HOME QUALITY MARK

www.homequalitymark.com

Home Quality Mark

Version 6.0

Technical Manual – SD259

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Acknowledgements

The Home Quality Mark has been made possible through the continued efforts of many dedicated BRE Group staff members, National Scheme Operators (NSOs), Technical Working Group members, BRE Global licensed assessors, customers, and all those who have responded to our consultation calls and meetings or provided feedback in other ways. We are grateful to those who support the HQM and BREEAM by specifying and applying the method and contributing to building a better world.

Cover image

Moda Living's Heworth Green, York

About this document

This publication is the technical manual for the Home Quality Mark (HQM)™. Its main purpose is to support the assessment and rating of new homes by licensed Home Quality Mark assessors, in line with the scheme processes and procedures;(1) and in doing so allow us to make a certification decision in accordance with BS EN ISO/IEC 17065:2012, the international standard to which we are accredited by United Kingdom Accreditation Service (UKAS).(2)

The technical manual also acts as a reference for any stakeholder involved in the development of a new home which is being (or has been) assessed against the standard. This includes home owners and occupiers, clients, housing developers, the financial sector, comparison websites, project team members and the wider stakeholder group.

When carrying out an assessment and determining an HQM rating the HQM assessor must use this technical manual alongside the assessment tools provided and the BREEAM operations manual (SD5070).

The Home Quality Mark includes country-specific criteria for England, Scotland, Wales, and Northern Ireland.

The technical manual is available to download from www.homequalitymark.com.

Changes to this document

We may revise and reissue this technical manual from time-to-time. A schedule of the publication date for each issue of this manual is provided below.

Document reference	Version / issue number	Issue date
SD259	6.0.0 (withdrawn)	28/06/2023
	6.0.1 (withdrawn)	06/07/2023
	6.0.2	08/11/2023

6.0.2

Location	Description of change
(Multiple)	Fix typographical errors.
3.2 Managing Rainfall Impacts	Fix typo in methodology section for 'Discharges directly to a tidal estuary or the sea'. 14 credits can be achieved.
3.3 Security	Fix applicability of crit 2. The criterion applies to Northern Ireland.
4.5 Temperature	Update criteria, methodology, and definitions for the foundation route (HQM temperature tool). The number of credits available for the foundation route has been reduced to 6 credits.
	Add crit 4 on the use of passive design solutions to limit the risk of overheating.
	Modify crit 10 to align with the requirements in crit 4.
5.1 Energy and Carbon Performance	Add greater than or equal signs (≥) to Table 30 for clarity.
	Clarify how the HEPR is calculated from the weighted EPR for each metric (in the methodology section and in the note to the criteria).
8.1 Water Efficiency	Replace "European Water Label" with "Unified Water Label".
11.2 Home Information	Remove reference to "HQM charter" in the information required under the 'Introduction' topic in Table 62.
11.3 Smart Homes	Update references to PAS 35491:2017 (in crit 4 and crit 8) with references to BS EN 50174 series.
Appendix A	Add rating levels alongside the credits and percentages required for each star level in Table 65.
	Update indicator backstops for 'My Cost' and 'My Wellbeing' following changes to the number of credits available for the foundation route in 4.5 Temperature.

6.0.1

Location	Description of change
1.2 Sustainable Transport Options	Clarify methodology for the percentage of disabled persons' parking spaces that must be supplied with electric vehicle charging points (EVCP).

Introduction to the Home Quality Mark

What is the Home Quality Mark?

The Home Quality Mark (HQM) is a customer-focused, third-party assessment and certification scheme. It recognises new homes where performance meets best-practice standards that are often significantly above those required by regulation. It defines a rigorous, evidence-based, relevant and independent voluntary standard for new homes, and is built on tried and tested processes commonly used in the UK and the rest of the world.

Through a simple and accessible rating system supported by a number of performance indicators representing home occupier's key priorities, HQM does the following:

- Allows consumers to compare new homes in terms of their likely running costs and environmental footprint (effect), as well as providing a measure of a healthier home. It helps them to make informed choices when buying or renting a home
- Allows home builders and developers to evaluate their operations and set their new homes apart from others by supporting performance claims and explaining the benefits of new homes to their customers and others
- Allows public and private sector landlords to set priorities and monitor performance against these priorities in new build properties throughout the design and construction phases, making sure that the properties they take on, meet their expectations and their tenants' needs.
- Allows the financial service providers to more accurately reflect in their lending or affordability criteria, the effect the cost of running a new home has on a homeowner's financial outgoings. This helps to guide lending decisions by taking into account the likely reduction in spending for customers living in better-performing homes.
- Reassures planners, designers, communities and other stakeholders that objectives relating to sustainability and quality of developments are being achieved and robustly monitored.

HQM builds on best practice in the housing and wider residential sector, drawing together a range of quality and performance standards and combining this with the latest scientific research. In doing so, it provides a rigorous, credible and achievable performance label of new homes that reflects a broad range of expectations from industry, occupiers and society.

HQM is a UK scheme. However, many criteria are interpreted in terms of national standards, regulations and practices to allow the scheme to be used efficiently to assess new homes in England, Scotland, Wales, and Northern Ireland.

HQM is developed and operated by BRE and it is part of the BREEAM(3) family of quality and sustainability standards. As such, it benefits from over 33 years of experience in evaluating and certifying performance in homes and other buildings within the UK and the rest of the world.

What makes a HQM home different?

Our homes are important to us. In the UK we typically spend well over 50% of our time in and around them, and they represent the biggest single financial commitment in terms of their purchase or rental and running costs. They have a major effect on our health and wellbeing and they say a lot about us, our priorities and our interests.

HQM measures performance across a wide range of financial, wellbeing, environmental and social issues. It gives an overview of the performance of the whole home and how this may affect the occupier in a way that other standards are unable to do.

A home that has a certified HQM rating will stand out because:

- there is a greater level of confidence in the performance and quality of the home;
- the home has been built to improve performance beyond that required by regulation and standard practices; and
- the home and its surroundings have been built to consider issues that are important to the homeowner and the environment and wider society, but which are not covered by regulations, to reduce the risk of unintended consequences occurring as a result of focussing on a single issue.

HQM allows consumers to make a smart choice based on their personal priorities and gives home builders and others the tools to set their new homes apart from others by providing:

- a rating, scored out of five levels
- indicators of performance, ranked on a five-point scale.

The rating gives an overall picture of the home's quality, with level 5 being an outstanding home. The indicators focus on specific aspects of interest to home occupants in three key areas, including living costs (My Costs), health and wellbeing (My Wellbeing) and environmental footprint (My Footprint).

My Cost	
Provides an indication of the overall costs of living in the home. This takes account of the following. – Energy use – How long materials are likely to last – Maintenance – Performance of the home in extreme weather – Access to transport and amenities such as GP surgeries, cash points, pharmacies, supermarkets and so on – Higher quality homes. This indicator could influence mortgages, insurance and financing for development.	

My Wellbeing	
Provides an indication of how the home will affect the occupier's health and wellbeing. This takes account of the following. – Quality of living space (indoor air, temperature, light and noise) – Local amenities such as GP surgeries, cash points, pharmacies, supermarkets and so on.	

My Footprint	
Provides an indication of how the home will affect the environment both during its construction and when it is being used. This takes account of the following. – Local and global emissions to the environment when the home is being used – Environmental impact of constructing the home – Protecting and enhancing ecology.	

The overall rating and indicators are presented as a HQM 'scorecard'. This scorecard is an easy-to-understand tool which people who are buying or renting a new home can use to compare householder costs, positive effects on health and wellbeing, and environmental footprint. It is an all-round indicator of quality.

HQM application

What can HQM assess?

HQM can be used to assess the environmental, social, and economic impacts of new-build homes in England, Scotland, Wales, and Northern Ireland.

For the purpose of HQM, a home is defined as a "self-contained residential unit designed to accommodate a single household. It will therefore contain all the spaces that the household requires for living, sleeping, food preparation and hygiene". This definition of a home is the same as that used to define a 'dwelling' in Approved Document L1[(4)].

A new-build home is one that is a new standalone structure or a part of one – such as a Build to Rent (BTR) development, Private Rental Sector (PRS) scheme, or a privately owned home – that will come into use for the first time after it is completed.

HQM is not appropriate for the refurbishment of existing homes or for new-build projects which contain rooms for multiple residential purposes such as student and key-worker accommodation, care homes, sheltered housing or other types of building which are defined for more than one household to live in. The BREEAM UK Domestic Refurbishment and BREEAM UK Non-Domestic New Construction schemes can be used to assess these types of projects. Please see the technical manuals for these schemes for a detailed description of what they cover and who they apply to. For further details of these schemes and the technical manuals, please visit www.breeam.com

When does the HQM assessment take place?

It is essential to get the timing of engagement with the HQM right to make sure it fits seamlessly with the process for developing and buying a new home (the procurement process). Stakeholders must carefully consider criteria requirements in the design and construction process to make sure they can be properly addressed without affecting costs or performance in other areas. Without this engagement with the supply chain, a new home may not achieve the desired HQM rating or the associated benefits.

A HQM assessment is a two-stage process to make sure that opportunities to improve the performance of the home are identified during the design stage (interim assessment and certificate) and put into practice during the construction and commissioning stages and when people move into the home (final assessment and certificate).

Although the final certification is issued after the construction is completed (post-construction) to make sure the specified level of performance is achieved in the most cost-effective way and consumers are given the highest degree of confidence in the HQM rating, we strongly recommend an interim assessment and certification at the design stage. An interim stage certificate shows with confidence the predicted assessment rating of the home based on the design intent and specification.

Before an application for a certified assessment and rating, a pre-assessment can be carried out in the early stages of the design to estimate the likely HQM performance. Although HQM is voluntary, a pre-assessment will often be useful to support an outline or detailed planning application or tender bid by demonstrating the likely performance of the proposals. Pre-assessments are not formal assessments certified by us, and there is no such thing as an uncertified HQM rating, so the HQM performance based on a pre-assessment is not proven and no-one must claim that a home has been awarded a HQM rating based on pre-assessment.

Making sure people can trust the Mark

It is important that developers and their customers can trust that HQM is reliable and robust. As an accredited third-party certification body, we make sure robustness and fairness are key aspects that underpin the scheme.

Creating and operating the Mark

The credibility and consistency of the HQM assessment and rating is a fundamental part of the scheme. As the UK's leading building science centre, BRE is owned by the BRE Trust, a registered charity that works to improve the quality and sustainability of our buildings and the built environment for the wider public benefit, promoting best practice and developing knowledge and understanding throughout the sector. BRE is independent from interest groups that are involved in designing and building new homes.

BRE is highly respected as a world-leading authority in building performance research, testing, evaluation, standard setting and certification, with over 100 years of experience operating both within the UK and internationally. The science-based content and independent application in line with recognised international standards(5) underpin both the creation and operation of HQM. We, BRE Global, are the BRE's certification body. We operate the HQM scheme and are accredited by the United Kingdom Accreditation Service (UKAS) against these international standards to make sure we are independent, competent and impartial. As an accredited certification body, BRE Global maintains an open and accountable governance structure.

BREEAM operates a series of Technical Working Groups, these provide BRE Global with access to a range of experts that can review BRE Global's standards and schemes to ensure their robustness from a scientific, technical and market perspective as well as ensuring the development of the standards and schemes is open to greater external and independent scrutiny.

Process of certification

Independence is a key feature of HQM as it provides confidence to the consumer. Our assessors are trained and licensed by BRE to carry out the HQM assessment and determine a rating. For an up-to-date list of HQM assessors, visit www.greenbooklive.com.

The HQM assessor will evaluate the design, specification and construction of a new home using the criteria and methodologies defined in this technical manual and the assessment tools that support it.

Once an assessment is complete, if the home has achieved a positive outcome under our quality assurance procedure, we will issue one certificate per home. The certificate provides formal confirmation that the HQM assessor has completed their assessment in line with the requirements of the scheme and its quality standards. The certificate will give the consumer (or any other interested party) confidence in the HQM rating and performance of the new home.

Anyone who wants to check a certified assessment and rating of a new home against HQM can do so by either checking the home's HQM certificate, which will contain the scheme's certification mark, or by searching the project listings on Green Book Live(6).

Overview of the HQM technical content

This section provides an overview of the detailed technical assessment issues and supporting guidance, which makes up the majority of this manual. This detail is separated into three main parts.

HQM assessment issues and criteria - This section includes the technical sections and all the assessment issues and criteria that make up the HQM scheme (see HQM assessment issues and criteria below for more detail).

HQM evidence requirements - This section provides guidance to assessors and project teams on the types and forms of evidence required to demonstrate a home is meeting HQM criteria. It should be read alongside the evidence section in each individual assessment issue.

Appendices - The appendices provide supporting information on the methods we use to score and rate a home for HQM, the benchmarks we use, and supporting guidance for project teams applying and aiming to meet the HQM criteria including 'post-construction stage assessment issue exceptions'.

HQM assessment issues and criteria

The 39 assessment issues that define HQM are categorised into three sections.

- Our Surroundings – includes issues that look at a home's ability to work with current and future surroundings.
- My Home – includes issues that look at providing living spaces that are comfortable, healthy and cost effective and have reduced harmful effects on the environment.
- Delivery – includes issues that focus on delivering construction quality. It encourages the designer, builder, client and householder to co-operate and share knowledge and encourages them to support occupiers after they hand over the property to them.

Each assessment issue has a number of 'credits' available and this number reflects how important the issue is in relation to other issues in the scheme. The HQM assessor awards the appropriate number of credits if the new home meets the issue criteria. The total number of credits a home achieves determines the rating and performance against each of the HQM indicators (please see Appendix A – HQM Scoring and Rating for a description of the methods and benchmarks we use to score a new home).

Each of the assessment issues that define HQM is structured as follows.

- **Aim**: This outlines the intention of the issue.
- **Benefit**: This describes the key benefits and values for the householder.
- **Context**: This outlines why the issue is relevant to the development of quality homes in sustainable communities.
- **Credit summary**: This summarises the key topics being assessed in the issue including number of credits available and groups criteria by topic.
- **Criteria**: This sets out the criteria the issue assesses and the relevant number of HQM credits that can be awarded. A home must meet all criteria marked as 'minimum requirement' to achieve a HQM certificate. The home must meet criteria marked as 'prerequisite' to gain any credits within that issue.
- **Methodology**: This sets out any methodology that should be followed or used to assess if the home is keeping to criteria needed to award credits.
- **Compliance notes**: These notes provide extra guidance that helps HQM assessors and project teams apply and interpret the assessment criteria, including how to assess whether a home is meeting criteria in specific situations. All compliance notes are published on the BREEAM Knowledge Base. Each note has a unique reference number which can be quoted in the HQM quality assurance (QA) report.
- **Evidence**: This outlines typical examples of the type of information the developer must give the HQM assessor. This information allows the assessor to independently verify the development's performance against the assessment criteria and award the relevant number of credits. See also Appendix C – HQM Evidence Requirements.
- **Checklists, tables and illustrations**: These include any supporting assessment information and guidance.
- **Definitions**: This contains the definitions of terminology used throughout the issue.

Minimum requirements

To make sure all HQM certified homes consistently deliver on some important issues, the scheme sets out minimum performance levels in several key areas. These requirements establish a standard that consumers can expect from all homes which have achieved a HQM certificate. This is important to promote trust and give consumers assurance and confidence as to the quality of a home.

The minimum requirements have been set in a way that can be achieved on all types of homes, but still require performance which is better than building regulations. There are nine issues which include minimum requirements. A home must meet all minimum requirements to gain a certificate under HQM. The table below provides a summary of the minimum requirements for each of the nine issues. Please see the relevant issue for full details.

