   | 100    |
| The location lies along a developed network of walkway and bicycle paths are not developed yet but in planning.                             | 50     |
| The location has average accessibility by foot or bicycle   | 10     |
| The location is practically impossible or impracticable to reach by either foot or bicycle (e.g. industrial area, freeway rest area, etc.). | 0      |



(Source: Open House, adapted by OH from BREEAM, DGNB/BNB, and LEED)

### 1 Intent

The intention is to:

- reward community connectivity, assist in reducing transport-related emissions and traffic congestion, and promote communal life
- quantify the number of and distance to key amenities in relation to the assessed home.

### 2 Assessment methodology

This is based on the distance to and number of available amenities, which are identified and categorised in the 9 sub-indicators below. Points are given for the type and number of facilities of each amenity, weighted by the distance from the assessed home.

The following sub-indicators will be assessed:

- 1 Access to restaurant facilities
- 2 Access to local supply facilities
- 3 Access to parks and open spaces
- 4 Access to education facilities
- 5 Access to public administration facilities
- 6 Access to medical care facilities
- 7 Access to sport facilities
- 8 Access to leisure facilities
- 9 Access to other services

### 3 Calculation and rating

#### SL 2.1: Restaurants

Restaurants, bars, cafés, snack stands, bakeries, etc. Food facilities within the development boundaries are also taken into account.

|  |    |
|--|----|
| 2 facilities of different types within max. 300m distance or 3 facilities of different types within max. 500m distance or 4 facilities of different type within max. 750m distance | 20 |
| 1 facility within max. 300m distance or 2 facilities of different types within max. 500m distance or 3 facilities of different types within max. 750m distance                     | 15 |
| 1 facility within max. 500m distance or 2 facilities of different types within max. 750m distance  | 10 |
| 1 facility within max. 750m distance   | 5  |
| No facilities within 750m distance   | 0  |

#### SL 2.2: Local shop

Supermarkets, minimarkets, grocery shops, street markets, etc. Local grocery supply facilities within the development boundaries are also taken into account

|   |    |
|---|----|
| 2 facilities of different types within max. 300m distance or 3 facilities of different types within max. 500m distance or 4 facilities of different types within max. 750m distance | 20 |
| 1 facility within max. 300m distance or 2 facilities of different types within max. 500m distance or 3 facilities of different types within max. 750m distance                      | 15 |
| 1 facility within max. 500m distance or 2 facilities of different types within max. 750m distance   | 10 |

|                                      |   |
|--------------------------------------|---|
| 1 facility within max. 750m distance | 5 |
| No facilities within 750m distance   | 0 |

### SL 2.3: Parks and open spaces

Public parks, gardens, recreation green spaces, lakes and rivers, etc. Parks and open spaces within the development are also taken into account.

|   |    |
|---|----|
| 1 park or open space in plain sight or 2 parks or open spaces within max. 500m distance         | 20 |
| 1 park or open space within max. 500m or 2 parks or open spaces within max. 500m distance       | 15 |
| 1 park or open space within max. 750m distance or 2 parks or open spaces in max. 1000m distance | 10 |
| 1 park or open space in max. 1000m distance   | 5  |
| No parks or open spaces in less than 1000m distance   | 0  |

### SL 2.4: Education

Children's nurseries and crèches, schools and universities. etc. Education facilities within the development are also taken into account.

|  |    |
|--|----|
| 2 facilities of different types within max. 500m distance or 3 facilities of different types within max. 1000m distance  | 50 |
| 1 facility within max. 500m distance or 2 facilities of different types within max. 1000m distance or 3 facilities of different types within max. 1500m distance | 35 |
| 1 facility within max. 1000m distance or 2 facilities of different types within max. 1500m distance  | 25 |
| 1 facility within max. 1500m distance  | 10 |
| No facilities within 1500m distance  | 0  |

### SL 2.5: Public administration

Local public administration offices and town halls, citizen services, and other public facilities. Public administration facilities within the development are also taken into account.

|   |    |
|---|----|
| 2 facilities of different types within max. 500m distance or 3 facilities of different types within max. 1000m distance                                     | 20 |
| 1 facility within max. 500m distance or 2 facilities of different types within max. 1000m distance or 3 facilities of different type in max. 1500m distance | 15 |
| 1 facility within max. 1000m distance or 2 facilities of different types within max. 1500m distance   | 10 |
| 1 facility within max. 1500m distance   | 5  |
| No facilities within 1500m distance   | 0  |

### SL 2.6: Medical care

Medical practitioners such as doctors, dentists, physiotherapists, and nursing homes, hospitals, and rehabilitation clinics, etc. Medical care facilities within the development are also taken into account.

|   |    |
|---|----|
| 2 facilities of different types within max. 500m distance or 3 facilities of different types within max. 1000m distance                                     | 20 |
| 1 facility within max. 500m distance or 2 facilities of different types within max. 1000m distance or 3 facilities of different type in max. 1500m distance | 15 |
| 1 facility within max. 1000m distance or 2 facilities of different types within max. 1500m distance   | 10 |
| 1 facility within max. 1500m distance   | 5  |
| No facilities within 1500m distance   | 0  |