Table 1 Minimum requirement summary table

Issue	Criteria	Summary of minimum requirement
3.1 Flood Risk	For England, Scotland, and Northern Ireland: 01 Flood risk assessment: crit 1-crit 2 For Wales: 01 Flood consequence assessment: crit 3-crit 4	– Carry out an assessment of the site's risk of flooding
3.3 Security	For Wales: 02 Approved Document Q compliance: crit 2	– The home meets Approved Document Q
4.5 Temperature	02 Temperature analysis : crit 2	– Thermal analysis has been carried out – The results of the analysis are included in the home information with guidance on how to manage high temperatures
4.6 Ventilation	01 Information sign: crit 1	– A securely fixed sign providing information on the location, design intent, operation and maintenance of all ventilation systems and controls has been installed in the home
	03 Ventilation rates: crit 4	– The home achieves the minimum ventilation rates set for continuous mechanical extract ventilation and mechanical ventilation with heat recovery (England and Wales) or systems 3 and 4 (Northern Ireland)
	04 Maintenance and controls: crit 8	– Ventilation systems are capable of boosting the rates during instances of increased humidity.
9.1 Project Preparation	02 Project delivery plan: crit 3-crit 4	– A project delivery plan is in place, which sets out roles, responsibilities, target, requirements for handing over the home to the occupier after construction is complete, strategy to manage quality, carry out commissioning and testing
	03 Product procurement and substitution policy: crit 5	– The project has a product procurement and substitution policy in place
	04 Dissemination of information: crit 6	– Processes are in place to communicate project requirements and key considerations to all trades and site workers
9.2 Commissioning and Testing	01 Commissioning building services and control systems: crit 1-crit 3	– Commissioning of building systems is carried out according to best practice guidance, by people not involved in installations

Issue	Criteria	Summary of minimum requirement
9.3 Inspections and Completion	01 Visual defects inspection: crit 2	– A visual defects inspection is carried out for the assessed home when construction is complete to make sure any defects identified are put right and that the home is finished and habitable (suitable to live in) in line with the specifications
	02 Construction inspections: crit 3	– Inspection details are agreed and carried out at key stages to ensure the home complies with required performance characteristics. Any design variations or material substitutions are appropriately managed and approved.
	03 Construction record: crit 4-crit 5	– Throughout the construction stage, a record is kept of all the quality assurance measures carried out
11.1 Aftercare	01 Building warranty: crit 1	– The home is covered by a building warranty, recognised by the Consumer Code for Home Builders or the Trading Standards Institute
	02 Handover visit: crit 2	– The developer has committed to provide demonstrations to occupants when they move in to make sure they know how to operate and maintain their home
11.2 Home Information	01 Home information: crit 1	– The developer gives occupants key information in an accessible way, to help them get the most from their home.

Indicator backstops

As well as the above, HQM also sets minimum performance level for the indicators ('indicator backstops'). These apply for an indicator score of three or more and have been set to make sure key issues (specific to that indicator) are not overlooked when targeting a high score.

The indicator backstops require a home to achieve a set number of credits within key issues. For example, to achieve a score of three in the 'wellbeing' indicator, a home must achieve three credits in the 'daylight' issue.

Please see Appendix A for a full list of indicator backstops.

HQM assessment issues

HQM sections, category, assessment issues and available credits			
Section	**Category**	**Assessment Issue**	**No. Credits Available**
 Our Surroundings	1 Transport and Movement	1.1 Public Transport Availability	15
		1.2 Sustainable Transport Options	17
		1.3 Local Amenities	16
	2 Outdoors	2.1 Identifying Ecological Risks and Opportunities	07
		2.2 Managing Impacts on Ecology	09
		2.3 Ecological Change and Enhancement	12
		2.4 Long Term Ecological Management and Maintenance	08
		2.5 Recreational Space	22
	3 Safety and Resilience	3.1 Flood Risk	19
		3.2 Managing Rainfall Impacts	19
		3.3 Security	09
 My Home	4 Comfort	4.1 Indoor Pollutants	12
		4.2 Daylight	13
		4.3 Noise Sources	04
		4.4 Sound Insulation	09
		4.5 Temperature	17
		4.6 Ventilation	13
	5 Energy	5.1 Energy and Carbon Performance	60
		5.2 Decentralised Energy	08
		5.3 Impact on Local Air Quality	15
	6 Materials	6.1 Responsible Sourcing	25
		6.2 Environmental Impact of Materials	25
		6.3 Life Cycle Costing	12
		6.4 Durability	07
	7 Space	7.1 Drying Space	03
		7.2 Access and Space	11
		7.3 Recyclable Waste	10
	8 Water	8.1 Water Efficiency	17
 Delivery	9 Quality Assurance	9.1 Project Preparation	06
		9.2 Commissioning and Testing	11
		9.3 Inspections and Completion	16
	10 Construction Impacts	10.1 Responsible Construction Practices	05
		10.2 Construction Energy Use	05
		10.3 Construction Water Use	05
		10.4 Site Waste Management	15
	11 Customer Experience	11.1 Aftercare	04
		11.2 Home Information	00
		11.3 Smart Homes	08
		11.4 Post Occupancy Evaluation	10

Our Surroundings

1 Transport and Movement

1.1 Public Transport Availability

Maximum credits

15

Indicators (Average)

Aim

To recognise and encourage developments which are close to public transport networks. This will give consumers a choice and mean they are not as dependent on their cars, which will reduce associated emissions.

Benefit

- Promotes activity and empowerment.
- Future-proofs developments for changes in transport practices and in the population, including an ageing population.
- Reduces occupants' carbon footprint.
- Provides cost savings when compared with the cost of owning and running a car.(7)

Context

Transport accounts for a quarter of UK greenhouse-gas emissions, significantly affecting air quality. Public transport helps reduce transport-related greenhouse-gas emissions, as emissions per passenger mile resulting from trains and buses can be up to eight times lower than those from private cars.

New housing development has a large part to play in making sure that sustainable and public transport facilities are in place and are suitable for the number of people a development is designed for. Including the necessary infrastructure at an early planning stage is the most cost-effective way to help build communities and improve accessibility, and can also help improve existing local transport links.

Credit Summary

Criterion number	Title	Credits
crit 1-crit 3	01 Accessibility Index	up to 12
crit 4-crit 5	02 Improved local service	3
Total credits available		15

Criteria

01 Accessibility Index **up to 12 credits**

crit 1 Homes are awarded credits based on the accessibility to public transport nodes. Credits are awarded based on the Public Transport Accessibility Index (AI) as shown in Table 2.

Table 2 Public Transport Accessibility Index (AI) scores and associated number of credits

Credits	AI Score in Rural Locations	AI Score in Urban Locations
4	1	2
6	2	4
8	4	8
12	6	12

crit 2 The Accessibility Index is determined by entering the following information into the HQM Transport calculator:

- crit 2.a: The distance (m) from the homes main entrance to each compliant public transport node via Safe pedestrian routes. In cases where the site boundary crosses a pedestrian route of an existing network and is not controlled by the developer, guidance should be sought from the local authority to apply the appropriate measures.
- crit 2.b: The public transport types serving the Compliant public transport nodes, such as bus or rail.
- crit 2.c: The average number of services stopping per hour at each compliant node during peak times.
- crit 2.d: Home information is provided for local transport networks or nodes.

crit 3 During off-peak hours for a weekday (09:30–16:00 and 19:00–06:30) and off-peak hours at the weekend (between 06:30–19:00), the average number of services stopping per hour should not reduce to less than a quarter of the weekday on-peak service (06:30–09:30 and 16:00–19:00) serving all Compliant public transport nodes. For rural locations services between midnight and 5am are exempt from this requirement.

02 Improved local service **3 credits**

crit 4 Transport companies have been contacted and an increase in the local service provision for the development has been negotiated, which results in an increase in the existing AI score of at least 1.00.

crit 5 Contracts are in place to ensure that the increased service provision will be in place for a minimum of 5 years following occupation of all homes.

Methodology

Accessibility Index

The methodology for calculating the Accessibility Index uses Transport for London's Public Transport Accessibility Level (PTAL) method, itself based on a methodology developed in 1992 by the London Borough of Hammersmith and Fulham. For a detailed description of the PTAL methodology see the 'Measuring Public Transport Accessibility Levels Summary'[8] document.

Distance to transport node

Distance should not be measured 'as the crow flies' and must be measured via a safe pedestrian route from the main entrance of the home (communal entrance of the building for an apartment block) to the nearest compliant transport node.

Multiple transport nodes
Where there is more than one transport node serving the home, located at different proximities, for example one node at 400m and another at 600m, then each node should be assessed.

Services that operate from more than one node within proximity of the home, i.e. two separate bus stops served by the same bus, must be considered only once - at the node in closest proximity to the home. Different services at the same node can be considered as separate.

Calculating the average number of services
For the purpose of the calculation, the frequency of public transport is the average number of services per hour. This is calculated by determining the number of stopping services at the node during peak times divided by the number of hours within that period.

For example: in rural locations within proximity of a bus stop with 12 stopping services during the peak periods (i.e. the 6 hours of peak time as defined in crit 3, the average number of services is 12/6 = 2 services per hour at peak times (equivalent to an average service frequency of approximately 30 minutes).

Multiple services
Where a transport node is served by more than one service going to a local urban centre, the frequency between services can be used as the frequency for assessment. For example, where there are three services, each with a 30-minute frequency but each follows on 10 minutes after the other, the frequency used for assessment purposes would be 10 minutes.

Bidirectional routes
Routes will be bidirectional, however for the purpose of calculating the index, consider only the direction with the highest frequency (in accordance with the PTAL methodology).

Homes in Greater London
The Transport for London Planning Information Database allows users to search for a specific London location by street name, coordinates or postcode, and then calculate the Accessibility Index (AI) for that location.

Phased or multiple home development
For phased or multiple home developments, see Appendix D–Post-construction stage assessment issue exceptions.

Homes being assessed as part of a larger development
The AI can either be calculated for each home or where the client does not want to assess the AI for each home, the calculation should assume the 'worst case', i.e. by using the home which is furthest away from each transport node to determine the AI.

Compliance Notes
Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
All	02 AI calculation	A copy of the completed AI calculator and documentary evidence supporting the data used to complete the calculator or TFL output.	

Checklists, Tables & Illustrations
None.

Definitions

Accessibility Index (AI)

A measure that provides an indicator of accessibility and density of the public transport networks for an individual home. The index can be influenced by the proximity and diversity of the public transport network and the frequency of service at the accessible node.

Compliant public transport nodes

A compliant node includes buses, trams, trains, tubes and other types of public transport. The service stopping at each node must provide transport from, or onward travel to, either an urban centre, major transport node or a community focal point, for example, a doctor's surgery, library, school or village centre. Only local services should be assessed and any national public transport services should be excluded from the analysis, unless such a service can be said to provide a local commuter service.

Urban

A compliant node includes any bus service with a stop within 400m and any railway station within 800m of the assessed building's main entrance, measured via a safe pedestrian route (not 'as the crow flies').

Rural

A compliant node includes any bus service with a stop within 800m and any railway station within 1600m of the assessed building's main entrance, measured via a safe pedestrian route (not 'as the crow flies').

Rural locations

A rural location is defined as being any settlement or land that does not meet the definition of urban below.

Safe pedestrian routes

Pedestrian routes on the development site, within control of the developer are deemed to be safe and accessible for all pedestrian users (including people with disabilities, the elderly and children), where they take into account any physical limitation of those who may use them, for example providing steps appropriately supported by slopped access and dropped curbs positioned at crossing points. These routes and associated spaces are appropriately sized, with good visibility of the route ahead. Alongside these principles they should also meet the following requirements:

1. Where required, lighting design must be in accordance with BS 5489-1:2020 *Design of road lighting - Lighting of roads and public amenity areas*[9] (rural areas are exempt from this requirement).
2. At crossing points there must be appropriate pedestrian crossings (such as zebra or pelican crossings) in place or a clear line of sight for at least 50m in each direction on roads with a 30mph speed limit or 100m in each direction on roads with a speed limit of greater than 30mph.
3. On roads with a speed limit of 30mph (or higher) there is a clearly defined footpath.
4. All footpaths provided should be at least 900mm wide. In rural areas, on single track roads, a grass verge is acceptable in place of a footpath.
5. In clearly defined home zones, it is acceptable for the pedestrian routes to use the road.
6. Follows a nationally recognised design guidance, such as BS 8300-2:2018[10].

Pedestrian routes that are outside of the development site, and therefore not within the control of the developer, do not need to meet the above requirements. However, it must be demonstrated that there is a pedestrian route, which is not shared with vehicular traffic, from the site boundary to the transport node (for example, via pavements, footpaths, pedestrian crossings). The route shall be signposted.

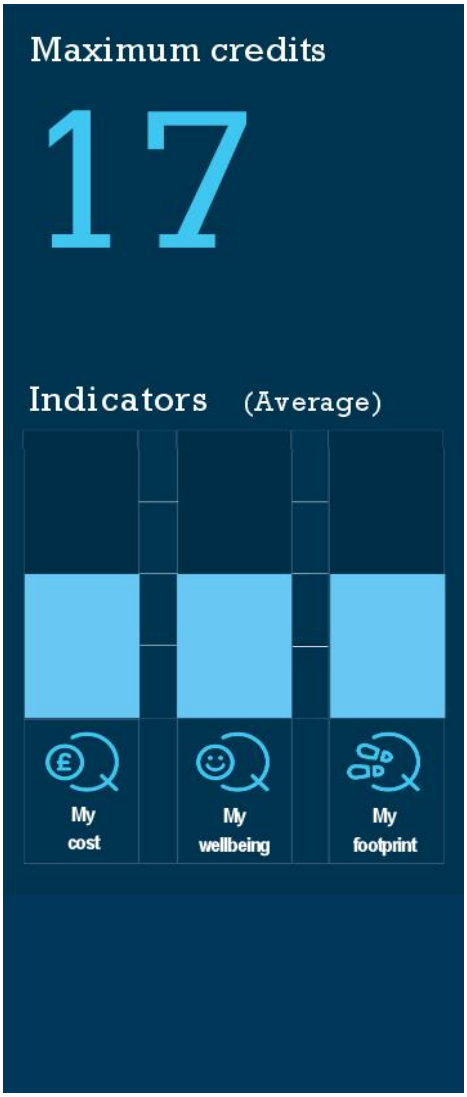
Transport companies

Any company operating (non-active) public transport services locally or nationally. Examples could include (but are not restricted to) bus, rail, river boat, tram, cable car.

Urban locations

An urban area with a population of 10,000 people or more, located within a tract of predominantly built-up land. This definition applies to the expected post-development population.

1.2 Sustainable Transport Options



Aim

To provide alternative sustainable transport and the associated facilities so that people become less dependent on traditionally fuelled cars.

Benefit

- Reduces costs compared with maintaining and running a traditionally fuelled car.
- Encourages active travel, improving people's health.
- Encourages clean travel and so helps to improve the air quality of the local area.

Context

Supporting the provision of alternative sustainable transport options can play an important role in allowing people to travel around their local area, while reducing associated congestion and carbon emissions and improving air quality. The UK Government is supporting a move towards alternative types of sustainable transport through, for example, the cycling delivery plan which encourages people to cycle and walk, and providing grants for 'plug-in cars' (electric cars).(11) Statistics published by the Department for Transport in 2015 showed that 5% of people 'were thinking about buying an electric car or van'.(12) This figure is likely to increase over time given the direction of policy and changes in the cost of different options. We need to make sure that the infrastructure is there to support people in making the move to alternative sustainable transport. The most cost-effective way of achieving this in new housing is through including the necessary capacity and facilities for sustainable transport from the outset.

Credit Summary

Criterion number	Title	Credits
crit 1	01 Home information	Prerequisite
crit 2–crit 4	02 Cycle storage	up to 6
crit 5–crit 7	03 Cycle networks	4
crit 8–crit 9	04 Electric vehicle charging points	up to 4
crit 10-crit 11	05 Car clubs	up to 3
Total credits available		17

Criteria

01 Home information **Prerequisite**

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 11.2 Home Information.

02 Cycle storage **up to 6 credits**

crit 2 Where cycle storage is provided for individual homes or in a communal setting, credits can be awarded based upon the size of the home and the number of cycle spaces provided, as detailed in Table 3.

crit 3 Compliant cycle storage is associated with the home or within close proximity to the home's entrance (communal entrance of the building for an apartment block).

Table 3 Number of cycle spaces per home and the associated credits

Home size	3 credits	6 credits
Studios or 1 bedroom	1 cycle space for every 2 homes is provided (where the assessment is only covering 1 home then 1 cycle space is required)	1 cycle space per home
2 and 3 bedrooms	1 cycle space per home	2 cycle spaces per home
4 bedrooms and above	2 cycle spaces per home	4 cycle spaces per home

Where the cycle storage is provided in a communal location, the number of communal spaces provided must be demonstrated to meet the above requirements for all homes served by the communal location.

crit 4 There are Safe pedestrian routes from the cycle storage to the entrance of the home (communal entrance of the building for an apartment block).

03 Cycle networks **4 credits**

crit 5 During preparation of the brief, the design team consult with the local authority on the state of the local cycling network and identifies improvements the development could make.

crit 6 The design team has agreed to and will implement one improvement chosen with the local authority. The improvement chosen is additional to existing local plans.

crit 7 The home is connected to a safe cycle route via a safe pedestrian route.

04 Electric vehicle charging points **up to 4 credits**

crit 8 Up to 4 credits can be awarded where electric vehicle charging points (EVCPs) are provided for private parking or there is charging infrastructure in place in Communal parking spaces. Credits are awarded in accordance with Table 4 and Table 5, depending on whether the parking provision is private or communal. Where a home has access to both private and communal parking, the private parking must be assessed for this criterion. Where the home has no access to private parking, they must follow the communal route.

Table 4 Private parking – provision of EVCPs and associated credits

Requirement	Credits
Fast charging EVCP (minimum 7 kW)	2
Fast charging EVCP (minimum 22 kW)	4

Table 5 Communal parking – communal EVC score and associated credits

Communal EVC score requirement (calculated in accordance with the Methodology)	Credits
Minimum of 10% of parking spaces must have EVCP installed	
≥ 7.5	1
≥ 15	2
≥ 30	3
≥ 50	4

crit 9 Where electric vehicle charging points (EVCPs) are provided in communal spaces, these must be clearly marked (for example, through signage or road marking) as designated spaces for electric vehicles. A management system must be in place to ensure fair use is enforced.

05 Car clubs **up to 3 credits**

crit 10 Two credits can be awarded where a compliant Car club is within 650m of the home via a safe pedestrian route.

crit 11 Where crit 10 is met, one further credit can be awarded where at least 60% of the vehicles available from the compliant Car club are electric vehicles.

Methodology

Communal EVC score

Where communal parking is provided, the following calculation method must be applied to calculate a communal EVC score to determine the number of credits achieved.

$$CommunalEVCScore = \sum(PS \times PST)/TS \times 100$$

Where:

PS = Provision score (see Table 6)

PST = Number of parking spaces with the same provision score

TS = Total number of communal parking spaces

Table 6 Provision score for communal parking supplied with EVCP or fast charging infrastructure

Provision	Provision score
Fast charging infrastructure is in place	0.25
Fast charging EVCP (minimum 7 kW)	0.75
Fast charging EVCP (minimum 22 kW)	1

Disabled persons' parking

For developments with some disabled persons' parking spaces, the percentage of these supplied with EVCP and/or fast charging infrastructure must equal or exceed the percentage of standard spaces that are supplied with EVCP and/or fast charging infrastructure. In these situations, disabled persons' parking must not be included in the communal EVC percentage.

For developments with only disabled persons' parking spaces, the requirements set out in Table 4 or Table 5 must be followed to determine the number of credits achieved.

Phased or multiple home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	

Checklists, Tables & Illustrations

None.

Definitions

Adequate lighting

Internal lighting should provide an illuminance (lux) level appropriate to the tasks undertaken. This can be demonstrated through a lighting design strategy that provides illuminance levels in accordance with the SLL Code for Lighting 2022(13) and any other relevant industry standard.

External lighting is designed to provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night. To demonstrate this, external lighting provided is specified in accordance with BS 5489-1:2020 *Design of road lighting - Lighting of roads and public amenity areas*(14).

The lighting must be controlled to avoid operation during daylight hours, where there is sufficient daylight in or around the facility.

Car club

Car clubs should have the following features:

- Cars can be rented by the hour and day.
- Fuel and insurance are included.
- They benefit from self-service reservation, pick-up, and return.
- Available 24hr.
- Dedicated parking space.
- Have, or will have by the time the development is complete, sufficient provision of cars to cater for the expected demands of the whole development.

Cycle storage locations

Cycles may be stored in any of the following locked structures:

1. Garage or shed.
2. Internal private spaces, such as dedicated space in a utility room.
3. External or internal communal cycle store.
4. Proprietary system.

Communal cycle storage should meet the following:

1. Spaces in racks that are covered overhead, and where the racks are fixed to a permanent structure (building or hardstanding).

Where the location is external to the home, access from the bike storage area to a pedestrian or cycle route is not permitted through the home.

Where the cycle storage is for individual homes in a locked structure (for example, 'Internal private spaces, such as dedicated space in a utility room'), cycle racks are not required. Where any communal cycle storage is provided, cycle racks must be provided.

Cycle storage requirements

The distance between each cycle rack and surrounding obstructions (e.g. walls) allows for bikes to be easily stored and accessed. Cycle racks must be a minimum of:

1. 2m long × 0.75m wide for one bike.
2. 2m long × 1.5m wide for two bikes.
3. 2m long × 2.5m wide for four bikes.
4. If hanging systems or proprietary systems are provided, the space requirements are flexible but the system must allow each cycle to be removed independently.

Cycle storage in communal locations has adequate lighting. The lighting must be controlled during daylight hours.

Cycle storage in a garage

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

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

- 2.4m × 4.9m for a single garage
- 5m × 5.2m for a double garage

Cycle storage in a shed

Where cycle storage is provided in a shed, adequate space must be provided to store both the bicycle(s) and garden tools at the same time. A minimum of 1m² is required for garden tools.

Additional space required for cycles

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

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

Cycle route

A compliant cycle route should meet one or more of the following:

1. Cyclists can share the road with vehicles on single track roads.
2. Cyclists can share the road with vehicles on roads with low traffic volumes and speeds (20mph).
3. Shared cyclist and pedestrian routes need to be a minimum of 3m wide.
4. Dedicated cycle lanes (segregated or unsegregated from roads), with one-way cycle lanes being a minimum of 2.2m wide and two-way cycle lanes a minimum of 3m wide)[15].

Cycle superhighways can be deemed to meet the above. The route from the home to the cycle superhighway must meet the requirements outlined above and must be signposted.

Close proximity

Within 50m of the home's entrance (communal entrance of the building for an apartment block), or alternatively no further from the home's entrance (communal entrance of the building for an apartment block) when compared to the nearest car parking space. This should be measured via the available pedestrian route and not ‘as the crow flies’.

Communal parking

Where parking spaces are open to occupants of multiple homes, including any spaces designated for visitors.

Fast charging infrastructure

As defined by TFL, EVCP infrastructure is "...the necessary underlying infrastructure (e.g. capacity in the connection to the local electricity distribution network and electricity distribution board, as well as cabling to parking spaces) to enable simple installation and activation of a charge point at a future date"(16).

To be recognised in a HQM assessment, the infrastructure in place needs to enable the future installation of a fast charging EVCP (minimum 7 kW).

Private parking

Where parking spaces are designated to a home and clearly identified as such.

Safe pedestrian routes

Pedestrian routes on the development site, within control of the developer are deemed to be safe and accessible for all pedestrian users (including people with disabilities, the elderly and children), where they take into account any physical limitation of those who may use them, for example providing steps appropriately supported by slopped access and dropped curbs positioned at crossing points. These routes and associated spaces are appropriately sized, with good visibility of the route ahead. Alongside these principles they should also meet the following requirements:

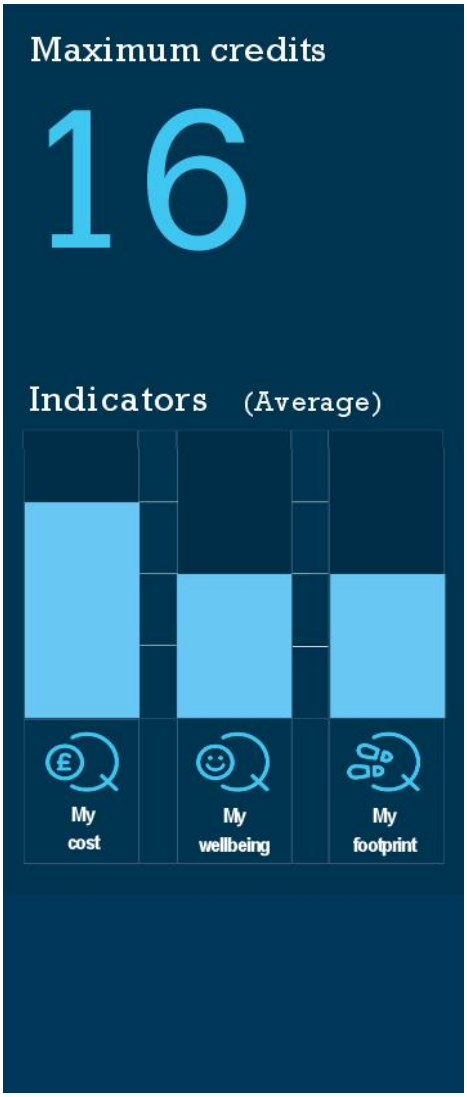
1. Where required, lighting design must be in accordance with BS 5489-1:2020 *Design of road lighting - Lighting of roads and public amenity areas* (rural areas are exempt from this requirement).
2. At crossing points there must be appropriate pedestrian crossings (such as zebra or pelican crossings) in place or a clear line of sight for at least 50m in each direction on roads with a 30mph speed limit or 100m in each direction on roads with a speed limit of greater than 30mph.
3. On roads with a speed limit of 30mph (or higher) there is a clearly defined footpath.
4. All footpaths provided should be at least 900mm wide. In rural areas, on single track roads, a grass verge is acceptable in place of a footpath.
5. In clearly defined home zones, it is acceptable for the pedestrian routes to use the road.
6. Follows a nationally recognised design guidance such as BS 8300-2:2018(17).

Pedestrian routes that are outside of the development site and therefore not within the control of the developer, do not need to meet the above requirements. However it must be demonstrated that there is a pedestrian route, which is not shared with vehicular traffic, from the site boundary to the transport node (for example via pavements, footpaths, pedestrian crossings). The route shall be signposted.

Walking distance

Walking distance for the purpose of this issue is 650m via a safe pedestrian route. This should be measured via the route and not 'as the crow flies'.

1.3 Local Amenities



Aim

To make sure occupants have easy access to a range of key amenities to reduce the need for motorised transport.

Benefit

- Helps to reduce the need for motorised travel, reducing occupiers' carbon footprint and costs.
- Encourages active travel, helping to improve people's health.
- Promotes community spirit, equality and a sense of place by supporting local amenities and business.

Context

With the increase in out-of-town shopping centres and the increasing dependency on private transport to get around, there has been a decline in town centres that provide everyday amenities within walking distance or with good public transport links. Where new homes are planned for an area they should be supported by appropriate local amenities, saving occupants travel time and money and helping to promote community spirit and a sense of place.(18) In designing places for the future, planners should make sure that communities and their residents have the space to grow, in particular to develop a distinctive character, and to shape the place so that it better meets local needs. And they should have scope to change as populations age and shift and new patterns of work and social life develop.(19)

Credit Summary

Criterion number	Title	Credits
crit 1	01 Key local amenities	11
crit 2–crit 3	02 Beneficial local amenities	5
Total credits available		16

Criteria

01 Key local amenities **11 credits**

crit 1 Three or more of the amenities listed in Table 7 are located within walking distance of the home via Safe pedestrian routes.

Table 7 Key local amenities

Amenities
Post Office
24-hour access to cash (free service), such as ATM
Bank
Public sector GP surgery or general medical centre
Pharmacy
Supermarket or grocery store

02 Beneficial local amenities **5 credits**

crit 2 crit 1 has been achieved.

crit 3 Two or more of the amenities listed in Table 8 are located within 1.5 miles of the home via Safe pedestrian routes or 30-minute public transport journey.

Table 8 Beneficial local amenities

Amenities
Purpose built recreation or leisure facility for fitness or sports
Childcare facility or school
Large scale retail
Community facilities

Methodology

Phased or multiple home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Homes being assessed as part of a larger development

For homes being assessed as part of a larger development the 'worst case' can be used to determine the number of credits awarded, i.e. by using the home which is furthest away from each local amenity.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	

Checklists, Tables & Illustrations

None.

Definitions

Collective amenities

One type of amenity may exist within or as part of another amenity, for example a GP surgery in a community centre, or a cash point or pharmacy in a supermarket. It is not a requirement of this issue that each amenity is 'standalone'.

Community facilities

Internal spaces which are inclusive to the majority of users who will occupy the home or development. The facility will serve to facilitate community activities.

Local amenities

The number of local amenities can include several different amenities from the same group; however, it cannot include more than one of the same type of amenity. For example, a butchers and a green grocers can count as two amenities, but two cash machines cannot be counted twice.

Safe pedestrian routes

Pedestrian routes on the development site, within control of the developer are deemed to be safe and accessible for all pedestrian users (including people with disabilities, the elderly and children), where they take into account any physical limitations of those who may use them, for example providing steps appropriately supported by slopped access and dropped curbs positioned at crossing points. These routes and associated spaces are appropriately sized, with good visibility of the route ahead. Alongside these principles they should also meet the following requirements:

1. Where required, lighting design must be in accordance with BS 5489-1:2020 *Design of road lighting - Lighting of roads and public amenity areas*(20) (rural areas are exempt from this requirement).
2. At crossing points there must be appropriate pedestrian crossings (such as zebra or pelican crossings) in place or a clear line of sight for at least 50m in each direction on roads with a 30mph speed limit or 100m in each direction on roads with a speed limit of greater than 30mph.
3. On roads with a speed limit of 30mph (or higher) there is a clearly defined footpath.
4. All footpaths provided should be at least 900mm wide. In rural areas, on single track roads, a grass verge is acceptable in place of a footpath.
5. In clearly defined home zones, it is acceptable for the pedestrian routes to use the road.
6. Follows a nationally recognised design guidance, BS 8300-2:2018(21).

Pedestrian routes that are outside of the development site and therefore not within the control of the developer do not need to meet the above requirements. However it must be demonstrated that there is a pedestrian route that allows access to the local amenity.

Walking distance–urban

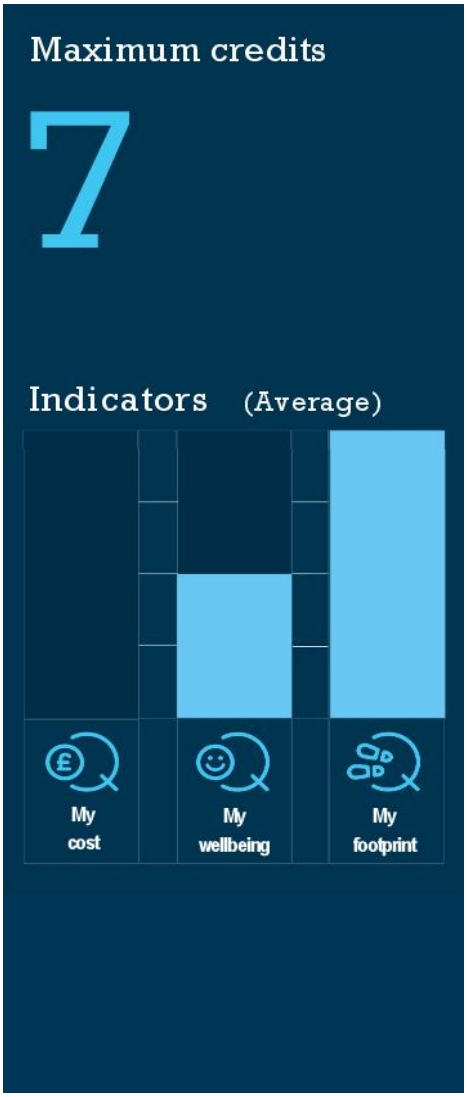
Walking distance for the purpose of this issue is 650m via safe pedestrian routes. This should be measured via the route and not 'as the crow flies' from the main entrance of the home (communal entrance of the building for an apartment block) to the amenity.

Walking distance–rural

Walking distance for the purpose of this issue is 1300m via safe pedestrian routes. This should be measured via the route and not 'as the crow flies' from the main entrance of the home (communal entrance of the building for an apartment block) to the amenity.

2 Outdoors

2.1 Identifying Ecological Risks and Opportunities



Aim

To work out the ecological baseline and zone of influence of the site and identify risks and opportunities for achieving the best outcomes.

Benefit

- Demonstrates sound understanding and consideration of ecological value, including providing Ecosystem services, Biodiversity and associated benefits.
- Avoids risks associated with the wider environment.
- Makes it possible for construction work to be programmed successfully while minimising impacts on natural assets.
- Appropriate ecological design and management practices increases the benefits (including ecosystem benefits) associated with wellbeing, makes the area more appealing to visit and live in and helps to bring a sense of community.
- Makes sure there is an appropriate level of expertise on the project to recognise both the level of risk and the opportunity to increase ecological value in a way that takes account of successfully building and running the project.