### SL 2.7: Sports facilities

Sports fitness clubs and gyms, games pitches and courts, spas, sports and skating tracks, etc. Sports facilities within the development are also taken into account.

|   |    |
|---|----|
| 2 facilities of different types within max. 500m distance or 3 facilities of different types within max. 1000m distance                                     | 20 |
| 1 facility within max. 500m distance or 2 facilities of different types within max. 1000m distance or 3 facilities of different type in max. 1500m distance | 15 |
| 1 facility within max. 1000m distance or 2 facilities of different types within max. 1500m distance   | 10 |
| 1 facility within max. 1500m distance   | 5  |
| No facilities within 1500m distance   | 0  |

### SL 2.8: Leisure

Leisure centres, including cinemas, galleries, theatres, libraries, bowling and billiards, dance schools, wellness amenities, etc. Leisure facilities within the development are also taken into account.

|   |    |
|---|----|
| 2 facilities of different types within max. 500m distance or 3 facilities of different types within max. 1000m distance                                     | 20 |
| 1 facility within max. 500m distance or 2 facilities of different types within max. 1000m distance or 3 facilities of different type in max. 1500m distance | 15 |
| 1 facility within max. 1000m distance or 2 facilities of different types within max. 1500m distance   | 10 |
| 1 facility within max. 1500m distance   | 5  |
| No facilities within 1500m distance   | 0  |

### SL 2.9: Other services

Post offices, banks, launderettes, veterinary clinics, printing centres, bookshops, flower shops etc. Services within the development are also taken into account.

|   |    |
|---|----|
| 2 facilities of different types within max. 500m distance or 3 facilities of different types within max. 1000m distance                                     | 20 |
| 1 facility within max. 500m distance or 2 facilities of different types within max. 1000m distance or 3 facilities of different type in max. 1500m distance | 15 |
| 1 facility within max. 1000m distance or 2 facilities of different types within max. 1500m distance   | 10 |
| 1 facility within max. 1500m distance   | 5  |
| No facilities within 1500m distance   | 0  |

### 4 Evidence

1 Site plan or location map to scale, highlighting existence of:

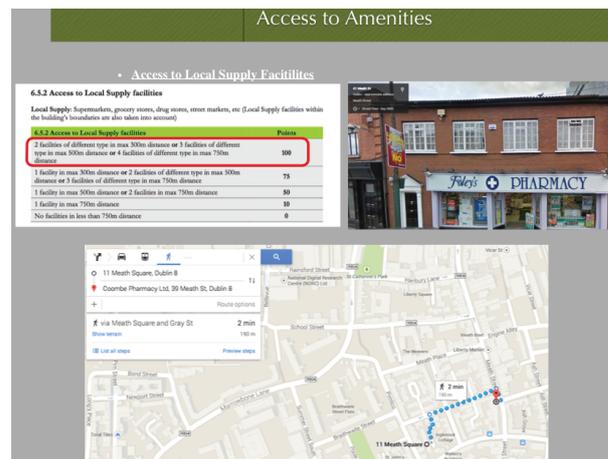
- location of assessed home
- location, type and number of amenities
- distance to the amenities

2 Site plan or location map to scale, illustrating where the amenities do not currently exist, but are due to be developed, with a letter from the client/developer confirming:

- location, type and number of amenities to be provided
- timescale for development of the amenities.

### 5 Guidance

Google maps, GPS mapping or similar software can be used to illustrate the distances:





(Source: Open House, adapted by OH from ESPON and BREEAM, and DECLG/OPW)

### 1 Intent

The intention is to:

- avoid the development of buildings, roads or car parks in high-risk and inappropriate areas
- reduce the risk resulting from ground, water and man-made hazards.

### 2 Assessment methodology

HPI currently only assesses flood risk. This is based on the risk identified in a Flood Risk Assessment, which is carried out with reference to DECLG/OPW flood maps and guidance, available at: <http://www.floodmaps.ie/>

### 3 Calculation and rating

|                          |     |
|--------------------------|-----|
| Level 4: Very low hazard | 100 |
| Level 3: Low hazard      | 75  |
| Level 2: Moderate hazard | 50  |
| Level 1: High hazard     | 25  |
| Very high hazard         | 0   |

### 4 Evidence

A Flood Risk Assessment (FRA) has been carried out on the site by a competent professional, who assessed the hazard while taking into account any remedial measures undertaken by local authorities or the OPW on the site.

### 5 Guidance

Refer to the DECLG/OPW guidance in the Planning System and Flood Risk Management Guidelines for Planning Authorities, available at:

<http://www.environ.ie/en/Publications/DevelopmentandHousing/Planning/FileDownload,21709,en.pdf>

Further guidance from UK CLG Planning Policy Statement 25: Development and flood risk practice guide, available at:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/7772/pps25guideupdate.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7772/pps25guideupdate.pdf)



# 4.0 ACKNOWLEDGEMENTS



## 4.0 ACKNOWLEDGEMENTS

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