Context

Conserving habitats and biodiversity is important for life on earth. It supports the variety of living organisms on the planet as well as the interdependence that exists between them. Development and landscape management can have a significant impact on the broader environment that supports ecological value. It is important to understand the existing value and condition of sites, promote (where possible) the use of land that has low ecological value and, where this is not practical, aim to reduce ecological damage. It is also important to make decisions and take action that support and, where possible, enhance the ecological value of the site and surrounding areas.

Credit Summary

Criterion number	Title	Credits
crit 1–crit 2	01 Assessment route selection	Prerequisite
crit 3–crit 6	02 Survey and evaluation	up to 3
crit 8–crit 10	03 Determining ecological outcomes	up to 3
crit 8	– 03A Foundation route - Project team member	2
crit 9–crit 10	– 03B Comprehensive route - Suitably qualified ecologist	3
crit 11–crit 12	04 Comprehensive route - Wider site sustainability	1
Total credits available		7

Criteria

01 Assessment route selection **Prerequisite**

crit 1 An Assessment Route (see Definitions) for the project has been determined using Guidance Note 34: *BREEAM and HQM Ecology Risk Evaluation Checklist* (GN34).

crit 2 The client or contractor confirms compliance is, or will be, monitored against all relevant UK and EU or International legislation relating to the ecology of the site.

02 Survey and evaluation **up to 3 credits**

02A Foundation route - Project team member **Prerequisite for foundation route**

crit 3 Completion of the BREEAM and HQM Ecology Risk Evaluation Checklist (GN34) indicates assessment Route 1 can be used (see Methodology).

02B Comprehensive route - Suitably qualified ecologist **3 credits**

crit 4 A suitably qualified ecologist is appointed sufficiently early in the project stage to ensure involvement with site configuration and, where necessary, influence over strategic planning decisions.

crit 5 Before the design brief (typically RIBA Stage 1 or equivalent), a suitably qualified ecologist has carried out an appropriate level of survey and evaluation for the site and its zone of influence (see Methodology) to determine the ecological baseline including:

crit 5.a: Current and potential ecological value, and condition of the site and related areas within the zone of influence.

crit 5.b: Direct and indirect risks to current ecological value.

crit 5.c: Capacity and feasibility to enhance the ecological value of the site and, where relevant, areas within the zone of influence.

crit 6 Information and data are collated and shared with the project team to inform the site preparation, design or construction works.

03 Determining ecological outcomes **up to 3 credits**

03A Foundation route - Project team member **2 credits**

crit 7 crit 3 has been achieved.

crit 8 During early design stages (typically RIBA stage 2 or equivalent), the project team liaise and collaborate with representative stakeholders to identify, appraise and agree actions for the project that will achieve optimal ecological outcomes in line with the first two points of the mitigation hierarchy: avoidance and protection.

03B Comprehensive route - Suitably qualified ecologist **3 credits**

crit 9 crit 4 to crit 6 have been achieved.

crit 10 During early design stages (typically RIBA stage 2 or equivalent), the project team liaise and collaborate with representative stakeholders to identify, appraise and agree actions for the project that will achieve the optimal ecological outcomes, in line with the mitigation hierarchy of action:

crit 10.a:Avoidance.

crit 10.b:Protection.

crit 10.c:Reduction or limitation of negative impacts.

crit 10.d:On-site compensation.

crit 10.e:Enhancement considering the capacity and feasibility within the site, or where this is not viable, off-site.

04 Comprehensive route - Wider site sustainability **1 credit**

crit 11 crit 9 and crit 10 have been achieved.

crit 12 When determining the optimal ecological outcome for the site, in addition to the points outlined in crit 10, consider the wider site sustainability-related activities and the potential for ecosystem service related benefits. See Methodology for a list of the minimum areas for consideration.

Note: This may be considered as part of the project preparation issue, when similar types of strategic decisions are made.

Methodology

Please note that this issue is referred to as 'Identifying and understanding the risks and opportunities for the project' in Guidance Note 34 and Guidance Note 36.

Assessment route selection

There are two routes that can be used to achieve credits in HQM's ecology issues (2.1 to 2.4); the Foundation route or the Comprehensive route, which are referred to as route 1 and route 2, respectively, in relevant Guidance Notes.

Foundation route (route 1), project team member

This route is only appropriate where the level of ecological risk associated with the site can be understood and addressed by a project team member using general observation, non-specialist knowledge and publicly available resources and information. This would be assessed by completing the Ecological Risk Evaluation Checklist - see Appendix B, Guidance Note 34 (GN34). A lower level of reward is available as this route does not involve the same level of input and expertise that would be available through using a Suitably Qualified Ecologist.

Comprehensive route (route 2), suitably qualified ecologist

This route is primarily for sites where complex ecological systems are likely to be present or if the project team or developer choose to target higher credits for achieving better ecological outcomes compared with the foundation route. This route must be carried out by a Suitably qualified ecologist and conducted for sites identified as being of more significant ecological risk (using GN34). In many cases this route is likely to be unnecessarily onerous for foundation route assessment projects but in instances where a simpler project is willing and able to achieve additional ecological enhancement, route 2 remains an option worth considering. Guidance Note 36: *BREEAM, CEEQUAL and HQM Ecology Calculation Methodology – Route 2* (GN36) sets out the detailed methodology for the comprehensive route.

The appropriate assessment route is determined by completing the checklist in GN34 to determine the level of ecological risk. Alternatively, GN34 does not need to be completed if the comprehensive route is already chosen.

Once the appropriate route has been selected, the relevant section below must be followed.

Assessment routes:

While many projects will require input from a suitability qualified ecologist to determine the best approach, the varied nature and scope of development sites means that some may not warrant this level of specialist input. HQM's goal is to promote the consideration of ecological value and its resulting benefits on all sites. This is to increase the chance of positive benefits for the environment and for those who will occupy, interact with or otherwise be affected by the project. HQM has therefore developed assessment criteria that recognise meaningful actions taken involving levels of expertise that are appropriate to the specific project risks and the life cycle stage under assessment.

Foundation route, project team member

Survey and evaluation

For crit 3, completion of the BREEAM and HQM Ecology Risk Evaluation Checklist (GN34) act as the survey and evaluation for this route. Where this indicates that Route 1 can be used, no further 'Survey and evaluation' work is required.

Determining the ecological outcomes for the site

For crit 8, the methodology for the foundation route is the same as it is for the comprehensive route. The approach taken should be appropriate to the scope and scale of the project, which is likely to mean that requirements need to be interpreted and assessed in a simpler way for projects using the foundation route. This may result in some points not being applicable. Depending on the project and the option selected, specialist input may be required to adequately consider certain points (for example, in issue 2.3, off-site enhancement requires the support of an Ecologist).

Comprehensive route, suitably qualified ecologist

Survey and evaluation

For crit 5, the following must be considered as a minimum:

Survey

1. Determining the zone of influence for the site, including neighbouring land and habitats.
2. Current flora, fauna (including, permanent and transient species) and habitat characteristics (including but not limited to ecological features in or on built structures).
3. Habitat extent, quality, connectivity and fragmentation.
4. Recent and historic site condition.
5. Existing management and maintenance levels and arrangements.
6. Existing ecological initiatives within the zone of influence.
7. Identification of, and consultation with, relevant stakeholders impacted or affected by the site.
8. Local knowledge or sources of information.

Evaluation

1. Current value and condition of the site and, where relevant, the zone of influence in terms of:
    a. Features including habitats, species, food sources and connectivity.
    b. Broader biodiversity and ecosystem services benefits or opportunities.
2. Direct and indirect risks to current ecological value:
    a. Sensitive areas and features on or near the site.
    b. Direct risks including those from human activity (such as construction work), habitat fragmentation, and potentially harmful species.
    c. Indirect risks including water, noise, vibration and light pollution.
3. Capacity and feasibility to enhance the ecological value.

4. Habitat restoration and creation potential.
5. Impact of the proposed design, construction works and operations on-site.

Determining the ecological outcomes for the site

Liaison

For crit 10, the liaison and collaboration activities should be coordinated by an individual who has an overview of the project as well as the authority to issue instructions relating to delivery of actions aimed at achieving ecological outcomes and avoiding conflicts. This may be a central project team member or equivalent for a smaller scale project, as appropriate.

Project team members should liaise with each other and other stakeholders at appropriate times to determine appropriate options for the site. This process should take place throughout the project, particularly when key decisions that could impact ecology are being made. Stakeholders would include but are not limited to:

1. The client, owner, occupier
2. Design or project team
3. Specialist consultant. For example, drainage engineer, acoustic consultant or landscape architect, depending on the nature of the site
4. Relevant local stakeholders should be consulted to determine appropriate options for the site in question including but not limited to:
    a. Local Government and other statutory relevant organisations.
    b. Local community groups, organisations, or charities, such as the Wildlife Trusts.
    c. Local, regional, or national fauna focused groups such as Bug life, RSPB, Bat Conservation Trust.

To get an effective outcome which promotes ecology on the site, it is important to liaise with the relevant people, throughout key stages of the project including those who have the knowledge to help determine how the project can contribute to local ecology.

Identifying and agreeing actions

For crit 10, appropriate actions for the site need to optimise ecological outcomes in terms of:

1. Ecological benefit offered (pre, during and post project completion, as appropriate)
2. Contribution of the site to local biodiversity goals taking into consideration quality, connectivity and fragmentation of local habitats
3. Opportunities to enhance the value of existing habitats and biodiversity in the vicinity, or to restore or add new features of ecological value to local biodiversity.
4. Wider community and end user involvement benefits.

To identify, appraise and agree appropriate actions for achieving optimal ecological outcomes with stakeholders, the following need to be considered:

1. Ecological value and biodiversity, accounting for:
    a. Local priorities
    b. Long term viability of the outcome or option
    c. Alignment with the sites function, amenity and value.
2. Practicality, including consideration of:
    a. Timing and duration of implementing and realising the outcome
    b. Long term management and maintenance implications, and outline costs
    c. Opportunities and barriers arising from management structures and procurement processes.
    d. Availability of appropriate skills, budgets and other resources at all stages.
3. The risks and opportunities identified in the survey and evaluation .

Wider site sustainability

For crit 12, the considerations made as part of determining the optimal ecological outcome for the project must also consider opportunities for integrating ecology with wider site sustainability related activities and ecosystem service related benefits, including but not limited to the following:

1. Landscape, including design, heritage and local character, and green infrastructure.
2. Health and wellbeing:
    a. Recreational space (including growing space, community agriculture or horticultural and allotment activities). This may feed into the 2.5 Recreational Space issue.
    b. Mitigation and control measures relating to: water quality, noise, air quality and light pollution.
3. Resilience:
    a. Climate change mitigation.
    b. Management of surface water run-off.
    c. Flood risk management.
    d. Climate-sensitive urban design (such as heat island effect, thermal mass, shading, biotic cooling).
4. Infrastructure in terms of maximising the benefits of green infrastructure and optimising alignment with existing infrastructure on the site and the zone of influence.
5. Community and end-user engagement and involvement.
6. Life cycle costing and service life planning (where targeted under Life cycle costing issue).

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
Prerequisite	02 Risk evaluation checklist	Completed BREEAM and HQM Ecology Risk Evaluation Checklist (GN34).	As per design stage.

Checklists, Tables & Illustrations

None.

Definitions

Avoidance

Prevention of impacts occurring, as a result of the project having regard to predications about potentially negative environmental effects (such as project decisions about site, location, design or timing of works).

Biodiversity

The variety of plant and animal life in the world or in a particular habit at the following levels of organisation: landscape, ecosystem, habitat, community, species, population, individual, and the structural and functional relationships within and between these.

Compensation

Measures taken to make up for the loss of, or permanent damage to, ecological features despite mitigation; for example, replacement habitat or improvements to existing habitats similar in terms of biological features and ecological functions to that lost or damaged. Compensation can be provided either within or outside the project site, in line with the following hierarchy: within site, adjacent to site and off-site (offsetting) as a last resort.

Connectivity

The degree to which the configuration of habitat facilitates movement between and across resource patches.

Ecological baseline

The ecological baseline is the ecological value of the site before construction. The ecological baseline is used to compare performance after construction to determine if it is the same or significantly changed.

Ecological value

The importance, worth, or usefulness of a species, habitat or ecosystem in terms of its impact on other species and/or habitats, as well as the other environmental, social, cultural and economic value that can be delivered from species and habitats and their interactions (ecosystem services), specific to a geographical frame of reference.

Ecosystem

An ecosystem is a dynamic complex of plant, animal, and micro-organism communities and the non-living environment interacting as a functional unit. Ecosystems vary enormously in size; a temporary pond in a tree hollow and an ocean basin can both be ecosystems.

Ecosystem services

Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; economic value such as tourism; and cultural or social services such as health and wellbeing, recreational, spiritual, religious and other non-material benefits.

Enhancement

Improved management of ecological features or provision of new ecological features, resulting in a net benefit to biodiversity, which is unrelated to a negative impact or is 'over and above' that required to mitigate or compensate for an impact.

Fragmentation

The breaking up of a habitat, ecosystem or land-use type into smaller parcels with a consequent impairment of ecological function, connectivity and long-term viability.

Green infrastructure

Multi-functional space, urban and rural, that can form a network or be self-contained, which is capable of delivering a wide range of environmental and quality of life benefits for local communities. It covers both 'green' and 'blue' (water environment) features of the natural and built environments. Examples include parks, open spaces, playing fields, woodlands, wetlands, grasslands, river and canal corridors, allotments, private gardens and living (green) roofs and façades.

Habitat

A place in which a particular plant or animal lives. It is often used in the wider sense referring to major assemblages (a group of species found in the same location) of plants and animals found together.

Handover

For the purposes of the ecology-related issues in this category, handover refers to any point in the life cycle of a site or development where ecological or landscape-related responsibilities are passed from one organisation, group or individual to another. This will include information or documentation deemed to be crucial to the successful attainment of ecological aims and objectives. Handover strategies should be designed to support effective communication, monitoring and transition throughout the project's life cycle.

Landscape

An area, as perceived by people, whose visual features and character is of environmental, social and economic value, usually as a result of the action and interaction of natural and human factors, such as aesthetic, heritage, scenic, cultural and leisure benefits.

Land-sea interface

The land-sea interface, also known as the Coastal Transition Zone, is the area of transition that links terrestrial and marine environments. In this zone, ecological and physical processes from both the marine and terrestrial environments interact.

Relevant project team member

This covers members of the project team responsible for delivering the project. Where implementation activities are taking place, such as site preparation and construction works, the principal contractor would typically take responsibility for the activities related to the HQM requirements.

Site

For the purposes of HQM the site is considered to be the land enclosed by the boundary of the HQM assessment.

Suitably Qualified Ecologist (SQE)

An individual achieving all the following items can be considered to be 'suitably qualified' for the purposes of compliance with HQM:

1. Holds a degree or equivalent qualification (such as N/SVQ level 5) in ecology or a related subject.
2. Is a practising ecologist, with a minimum of three years' relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting ecology in relation to construction and the built environment including: acting in an advisory capacity to provide recommendations for ecological protection, enhancement and mitigation measures. Examples of relevant experience are: ecological impact assessments, Preliminary Ecological Appraisals (PEA), Phase 2 habitat and fauna surveys, and habitat creation.
3. Is covered by a professional code of conduct and subject to peer review. Full members of the following organisations, who meet the above criteria, are deemed Suitably Qualified Ecologists for the purposes of HQM:
    a. Chartered Institute of Ecology and Environmental Management (CIEEM).
    b. Chartered Institution of Water and Environmental Management (CIWEM).
    c. Institute of Environmental Management and Assessment (IEMA).
    d. Landscape Institute (LI).
    e. The Institution of Environmental Sciences (IES).

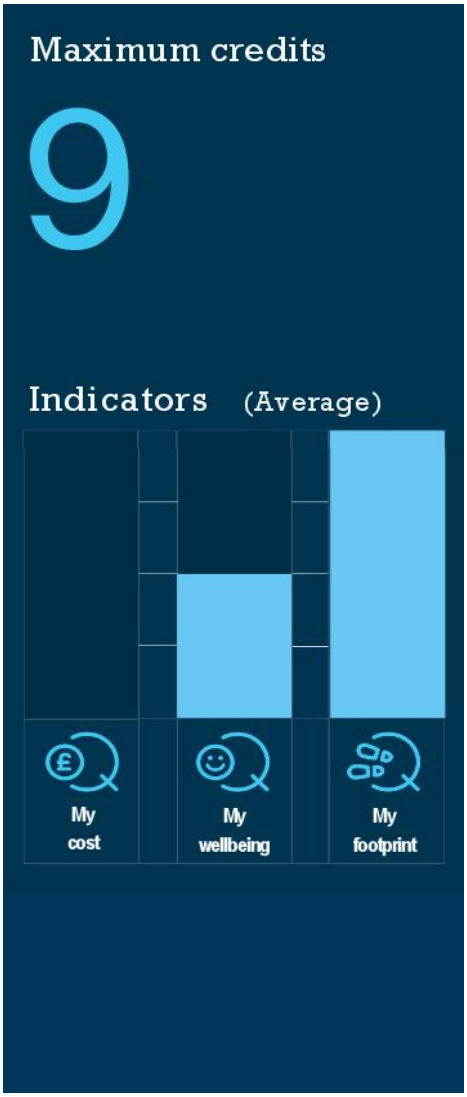
Wildlife corridors

A physical link or other route that facilitates and encourages the passage or movement of animals between habitats both on and off-site and so contributes to ecological networks in the area.

Zone of influence

Areas of land or water bodies impacted by the site undergoing assessment. These areas can be adjacent to the site or can be areas that are dependent on the site but not physically linked, including areas downstream from a site. Areas within the zone of influence can be negatively affected by changes on an assessment site, but they also provide further opportunity to maximise enhancement activities.

2.2 Managing Impacts on Ecology



Aim

To avoid, or limit as far as possible, negative impacts on the ecology of the site and its zone of influence arising as a result of the project.

Benefit

- Minimises ecological damage on the site and, where relevant, in the zone of influence.
- Helps to conserve local natural ecosystems and maintain environmental assets for the community.
- Supports activities to make sure that legislation, policy and guidance are followed for the good of the site, the zone of influence and the wider environment and to avoid legal issues.
- Reduces the risk of local controversy over a development and associated management strategies.

Context

Programming of work on a site is driven by many factors but can often have a negative impact on the ecology of a site or in the zone of influence (or both). Many species have legal protection. Damage can result in prosecution leading to company or personal fines, prison sentences and damaged reputations. Replacing lost habitats is not straightforward and takes time to be successful. In principle, developments should avoid, protect, reduce or limit impacts on ecology and compensate for ecological loss where necessary. This means that wherever possible, developments should limit disruption and disturbance to local wildlife and ecological systems. If the development is likely to cause disruption, this should be reduced as far as possible and effort should be made to increase the value it has to the community and wildlife, in a way that can be maintained for the long term.

Credit Summary

Criterion number	Title	Credits
crit 1–crit 2	01 Ecological risks and opportunities for the project	Prerequisite
crit 3–crit 5	02 Liaison, implementation and data	3
crit 6–crit 9	03 Routes of rigour (follow 3A or 3B) - Managing negative impacts	up to 6
crit 6	– 03A Foundation route, Project team member	3
crit 7–crit 9	– 03B Comprehensive route, Suitably qualified ecologist	up to 6
Total credits available		9

Criteria

01 Ecological risks and opportunities for the project **Prerequisite**

crit 1 The 02 Survey and Evaluation, and 03 Determining Ecological Outcomes criteria within the 2.1 Identifying Ecological Risks and Opportunities issue have been achieved via either the foundation or comprehensive routes.

crit 2 The client or contractor has confirmed that compliance is, or will be, monitored against all relevant UK, EU, and International legislative requirements relating to the ecology of the site.

02 Liaison, implementation and data **3 credits**

crit 3 Roles and responsibilities have been clearly defined, allocated and implemented to successfully deliver the actions for achieving optimal ecological outcomes agreed in issue 2.1 Identifying Ecological Risks and Opportunities and early enough to influence the concept design and design brief (typically by RIBA stage 2).

crit 4 Site preparation and construction works have been planned for and implemented early enough to deliver the actions for achieving optimal ecological outcomes agreed in issue 2.1 Identifying Ecological Risks and Opportunities.

crit 5 The project team have liaised and collaborated with representative stakeholders, taking into consideration data collated and shared, and have implemented actions (see the 2.1 Identifying Ecological Risks and Opportunities issue) during site preparation and construction works.

03 Routes of rigour (follow 3A or 3B) - Managing negative impacts **up to 6 credits**

03A Foundation route, Project team member **3 credits**

crit 6 Negative impacts from site preparation and construction works have been managed to minimise their effect and ensure that no net impact has resulted.

03B Comprehensive route, Suitably qualified ecologist **up to 6 credits**

crit 7 Negative impacts from site preparation and construction works have been managed according to the mitigation hierarchy (see comprehensive route in Methodology) and either:

crit 8 No overall loss of ecological value has occurred for 6 credits.

OR

crit 9 The loss of ecological value has been limited as far as possible for 3 credits.

Methodology

Please note that this issue is referred to as the 'Managing negative impacts on ecology' in Guidance Note 36.

Foundation route, project team member

For projects using the foundation route (see 2.1 Identifying Ecological Risks and Opportunities: Methodology on page 35), the following is required to demonstrate compliance:

Liaison and implementation

For crit 3 and crit 5, the methodology for the foundation route is the same as it is for the comprehensive route except where explained below. The approach taken should be appropriate to the scope and scale of the project, which is likely to mean that requirements need to be interpreted and assessed in a simpler way for projects using the foundation route. This may result in some points not being applicable. Depending on the project and the option selected, specialist input may be required to adequately consider certain points (for example, in issue 2.3, off-site enhancement requires the support of an Ecologist).

Site preparation and construction works

For crit 4, relevant considerations for timescales are likely to only include the following, due to the nature of projects likely to use the foundation route:

1. Ecological seasonality requirements (such as tree, shrub planting seasons, breading, nesting and hibernation periods) as set out by stakeholders (e.g. local expertise) and from best practice guidance from relevant national bodies
2. Any other time limitations that may impact successful implementation.

Managing negative impacts

For crit 6, the following hierarchy must be followed when managing negative impacts of the site preparation and construction works:

1. Avoidance of negative impacts on habitats and features of ecological value on the site.
2. If it is not possible for avoidance of negative impacts, protect habitats and features of ecological value from damage in accordance with best practice guidelines during development works.

Comprehensive route, suitably qualified ecologist

For projects using the comprehensive route (see 2.1 Identifying Ecological Risks and Opportunities), the following is required to demonstrate compliance:

Liaison, implementation and data

Roles and responsibilities

For crit 3 roles and responsibilities are established, as appropriate for the scale of project, to ensure delivery of actions for managing impacts on ecology. Defined roles and responsibilities must cover the following:

1. Relationships and management required for implementation, including clear ownership of tasks.
2. When the roles and responsibilities apply.
3. Resources required, including financial, time, technical and skills, and when these apply.
4. Procedures for monitoring and feedback of the actions being implemented, for continual improvement, including external monitoring by key stakeholders where appropriate.
5. Handover and collaborative activities where responsibility is transferred or shared, including transition to long term management and maintenance.

Site preparation and construction works

For crit 4, the following needs to be considered when planning and implementing actions for delivering optimal ecological outcomes in a robust and practical way:

Timescales:

1. Which roles and responsibilities apply.
2. Ecological seasonality.
3. Alignment with existing and planned activities and processes.
4. Project phasing.

Contract requirements:

1. Managing potential knock-on impacts of works (such as pollution and disturbance).
2. Contractual and other handover project milestones.

3. Long term management, maintenance and monitoring requirements and outline costs.

Liaison and collaboration

For crit 5, relevant project team members liaise and, where feasible, collaborate with relevant stakeholders at appropriate times to support optimisation of site wide outcomes.

See equivalent entry in 2.1 Identifying Ecological Risks and Opportunities, for more detail.

Data collation and application throughout the project

In addition to the data collated during assessment of the 2.1 Identifying Ecological Risks and Opportunities issue, data collated during assessment of this issue (crit 5) should be shared with the project team to inform decisions relating to the site preparation, design and construction.

Managing negative impacts

For crit 7, the following hierarchy must be followed when managing negative impacts of the site preparation and construction works:

1. Avoidance of negative impacts on habitats and features of ecological value on the site.
2. If it is not possible for avoidance of negative impacts, protect habitats and features of ecological value from damage in accordance with best practice guidelines during development works.
3. If it is not possible for avoidance of all negative impacts or to protect habitats and features of ecological value, reduce, limit or control negative impacts as far as possible.
4. Where it is not possible for avoidance, protection, limitation or control of the negative impacts on features of ecological value on site, compensation has taken place to ensure the existing ecological value is maintained during and after the project.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	

Checklists, Tables & Illustrations

None.

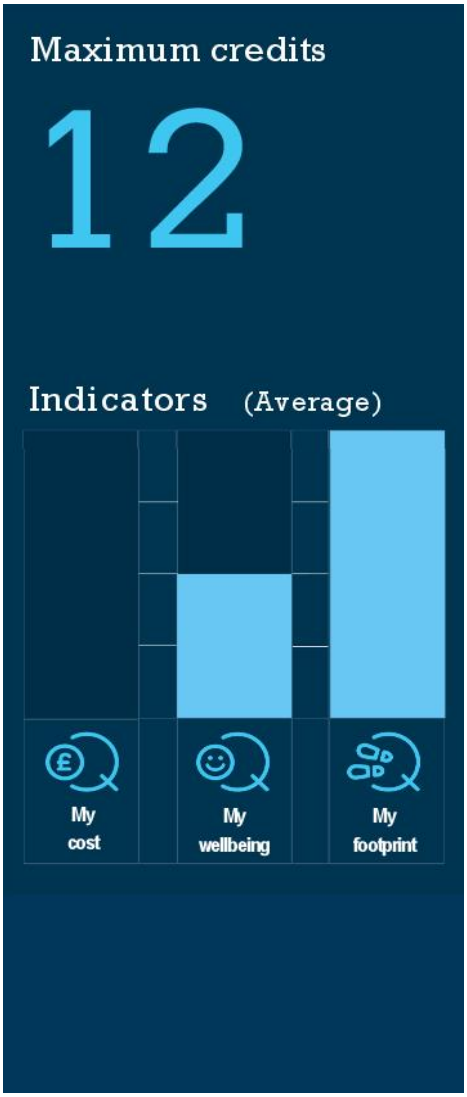
Definitions

See 2.1 Identifying Ecological Risks and Opportunities issue.

No overall loss

There has been no overall loss of ecological value on the site as a result of activities to avoid, protect, reduce, limit, control or compensate for impacts in line with the hierarchy set out in the assessment criteria in this issue. Where statutory designated sites, irreplaceable habitats or legally protected species have been impacted, all statutory requirements are met and are agreed with the relevant statutory bodies as necessary.

2.3 Ecological Change and Enhancement



Aim

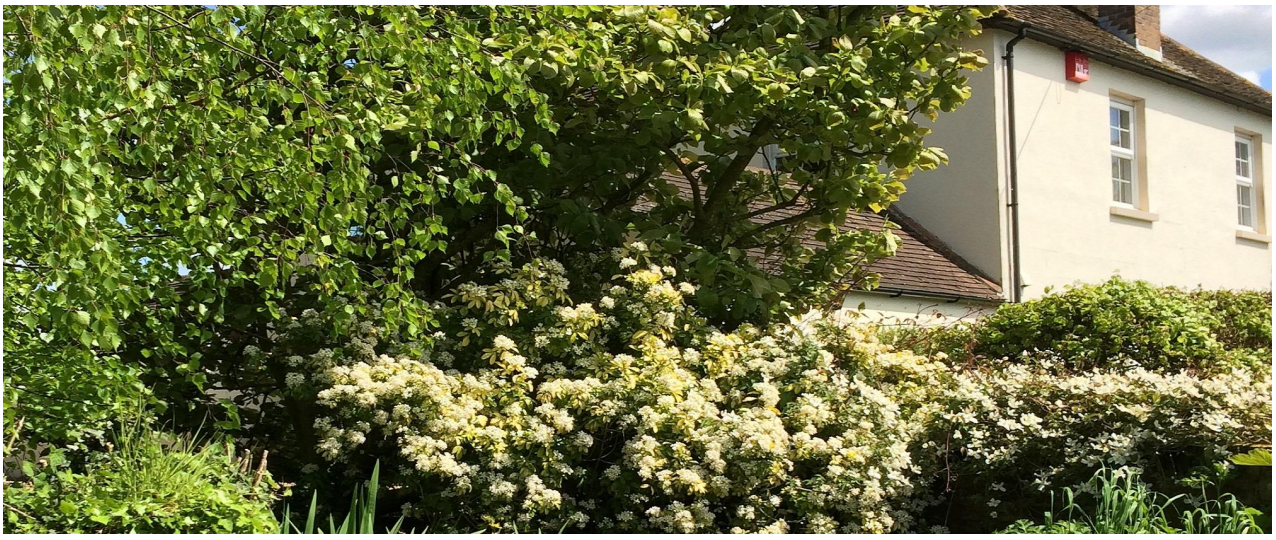
To enhance the ecological value of the site and areas within its zone of influence to support local, regional and national priorities.

Benefit

- Improves local biodiversity by increasing the quality, connectivity, density and area of natural green spaces, which can:
  - provide corridors for wildlife to survive and flourish;
  - introduce or reinforce native animal or plant species;
  - contribute to protecting and restoring biodiversity, and;
  - help to improve the health, wellbeing and, potentially, the productivity of occupants, users and neighbours through providing recreational space and an increased connection between people and the natural environment (biophilia).
- Increase property values by making the local area more attractive, which will encourage more people to want to live and work there.
- Raise awareness of the benefit of interacting with the natural environment.
- Support local, national and international efforts to stop the loss of biodiversity by promoting action to increase biodiversity where possible.

Context

Improving the ecological value of a site after development can have major benefits on local, regional and national biodiversity by introducing appropriate animal and plant life, as well as creating and enhancing biodiversity (species and habitats) and wildlife corridors. HQM rewards improvements to biodiversity on the development site or, where that is not possible, within its zone of influence.



Credit Summary

Criterion number	Title	Credits
crit 1	01 Previously occupied land	2
crit 2–crit 3	02 Ecological risks and opportunities for the project	Prerequisite
crit 4–crit 7	03 Routes of rigour (follow 3A or 3B): Liaison, implementation, and data	2
crit 4–crit 5	– 03A Foundation route, Project team member	2
crit 6–crit 7	– 03B Comprehensive route, Suitably qualified ecologist	2
crit 8	04 Comprehensive route: Measuring the change in ecological value	up to 8
Total credits available		12

Criteria

01 Previously occupied land **2 credits**

crit 1 At least 75% of the proposed development's footprint is on an area of land which has previously been occupied (see Definitions).

02 Ecological risks and opportunities for the project **Prerequisite**

crit 2 The 02 Survey and Evaluation, and 03 Determining Ecological Outcomes criteria within the 2.1 Identifying Ecological Risks and Opportunities issue have been achieved via either the foundation or comprehensive routes.

crit 3 The client or contractor has confirmed that compliance has, or will be, monitored against all relevant UK, EU, and International legislative requirements relating to the ecology of the site.

03 Routes of rigour (follow 3A or 3B): Liaison, implementation, and data **2 credits**

03A Foundation route, Project team member

crit 4 The project team have liaised and collaborated with representative stakeholders (see Liaison and collaboration in 2.1 Identifying Ecological Risks and Opportunities), taking into consideration data collated and shared, to determine and implement actions that enhance the ecological value of the site.

crit 5 The recommendations in crit 4 are based on recognised 'local' ecological expertise, specialist input and guidance to inform the adoption of locally relevant ecological actions which enhance the ecological value of the site.

03B Comprehensive route, Suitably qualified ecologist

crit 6 The project team have liaised and collaborated with representative stakeholders (see Liaison and collaboration in 2.1 Identifying Ecological Risks and Opportunities), taking into consideration data collated and shared, to determine and implement actions that enhance the ecological value of the site, or where this is not feasible, off-site, within the zone of influence.

crit 7 Data collated are provided to the local environmental records centres nearest to or relevant for the site.

04 Comprehensive route: Measuring the change in ecological value **up to 8 credits**

crit 8 Credits are awarded depending on the change in ecological value that occurs as a result of the project (see Methodology):

- 2 credits – minimising loss of ecology.
- 4 credits – no net loss of ecology.
- 6 credits – net gain of ecology.
- 8 credits – exceeds net gain.

Methodology

Please note that this issue is referred to as 'Ecological Change and Enhancement of ecological value' in Guidance Note 36.

Previously occupied land

When assessing new buildings developed within the boundary of an existing site, they do not automatically comply with the reuse of previously occupied land criteria. At least 75% of the land on which the new building will be sited must meet the definition of 'previously occupied'.

Foundation route, project team member

For projects using the foundation route (see 2.1 Identifying Ecological Risks and Opportunities: Methodology on page 35), the following is required to demonstrate compliance:

Liaison, implementation and data

On-site enhancement

For crit 4 and crit 5, appropriate actions will vary depending on the nature of the site and need to be clearly justified. Actions must be informed by liaison between the project team and representative stakeholders (see Foundation route, 'Determining the ecological outcomes for the site' in 2.1 Identifying Ecological Risks and Opportunities). Indicative examples of the kinds of approaches that may be relevant include:

1. Actioning relevant recommendations from Biodiversity Actions Plans.
2. Planting of ecologically appropriate species or those with a known attraction or benefit to local wildlife.
3. Adoption of horticultural good practice (such as no or low use of residual pesticides).
4. Installation of features to encourage existing wildlife (such as nesting, roosting, and insect boxes) at appropriate locations on the site.
5. Increase the porosity and texture of surfaces on-site to encourage wildlife and promote biodiversity.
6. Introduce water into the environment to encourage birds and other wildlife.
7. Only ecologically appropriate floral species, or those with a known attraction or benefit to local wildlife can be considered for the purpose of enhancing the ecological value of the site, except where explicitly recommended by an ecologist (justification must be provided).

Off-site enhancement

The comprehensive route and its associated assessment criteria must be used where off-site enhancement measures are being recognised.

Data collation and application throughout the project

In addition to the data collated during assessment of the Identifying ecological risks and opportunities issue, data collated during assessment of this issue should be shared with the project team to inform decisions relating to the site preparation, design and construction works.

Comprehensive route, suitably qualified ecologist

For sites where complex ecological systems are likely to be present, the following is required to demonstrate compliance (see 2.1 Identifying Ecological Risks and Opportunities: Methodology on page 35):

Measuring the change in ecological value

For crit 8 the BREEAM Family Change in Ecology calculation methodology is set out in Guidance Note 36 and builds on the existing 'Defra biodiversity metric'. The attributes used are based on habitat types and their distinctiveness, condition and area or length throughout the assessed project life cycle. This assessment issue's methodology follows the Defra metrics principles to quantify the impact of a development in terms of 'biodiversity units'.

The calculation methodology has two routes that are applicable depending on the project's scale and size and the distinctiveness of the habitats on the site. The two routes are summarised as:

1. Full methodology - Biodiversity units are calculated where the pre-development habitats are above the set size threshold or are of high distinctiveness.

2. Simplified methodology - Biodiversity units are calculated where the pre-development habitats are below the set size threshold and are of low or medium distinctiveness.

For both approaches, linear and area based habitats must be accounted for separately. Full details of the methodology and calculation procedure are set out in Guidance Note 36.

The benchmarks set for credits in crit 8 are explained in the table below.

Credit benchmarks	Meaning	Additional requirements
Minimising loss of ecology	Using the metric to demonstrate management of biodiversity loss. Post-Development Area and Linear Biodiversity Unit scores are ≥75% for both the Pre-development area and linear Biodiversity Unit scores	The design of the project needs to be updated to improve outcomes for biodiversity in ways that are appropriate to the project's impacts on biodiversity. This requires reinstating or enhancing biodiversity.
No net loss of ecology	Using the metric to demonstrate no net loss for biodiversity defined as: Post-Development Area and Linear Biodiversity Unit scores are between 95% and 104% for both the Pre-Development area and linear Biodiversity Unit scores (rounded to the nearest whole percentage point).	In cases where there is no impact on area or linear habitats at all the project can be assumed to be of no net loss without the need for a calculation provided that the total area of habitat created covers at least 2.5% of the Development Footprint and a length of linear habitat is included.
Net gain of ecology	Using the metric to demonstrate net gain for biodiversity defined as: Post-Development Area and Linear Biodiversity Unit scores are ≥105% for both the Pre-Development area and linear Biodiversity Unit score scores (rounded to the nearest whole percentage point). This can include sites used as biodiversity offsets.	In cases where there is no impact on area or linear habitats at all the project can be assumed to be of net gain without the need for a calculation provided that the total area of habitat created covers at least 5% of the Development Footprint and a length of linear habitat included.
Exceeds net gain (Only applicable if there are area or linear habitats present Pre-Development.)	Using the metric to demonstrate net gain for biodiversity defined as: Post-Development Area and Linear Biodiversity Unit scores are ≥110% for both the Pre-Development area and linear Biodiversity Unit scores (rounded to the nearest whole percentage point). This can include sites used as biodiversity offsets.	The design of the project is updated to improve outcomes for biodiversity in ways that are appropriate to the project's impacts on biodiversity. This requires reinstating or enhancing biodiversity so that impacts on designated sites and irreplaceable habitats have been prevented by being completely avoided or fully mitigated for.

Designated sites and irreplaceable habitats

The biodiversity associated with designated sites or irreplaceable habitats is covered by regulatory controls and processes and as such cannot be used to contribute to the change in ecological value for the purposes of the criteria. This includes any mitigation or compensation carried out in relation to these sites.

Enhancement of ecological value in addition to the calculator tool

Enhancement of ecological value can take place in various ways including enhancement of biodiversity (habitats and species). Where the ecological enhancement recommended is not covered by HQM Change in Ecological Value Calculator, the ecologist's report should clearly identify the enhancement options selected and implemented, and outline why this is a viable and meaningful way of enhancing the ecological value of the site.

Data collation and application throughout the project life cycle

In addition to the data collated during assessment of the 2.1 Identifying Ecological Risks and Opportunities, data collated during assessment of this issue should be shared with the project team to inform decisions relating to the site preparation, design and construction works.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 8	02 BREEAM Change in Ecological Value Calculator.	A completed copy of BREEAM Change in Ecological Value Calculator.	

Checklists, Tables & Illustrations

None.

Definitions

See 2.1 Identifying Ecological Risks and Opportunities issue and GN36.

Development footprint

The development footprint consists of the site, considered to be the land enclosed by the boundary of the HQM assessment, and includes any land used for buildings, hardstanding, landscaping, site access or where construction work is carried out (or land being disturbed in any other way). It also includes any areas used for temporary site storage and buildings. If it is not known exactly where buildings, hardstanding, site access, temporary storage and buildings will be located, it must be assumed that the development footprint is the entire development site.

For the purpose of the Change in Ecological Value calculation this area will also include any land outside the development boundary where:

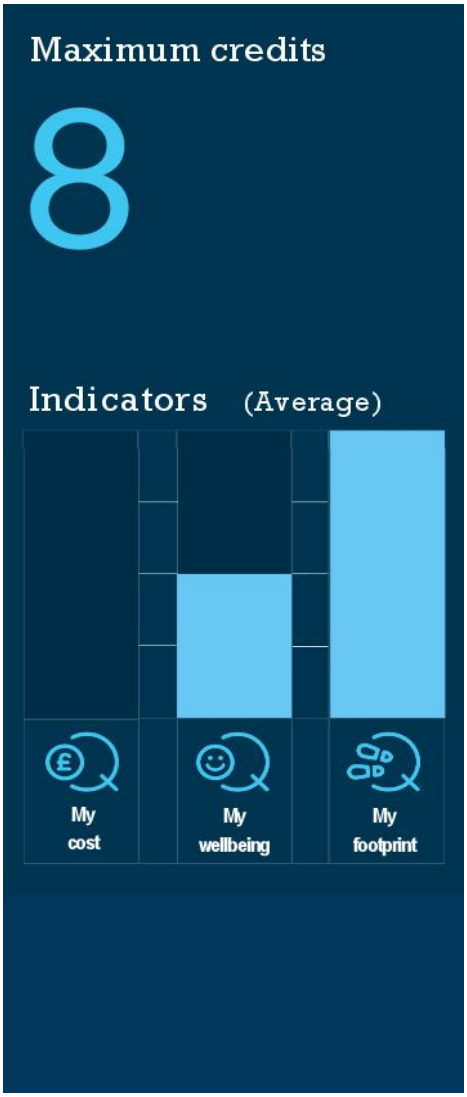
- There is an indirect impact on biodiversity, including but not limited to the Zone of Influence, and
- Land being used to compensate for impacts, either on the site or outside it as a biodiversity offset.

Previously occupied land

For the purposes of this issue HQM defines previously occupied land as that which is, or was, occupied by a permanent structure, including any associated fixed surface infrastructure (the definition is based on the National Planning Policy Framework(22) definition of previously developed land, with some further clarifications for items 3 and 4). The definition excludes:

- Land that is or has been occupied by agricultural or forestry buildings.
- Land that has been developed for minerals extraction or waste disposal by landfill purposes where provision for restoration has been made through development control procedures.
- Land in built-up areas such as parks, recreation grounds and allotments which, although they may feature paths, pavilions and other buildings, have not been previously occupied.
- Land that was previously occupied, but where the remains of the permanent structure or fixed surface structure have blended into the landscape in the process of time (to the extent that it can reasonably be considered as part of the natural surroundings), typically over a period of more than fifty years.

2.4 Long Term Ecological Management and Maintenance



Aim

To continue to monitor, manage and maintain the site and its biodiversity and ecological features to achieve the intended outcomes for the long term.

Benefit

- Sound, well-planned and monitored management practices make sure that expected benefits and outcomes will be achieved over the long term.
- A landscape and habitat management plan helps site owners, clients and occupiers to manage and improve the ecology for the long term both on the development site and, where relevant, in the zone of influence.
- Helps to improve corporate and local image and shows that statutory and legal requirements are being met.
- Open and transparent management and maintenance arrangements can involve the community. This encourages communities to work together and improves the local positive environmental responsibility and awareness.

Context

Many well-intentioned design aims are not achieved as sound management arrangements are not established and maintained during the construction, handover and ongoing operation stages of development, particularly if responsibility is transferred during a project.

An appropriate landscape and ecology management plan (or similar) covering the creation and aftercare of ecology on and near a site is essential to help maintain the ecological features and achieve the benefits of improved ecological value. For a long-term landscape and ecology management plan to be valuable, it must be based on a robust understanding of the baseline ecological value of the site, potential risks to ecology and a clear understanding of actions to reduce the negative impacts of a development and where possible, to enhance ecology.

Credit Summary

Criterion number	Title	Credits
crit 1–crit 2	01 Roles & responsibilities, implementation, statutory obligations	Prerequisite
crit 3	02 Home information	Prerequisite
crit 4	03 Liaison, review and management	Prerequisite
crit 5	04 Landscape and ecology management plan	4
crit 6–crit 8	05 Monitoring and update	4
Total credits available		8

Criteria

01 Roles & responsibilities, implementation, statutory obligations **Prerequisite**

crit 1 The client or contractor has confirmed that compliance is, or will be, monitored against all relevant UK, and EU and International legislation and relating to the ecology of the site.

crit 2 Either of the following criteria from 2.3 Ecological Change and Enhancement issue have been achieved:

crit 2.a: If the foundation route has been followed: 2.3 Ecological Change and Enhancement crit 4 and crit 5.

crit 2.b: If the comprehensive route has been followed: 2.3 Ecological Change and Enhancement crit 6 and crit 7, and 2 credits for crit 8 (minimising loss of ecology).

02 Home information **Prerequisite**

crit 3 Information is provided to the home occupier detailing the long-term ecological management actions and requirements as part of 11.2 Home Information.

03 Liaison, review and management **Prerequisite**

crit 4 The project team liaise and collaborate with representative stakeholders, taking into consideration data collated and shared, to determine and implement the actions made and structures required for 04 Landscape and ecology management plan and 05 Monitoring and update criteria, where pursued.

04 Landscape and ecology management plan **4 credits**

crit 5 A management plan is in place for the landscape and ecology accessible to the assessed home that meets the following (see Methodology):

crit 5.a: Is appropriate for the type of home and site being assessed, in line with the Methodology section.

crit 5.b: Builds on the actions carried out for protecting and enhancing ecology, to ensure that commitments and efforts made during the development to achieve optimal ecological outcomes, are retained and continued during handover and as far as possible, in-use.

05 Monitoring and update **4 credits**

crit 6 crit 3 and crit 5 have been met.

crit 7 To help ensure the continued relevance of actions over the period of the Landscape and ecology management plan, formal commitments are in place, as appropriate, for the following to be carried out:

crit 7.a: Monitoring and reporting of the actions implemented during the project for protecting and enhancing ecology and the outcomes from these actions.

crit 7.b: Arrangements for the ongoing management of landscape and ecology connected to the project on and, where relevant, off-site.

crit 7.c: Maintaining the ecological value of the site and its relationship or connection to its zone of influence.

crit 7.d: Maintaining the site in line with any sustainability linked activities, for example ecosystem benefits (see 2.1 Identifying Ecological Risks and Opportunities).

crit 7.e: Remedial or other management actions are carried out which relate to those identified in 2.1 Identifying Ecological Risks and Opportunities, 2.2 Managing Impacts on Ecology, and 2.3 Ecological Change and Enhancement.

crit 8 The landscape and management plan or similar is updated as appropriate to support maintenance of the ecological value of the site.

Methodology

Please note that this issue is referred to as the 'Long term ecology management and maintenance' issue in Guidance Note 36.

Data collation and application throughout the project life cycle

In addition to the data collated as part of 2.1 Identifying Ecological Risks and Opportunities, data collated during assessment of this issue should be shared with the project team to inform decisions relating to the site preparation, design and construction works.

Landscape and ecology management plan

For crit 5, the type of plan and measures in place will vary depending on the outdoor space that is accessible to the home. Explanations need to be provided to justify the format and type of plan in place, with consideration of: land or home ownership arrangements, the ecological features present and the actions that have been implemented as part of protecting, mitigating and enhancing the ecology on-site. Any plans, formal arrangements, and home information provided need to be informed by recommendations from a suitably qualified ecologist to ensure the measures and guidance used will benefit the ecological features present.

Formalised management plan

For homes that have access to communal outdoor areas (e.g. communal gardens) and where formal management and maintenance is appropriate (e.g. centrally managed features that are more typical with private and social landlords), the following must be provided, as appropriate for the site:

- A landscape and ecology management plan, or equivalent and appropriate to the site, that covers at least the first five years after project completion in accordance with BS 42020:2013 Section 11.1 and:
  - Includes actions and responsibilities, to give to relevant individuals or groups, for managing the site.
  - Covers the ecological value and condition of the site over the development life.
  - Identifies opportunities for ongoing alignment with activities external to the development project which support the aims of BREEAM's Strategic Ecology Framework.
  - Identifies and includes guidance to trigger appropriate remedial actions to address previously unforeseen impacts.
  - Clearly defines and allocates roles and responsibilities, and where appropriate, contractual requirements.

Limited opportunity for management

In many cases it is unlikely to be feasible or appropriate for homes to have a formalised and contracted management plan in place. For example, if the outdoor space is limited to a private garden and where management will be the sole responsibility of private homeowners (e.g. as is common with private sale). In this situation, the guidance provided as part of the home information issue (crit 3 above) is likely to be sufficient on its own for the purposes of meeting crit 5.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	

Checklists, Tables & Illustrations

None.

Definitions

See 2.1 Identifying Ecological Risks and Opportunities.

2.5 Recreational Space

Aim

To provide occupants with access to outdoor recreational space, promoting community spirit, activity and wellbeing.

Benefit

- Encourages activities that can have physical, mental and social benefits for occupants.
- Increases social cohesion (where people socialise, and work together for the good of their community), and sense of place in the local community.(23)
- Encourages cost savings and reduces negative effects on the environment through providing growing space(24) for growing food (for example allotments, planters, and so on) and access to recreational spaces.
- Helps to increase a home's value and appeal as it encourages people to want to live there.(25)

Context

Providing recreational space encourages people to interact with the outdoor environment. This is important because it makes people more aware of the benefits that recreational space can provide (for example, promoting exercise and reducing stress levels).(26) Providing recreational space is a key consideration in the National Planning Policy Statement(27) as a result of the direct benefits to the community as identified above, but also through indirect benefits such as reducing the impact of flooding risk. Also, organisations such as the NHS are beginning to recognise the health benefits of recreational space. Improving the health of communities could result in significant cost savings and less disruption both to individuals and society in general.(28)

Credit Summary

Criterion number	Title	Credits
crit 1	01 Home information	Prerequisite
crit 2	02 Accessible recreational spaces	4
crit 3	03 Private space	up to 6
crit 4–crit 5	04 Communal space	up to 7
crit 6–crit 9	05 Growing space	up to 3
crit 10–crit 12	06 Expert input	2
Total credits available		22

Criteria

01 Home information **Prerequisite**

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 11.2 Home Information.

02 Accessible recreational spaces **4 credits**

crit 2 The home is within walking distance of Recreational spaces.

03 Private space **up to 6 credits**

crit 3 Private external space is provided that is clearly associated with the home. Where balconies or roof terraces are being specified these should be minimum 1.5 m in depth. Credits are awarded for private external space based on the areas detailed in Table 9.

Table 9 Private external space requirements

Apartments Number of bedrooms per home	1 credit	3 credits	6 credits
Up to two or studios	4m²	6m²	8m²
For each additional bedroom	1m² per additional bedroom	1m² per additional bedroom	1m² per additional bedroom

Homes Number of bedrooms per home	1 credit	3 credits	6 credits
Up to two	20m²	30m²	50m²
Three to four	25m²	40m²	65m²
Five and above	30m²	60m²	100m²

04 Communal space **up to 7 credits**

crit 4 The home is within Close proximity to Communal space. Credits are awarded for Communal space based on the areas detailed in Table 10.

Table 10 Communal external space requirements as a percentage of the gross development area (GDA). At least 20m² must be provided in all cases.

Flats or Apartments	4 credits	7 credits
Town or Urban Centre	5% of the total GDA	7.5% of the total GDA
Other	10% of the total GDA	15% of the total GDA

Homes	4 credits	7 credits
Town or Urban Centre	7.5% of the total GDA	10% of the total GDA
Other	15% of the total GDA	20% of the total GDA

crit 5 Suitable management and maintenance arrangements are in place for Communal space before practical completion of the project (this can form part of the Ecology Management Strategy).

05 Growing space **up to 3 credits**

crit 6 Up to 3 credits can be awarded where growing space is provided in close proximity to the home. Credits are awarded in accordance with Table 11 and Table 12, depending on whether the Growing space is private or communal. This space must be in addition to any space used to achieve credits in the 'Private space' or 'Communal space' criteria.

Table 11 Private growing space

Home type	1 credit	2 credits	3 credits
Flat or Apartment	At least 0.5m² is provided (per home)	At least 1m² is provided (per home)	At least 1.5m² is provided (per home)
Houses: Town or Urban	At least 2m² is provided (per home)	At least 3m² is provided (per home)	At least 5m² is provided (per home)
Houses: Other		At least 4m² is provided (per home)	At least 6m² is provided (per home)

Table 12 Communal growing space as a percentage of the gross development area (GDA)

Home type	1 credit	2 credits	3 credits
A minimum of 50m² must be provided.			
Flat or apartment: Town or Urban	1.5% of the total GDA	2.5% of the total GDA	3% of the total GDA
Flat or apartment: Other	2.5% of the total GDA	5% of the total GDA	7.5% of the total GDA
Houses: Town or Urban	2% of the total GDA	3% of the total GDA	5% of the total GDA
Houses: Other	3% of the total GDA	7.5% of the total GDA	10% of the total GDA

crit 7 Where growing space is provided in a communal area, Suitable management and maintenance arrangements are in place.

crit 8 The local authority and local growing initiatives or groups (where present) have been consulted to determine the demand for, and suitable types of, Growing space.

crit 9 The outputs of the consultation feed into the provision of Growing space.

06 Expert input **2 credits**

crit 10 crit 6–crit 9 have been achieved and growing space is being provided.

crit 11 Expert input is sought at the design stage to inform the design of the growing space, and their advice feeds into the provision of growing space.

crit 12 Growing space is planted with Low maintenance species in part of the area, in accordance with the expert input.

Methodology

Communal space

For the purposes of this issue, only external communal spaces are considered.

Double counting space

Space cannot be used against more than one criteria. For example, any space used to achieve growing space credits cannot also be used to achieve communal space credits.

Expert input

Expert input may be provided by a:

1. Suitably qualified ecologist.
2. Landscape architect.
3. Representative from a local growing initiative or group.
4. Local wildlife expert (see Suitably Qualified Ecologist (SQE)).

The expert input must include:

1. Additional design advice relating to compliant growing spaces.
2. Species suitable for initial planting, taking account of the local weather and soil conditions.
3. How growing space can complement the biodiversity within the area, for example providing additional habitat.
4. Contributes to home information.

Growing space

For the purposes of HQM growing space can be considered as any one or more of the following:

- Food planters.
- Private gardens.
- Allotments.
- Community gardens or community orchards.
- Roof top growing space.
- Raised beds dedicated for growing food (this is a particularly useful approach where the soil conditions are poor as they can be artificially filled with good quality soil).
- Greenhouse or polytunnel.

This space could be provided in private gardens, balconies or roof terraces.

Where growing space is not provided in a garden bed, facilities to enable food growing (i.e. planters or equivalent) must be in place at handover and must be fixed in place (i.e. a free-standing planter would not be accepted).

Where communal growing space is provided it must be:

1. Be located within 500m of the entrance from all homes on site.
2. Have clear ownership arrangements.
3. Be a clearly designated growing space, for example use of planting or fencing around the perimeter, or in the case of communal areas contain signage.
4. Ideally be south facing and not in an area that is heavily shaded.
5. Contain suitable soil conditions and depths.
6. Be sheltered from the wind on the perimeter, for example trees, hedges or other boundary protection.
7. Be designed to be accessible to all users, for example through the provision of raised beds.
8. Be located near to a rainwater collection system, such as a rainwater butt.

Private external space

In the case of a flat or apartment, balconies can be added together to accumulate total amount of private external space. For example, a home with up to two bedrooms would be awarded 3 credits for providing two balconies at 3m² each, to have total of 6m².

Phased or development of multiple homes

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
crit 1	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 8	02 Consultation outputs	Documentary evidence of the consultation process, including the content and the findings from this.	Written confirmation from the designer.

Checklists, Tables & Illustrations

None.

Definitions

Close proximity

For the purposes of this issue, close proximity is defined as a location no more than 100m from the main entrance to the home (communal entrance of the building for an apartment block) via a safe pedestrian route.

Communal space

Space that is accessible to the occupants of several homes and clearly associated with the development. Each individual space contributing to the total area of communal space should be over 20m².

Gross Development Area (GDA)

The area of land:

- On which the new homes, associated buildings and hard landscaping (such as roads, paths) will stand, and
- Any surrounding land that will be owned by, or accessible to the owner(s) or occupant(s), of the finished home(s) (either collectively or solely).

Low maintenance

Low-maintenance plants can survive in the local conditions with minimal external input. For example, where:

1. Little or no watering is required outside of natural rainfall.
2. They can withstand local wind speeds and temperature.
3. Physical exertion needed to obtain the harvest is reasonable for those expected to do the gardening work.

Some examples of low maintenance crops that may be appropriate include herb, soft fruit bushes and fruit trees.

Private space

Space that is accessible only to the occupants of an individual home and is accessible directly from the entrance to the home.

Recreational spaces

For the purpose of HQM public recreational spaces can include the following where they over 1 hectare in size and are within 1km of the home via a safe pedestrian route:

1. Green park spaces - an area of grass, trees, or other vegetation set apart for recreational or aesthetic purposes and that is publicly owned and allows public access during the hours of daylight.
2. Woodland.
3. Nature reserves, or SSSI.

OR The following where they are within 650m of the home:

1. Play park.
2. Sports fields.
3. Tennis courts[29].

Safe pedestrian routes

Pedestrian routes on the development site, within control of the developer are deemed to be safe and accessible for all pedestrian users (including people with disabilities, the elderly and children), where they take into account any physical limitation of those who may use them, for example providing steps appropriately supported by slopped access and dropped curbs positioned at crossing points. These routes and associated spaces are appropriately sized, with good visibility of the route ahead. Alongside these principles they should also meet the following requirements:

1. Where required, lighting design must be in accordance with BS 5489-1:2020 *Design of road lighting - Lighting of roads and public amenity areas*(30) (rural areas are exempt from this requirement).
2. At crossing points there must be appropriate pedestrian crossings (such as zebra or pelican crossings) in place or a clear line of sight for at least 50m in each direction on roads with a 30mph speed limit or 100m in each direction on roads with a speed limit of greater than 30mph.
3. On roads with a speed limit of 30mph (or higher) there is a clearly defined footpath.
4. All footpaths provided should be at least 900mm wide. In rural areas, on single track roads, a grass verge is acceptable in place of a footpath.
5. In clearly defined home zones, it is acceptable for the pedestrian routes to use the road.
6. Follows a nationally recognised design guidance, such as BS 8300-2:2018(31).

Pedestrian routes that are outside of the development site and therefore not within the control of the developer do not need to meet the above requirements. However it must be demonstrated that there is a pedestrian route, which is not shared with vehicular traffic, from the site boundary to the transport node (for example via pavements, footpaths, pedestrian crossings). The route shall be signposted.

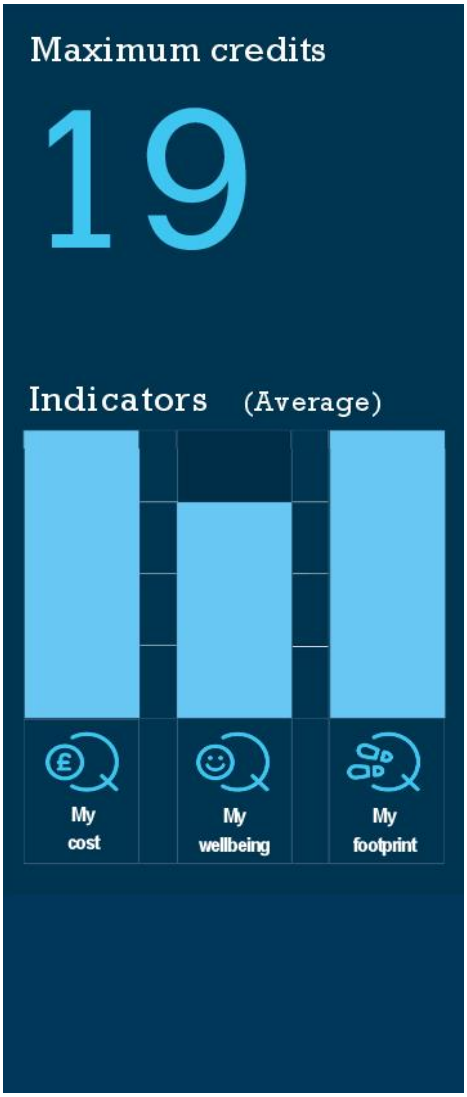
Suitable management and maintenance arrangements

Suitable management and maintenance arrangements can include any of the following:

1. The appointment of a management and maintenance company covering 3 years after occupation.
2. Responsibilities for management and maintenance are agreed with the local authority.
3. Responsibilities for management and maintenance are agreed with a community association.

3 Safety and Resilience

3.1 Flood Risk



Aim

To reduce the risk of flooding for occupants and neighbours by considering the location, master-planning and design of new homes.

Benefit

- Encourages measures to protect the home, to reduce the costs involved if there is a flood, potentially increase the attractiveness and value of the home, and reduce the time needed for the home to recover following a flood and the long-term effects of flooding on residents (such as the effect on mental health).
- Helps protect the environment against the risk of pollution arising from the release of harmful substances from the home during a flood event.

Context

In the winter of 2015/2016 severe weather across the UK resulted in widespread flooding, which affected thousands of households. The economic damage resulting from these floods was estimated to be around £1.6 billion in England, of which around £350 million related to residential property claims.(32) The Met Office has predicted that under future climate-change projections, the UK may see an increase in flood risk from various sources, including precipitation (rain, hail, snow and so on), rivers, drains and rising ground water.

The best way to reduce the risk of flooding is to build housing developments in areas with a low risk of flooding. However, land availability coupled with the current demand to provide more housing may make this impractical. In these situations, installing appropriate flood-resistance and resilience measures is the key to reducing the environmental, social and economic impact of flooding. Including these measures in the design can help reduce the risk of flood water entering a property and speed up the recovery following a flood, allowing occupants to return to their home quickly. It also reduces the need for costly repairs or work to fit these measures at a later stage.

Credit Summary

Criterion number	Title	Credits
crit 1–crit 4	01 Flood risk assessment 01 Flood consequence assessment	Minimum requirement Minimum requirement
crit 5–crit 8	02 Flood risk (follow 02A or 02B)	up to 19
crit 5	– 02A Low risk	19
crit 6	– Home information (02B Medium or high risk)	Prerequisite
crit 7–crit 8	– 02B Medium or high risk	17
Total credits available		19

Criteria

For England, Scotland, and Northern Ireland:

01 Flood risk assessment **Minimum requirement**

crit 1 A site-specific flood risk assessment (FRA) is undertaken in accordance with current best practice national planning guidance. The flood risk assessment (FRA) must take all current and future sources of flooding into consideration.

crit 2 The flood risk of the new home is communicated to the purchaser of the home before they make a decision on whether to buy the home.

For Wales:

01 Flood consequence assessment **Minimum requirement**

crit 3 A site-specific flood consequence assessment (FCA) is undertaken in accordance with current best practice national planning guidance. The flood consequence assessment must take all current and future sources of flooding into consideration.

crit 4 The flood risk of the new home is communicated to the purchaser of the home before they make a decision on whether to buy the home.

02 Flood risk (follow 02A or 02B) **up to 19 credits**

02A Low risk **19 credits**

crit 5 Where a site-specific flood risk assessment (FRA) or flood consequence assessment (FCA) confirms the development site is situated in a flood zone that is defined as having a low annual probability of flooding (Table 13 on page 64) from all sources of flooding (in accordance with current best practice national planning guidance). The flood risk assessment or flood consequence assessment must take all current and future sources of flooding into consideration.

Home information (02B Medium or high risk**)** **Prerequisite**

crit 6 Home information needs to be provided as part of 02B Medium or high risk. Please see 11.2 Home Information.

02B Medium or high risk **17 credits**

crit 7 Where a site-specific flood risk assessment or flood consequence assessment confirms the development site is situated in a flood zone by country that is defined as having a medium or high annual probability of flooding and is not in a functional flood plain (in accordance with current best practice national planning guidance). The flood risk assessment or flood consequence assessment must take all current and future sources of flooding into consideration.

crit 8 To increase the resilience and resistance of the development to flooding, one of the following must be achieved:

crit 8.a: The ground level of all habitable parts of the home and access to both the site and homes, are designed so that they are at least a 600mm* threshold above the design flood level of the flood zone by country in which the development site is located.

*This figure is from Environment Agency (EA) guidance. Where the EA has set more onerous requirements, these requirements must be met in order to achieve this criteria.

crit 8.b: The design of the building and the wider site reflects the recommendations made by an appropriately qualified professional in accordance with BS 85500:2015(33).

Methodology

Alternative standards and recommendations from an appropriate statutory body

None of the credits can be awarded where the assessed development has proceeded against the recommendation of the statutory body on the basis that the flooding implications are too great (this includes a recommendation given by the statutory body even where such a recommendation cannot be or is not statutorily enforced).

Where the local authority (or other statutory body) has set more rigorous criteria than those above, these must be met in order to achieve the relevant credits.

Existing community flood resilience measures

In an area protected by existing flood resilience measures (designed to withstand a certain magnitude of flooding) the appropriate number of flood risk credits can be awarded where the resilience measures reduce the risk to 'low' or 'medium' and the following condition is met:

The relevant agency confirms that, as a result of such resilience measures, the risk of a flood event occurring from a particular source is reduced to low or medium risk. If firm confirmation is not provided then the credits cannot be awarded.

Please note that flood risk from all sources must be 'low' or 'medium' for credits to be awarded.

A statutory body's local or regional office may be able to provide more information on existing resilience measures in the area in which the assessed development is located.

Third party defences

There are many landscape features that are owned by third parties and which act as a flood defence by default, for example embankments carrying a road or railway, or walls. For some, such as embankments and unless the assessor or project team have reason to believe otherwise, it can be assumed that they will remain in place and intact for the lifetime of the development.

For others, such as walls, or where there may be other doubts, assessors should seek assurance that they have a design life and remaining service life expectancy at least equal to that of the homes.

Level of detail required in the FRA for smaller sites

For developments of less than 1 ha (10,000m²), the level of detail required in an acceptable FRA will depend on the size and density of build. This will range from a brief report for small, low-density developments, to a more detailed assessment for a high-density development of 2000–10,000m².

For example, for very small developments (2000m² and less), an acceptable FRA could be a brief report carried out by an appropriate person (who is a member of a professional body that has a code of conduct ensuring their impartiality) the contractor's engineer confirming the risk of flooding from sources of flooding, including information obtained from the Environment Agency, water company or sewerage undertaker, other relevant statutory authorities, site investigation and local knowledge.

For England:

Where a site is located in an area that has critical drainage problems (as notified to the local planning authority by the Environment Agency), this compliance note is not applicable and a full Flood Risk Assessment must be completed where credits are sought.

Functional flood plain

Credits for locating the assessed development in a flood zone of 'medium or high annual probability' cannot be awarded where the homes are located in the functional flood plain.

A functional flood plain is defined in the current best practice national planning guidance. If the building being assessed is, or has been, defined as a 'water-compatible development', confirmation should be provided from the local planning authority that they are satisfied with the proposals before credits can be awarded.

600mm threshold

It is accepted that for homes located in medium and high risk flood zones, areas of the car park and site access may be allowed to flood and therefore fall below the 600mm threshold. In such cases credits are still achievable provided one safe access route to the site and the ground floor of the habitable parts of the home can be maintained (i.e. they are 600mm above the design flood level) to ensure the homes and the site do not become an 'island' in the event of a flood.

Where the development has been permitted and the ground levels of the topography and infrastructure immediately adjacent to the development site fall below the 600mm threshold, credits can still be awarded, provided there are no other practical solutions for access to the site above this level, and the assessed homes (and access to them) on the development site meet the assessment criteria. As much of the external site area as possible (or as required by an appropriate statutory body) should be designed at or above the threshold.

Phased or multiple home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 2, crit 4	02 Communication of flood risk	Homes to be marketed off-plan: Publicly available information showing flood risk and evidence demonstrating potential buyers are made aware of it.	Homes to be marketed after completion: same as design stage evidence for off-plan homes.

Checklists, Tables & Illustrations

Table 13 Flood zone by country

Definition	England	Wales	Scotland
Low annual probability of flooding	Zone 1—less than 1 in 1000 chance of river and sea flooding (< 0.1%).	Zone A—considered to be at little or no risk. Zone B—if site levels are greater than the flood levels used to define adjacent extreme flood outline.	Little or no risk area. As defined for England.
Medium annual probability of flooding	Zone 2—between 1 in 100 and 1 in 1000 chance of river flooding (1% – 0.1%) and between a 1 in 200 and 1 in 1000 chance of sea flooding (0.5% – 0.1%).	Zone B—if site levels are not greater than the flood levels used to define adjacent extreme flood outline. Zone C—equal to or greater* than 0.1% (river, tidal or coastal flooding). * For the purposes of HQM assume upper probability of flooding no greater than that specified for England Zone 2.	Low to medium risk area Watercourse, tidal or coastal flooding in the range 0.1% – 0.5% (1:1000–1:200).
High annual probability of flooding	Zone 3a—high probability 1 in 100 or greater chance of river flooding (> 1%) and a 1 in 200 or greater chance of flooding from the sea (> 0.5%). Zone 3b The Functional Floodplain Land where water has to flow or be stored in times of flood.	Zone C1—* *for the purposes of HQM assume the same lower and upper probability of flooding as that specified for England Zone 3a. Zone C2—* *for the purposes of HQM assume the same as that for England Zone 3b.	Medium to high risk areas Annual probability of watercourse, tidal or coastal flooding: greater than 0.5% (1:200).
Please note: Northern Ireland PPS15 does not categorise flood risk zones and assessments in NI will therefore need to rely on site-specific flood risk assessment (FRA), or other relevant data or surveys, to determine the extent of flood risk for a specific development, and use the same definitions as those outlined for England. The Northern Ireland Department of Environment or Rivers Agency may offer further advice or recommendations in this respect.			

Definitions

Appropriately qualified professional

For the purposes of this issue, a professional or team of professionals with qualifications and experience to recommend relevant site-specific flood prevention measures. Suitable professionals may be found in a variety of disciplines, such as engineering, landscape design or hydrology or a combination.

Where complex flooding calculations and prevention measures are required, this must be a specialist hydrological engineer.

Current best practice national planning guidance

These are current at the time of publication:

- Planning Practice Guidance – Flood Risk and Coastal Change – England.
- Scottish Planning Policy 7 – Scotland.
- Technical Advice Note 15 – Wales.
- Planning Policy Statement 15 – Northern Ireland.

Design flood event

A design flood event is a historic or notional flood event of a given annual probability, against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.

Design flood level

The maximum estimated water level during the design storm event including an allowance for climate change in line with current best practice national planning guidance. The design flood level for a site can be determined through either known historical data or modelled for the specific site.

Flood risk assessment (FRA) or Flood consequence assessment (FCA)

This is a study to assess the risk of a site flooding, and to assess the impact that any changes or development on the site will have on flood risk to the site and elsewhere.

An FRA should be prepared according to relevant planning policy and technical guidance documents. The FRA must account for future climate change and detail any necessary adaptation measures where or if required.

Where more than five years have passed since the FRA was carried out, evidence would be required to demonstrate that the basis of the FRA has not changed in that time.

Flood zones by country

See Table 13.

Habitable parts of the home

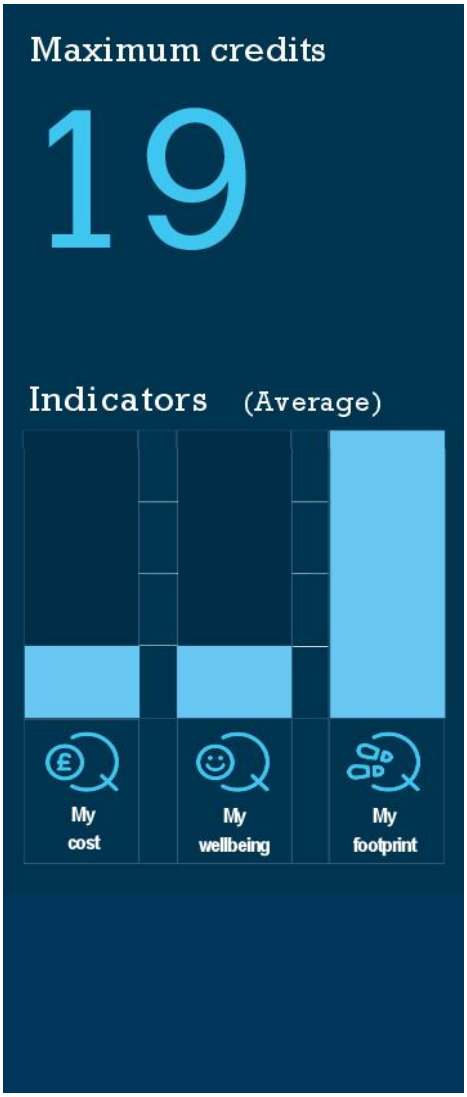
All spaces (such as living and dining rooms, kitchens, bathrooms and bedrooms) that are integral for the occupants to continue living in the home in the event of a flood occurring.

Sources of flooding

The FRA must detail the risk of flooding from the following sources:

1. Streams and Rivers: Flooding that can take place from flows that are not contained within the channel due to high levels of rainfall in the catchment.
2. Coastal or Estuarine: Flooding that can occur from the sea due to a particularly high tide or surge, or a combination of both.
3. Groundwater: Where the water table rises to such a height where flooding occurs. This is most common in low-lying areas underlain by permeable rock (aquifers), usually due to extended periods of wet weather.
4. Sewers and highway drains: Combined, foul or surface water sewers and highway drains that are temporarily overloaded due to excessive rainfall or blockage.
5. Surface water: The net rainfall falling on a surface (on or off the site) which acts as run-off which has not infiltrated the ground or entered into a drainage system.
6. Infrastructure failure: Canals, reservoirs, industrial processes, burst water mains, blocked sewers or failed pumping stations.

3.2 Managing Rainfall Impacts



Aim

To encourage new developments to include measures to manage rainfall to help reduce the risk of flooding, as well as the impact on the local environment and the environment downstream of the site, and improve the quality of run-off water.

Benefit

- Reduce costs and disruption through reduced risks of flood damage to the property and its surroundings.
- Helps people to accept new development and unites communities.
- Encourages methods to clean water run-off from developments, which will protect the environment from pollutants (such as oil) found on hard surfaces.

Context

This issue builds on the requirements within 'Sustainable Drainage systems: non-statutory technical standards', for designing, maintaining and operating of sustainable drainage systems.(34)

Flooding in the United Kingdom is an increasing problem due to a range of factors including development in areas that are prone to flooding, landscape becoming less permeable due to increased hard-surface areas, and increased rainfall. Flooding is likely to become more severe as a result of climate change. Development can increase flood risk through increased water run-off, especially from hard surfaces. The Met Office has predicted a very significant increase in the incidence of flooding over the next century as a result of climate change.(35)

The rate of water run-off has a major impact on the local environment through changes in water levels, flow rates and water quality. More widely, the overall volume of water run-off is a key factor in controlling flood risks downstream. Passive solutions such as Sustainable Urban Drainage Systems (SuDS) can be used to manage the volume and rate of run-off when appropriately designed and maintained.

Credit Summary

There are two routes to assessing this issue: foundation and comprehensive routes. These routes represent varying degrees of rigour. The route selected will depend on the number of credits sought. More credits are available through the more rigorous comprehensive route, recognising that an appropriate consultant has been employed to reduce rates or volume of run-off.

Criterion number	Title	Credits
crit 1	01 Home information	Prerequisite
crit 2–crit 5	02 Routes of rigour (follow 02A or 02B) - Managing the rate and volume of run-off	up to 14
crit 2	– 02A Foundation route	up to 3
crit 3–crit 5	– 02B Comprehensive route	up to 14
crit 6–crit 8	03 Water quality	3
crit 9	04 Designing for maintenance and operation	2
Total credits available		19

Criteria

01 Home information **Prerequisite**

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 11.2 Home Information.

02 Routes of rigour (follow 02A or 02B) - Managing the rate and volume of run-off **up to 14 credits**

02A Foundation route **up to 3 credits**

crit 2 The reduction in impermeable area of the development site is calculated in accordance with the Methodology section and achieves the following:

Table 14 Reduction in impermeable area and associated number of credits

Reduction in impermeable area	Credits
≥ 25%	1
> 50%	3

02B Comprehensive route **up to 14 credits**

crit 3 An appropriately qualified professional is appointed to carry out, demonstrate or confirm the development site's compliance with crit 4–crit 5.

Peak-rate of run-off **up to 5 credits**

crit 4 Drainage measures are specified to ensure that the peak rate of run-off from the site to the watercourses (natural or municipal) is no greater for the developed site than it was for either:

crit 4.a: The pre-development site for 3 credits;

– OR

crit 4.b: An equivalent greenfield site run-off rate for 5 credits.

Volume of run-off **up to 9 credits**

crit 5 Drainage design measures are specified to ensure that the post development volume of run-off, for the 100-year 6-hour storm event is no greater than it was for either the:

crit 5.a: The pre-development site for 6 credits;

– OR

crit 5.b: Greenfield site volume of run-off for 9 credits.

03 Water quality **3 credits**

crit 6 The water quality credits are only available where at least 3 credits are achieved in the comprehensive route.

crit 7 An appropriately qualified professional is appointed to carry out, demonstrate or confirm the development site's compliance with crit 8.

crit 8 To protect the water quality of receiving surface waters and ground waters, appropriate pollution prevention and treatment measures are designed and installed in surface water drainage systems in accordance with C753 The SuDS Manual[36].

04 Designing for maintenance and operation **2 credits**

crit 9 Agreements put in place for the ownership, long term operation and maintenance of all SuDS for the design life of the development.

Methodology

Managing Rainfall Impact template (BF1844)

This template can be used to demonstrate compliance with the 02 Managing the rate and volume of run-off criteria (both 02A Foundation route and 02B Comprehensive route). The template can be used by the HQM Assessor to aid in assessing these criteria. Completing this template is optional.

Discharges directly to a tidal estuary or the sea

crit 2–crit 5 can be deemed to be met and 14 credits achieved by default if the site discharges rainwater directly to a tidal estuary or the sea.

The site must discharge run-off directly into the Tidal estuary or the sea, if these criteria are to be awarded by default. Typically, this would mean that drainage pipes would only carry run-off from the site and that they would not need to cross privately owned land outside the boundary of the development before reaching the sea.

Discharges directly to a surface water body

Where the drainage system discharges directly to a surface water body (such as a reservoir) that can accommodate uncontrolled surface water discharges without any impact on flood risk from that surface water body, crit 2–crit 5 can be deemed to be met and 14 credits are achieved by default. Typically, this would mean that drainage pipes would only carry run-off from the site and that they would not need to cross privately owned land outside the boundary of the development before reaching the surface water body.

Where this compliance note is used to demonstrate compliance, please contact BRE Global with the details of your chosen solution to demonstrate compliance before proceeding.

Peak rate of run-off

Where the pre-development or greenfield peak rate of run-off for the site would result in a requirement for the post-development flow rate to be less than 5L/s at a discharge point, a flow rate of up to 5L/s may be used where required to reduce the risk of blockage.

Derelict sites

If the site has been derelict for over five years, the Appropriate Consultant must assess the previous drainage network and make reasonable assumptions to establish probable flow rates and volumes. To do this they should use best practice simulation modelling, to determine the 1-year and 100-year peak flow rates at the relevant discharge points. To complete the calculations, a site visit prior to development will be required unless accurate data already exist from a previous survey. The resultant professional report can then be used to determine the pre-development volumes and rates of run-off. Without this professional input, the site must be deemed greenfield pre-development, assuming Soil Type 5 for the calculation of the pre-development site run-off.

Sustainable Urban Drainage Systems (SuDS)

Where SuDS are specified, they should be designed in accordance with the CIRIA SuDS manual.

Alternative standards set by a statutory body

Where a statutory body (or local authority) has set more or less onerous requirements or equivalent alternative requirements, these requirements must be met in order to achieve the relevant credits.

Below are examples of standards set by statutory bodies:

1. Minimum flow rate or maximum storage requirement set by the statutory body: Where the statutory authority has exercised their statutory powers and set specific minimum flow rate and maximum storage requirements that are less onerous than the specific rate of run-off standard, the statutory requirements will take precedence over the rate of run-off requirements within this issue.
2. Maximum flow rate set by the statutory body: If a maximum flow rate is set that can be discharged, the peak rate of run-off requirement within the rate of run-off requirement will still apply unless the maximum flow rate set is more onerous (lower rate) than the HQM.

In both the above examples, all other criteria will still be applicable. Evidence should be provided to confirm that this is the case and should be in the form of formal documentation from the statutory authority. This should include evidence such as planning approvals, conditions or correspondence from a statutory body setting out specific requirements, i.e. a sewerage undertaker or the Environment Agency.

For guidance where alternative standards set by a statutory body are not covered here, please contact HQM technical support. These scenarios will be reviewed on a case-by-case basis.

Rainwater harvesting

BS EN 16941-1:2018 *On-site non-potable water systems - Systems for the use of rainwater*[37] should be followed where rainwater harvesting systems are used for storm water control. To ensure flood risk is not increased if the rainwater harvesting system is, for some reason, not utilised, the exceedance flow route capacity provided in accordance with CIRIA report C635 should ignore the beneficial effect of the rainwater harvesting system.

Phased or multiple home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Calculations

Calculating peak rate of run-off

Peak rate of run-off calculations should be carried out for the range of storm durations up to and including the 6-hour 1-year and 100-year return period storm events. The peak rate of run-off for the storm event will then be the 'worst case' run-off rate for the range of storm durations. Calculations should include an allowance for climate change; this should be made in accordance with current best practice national planning guidance.

Key publications that should be referred to for guidance on calculating the peak rate of run-off include:

1. The SuDS Manual.
2. Preliminary rainfall run-off management for developments.
3. National planning policy guidance or statement for the specific country.
4. IH Report 124, Flood estimation for small catchments (Marshall and Bayliss, 1994).
5. Flood Estimation Handbook (Centre for Ecology and Hydrology, 1999).

Greenfield sites of less than 50 ha

The calculation of greenfield run-off rates must be in accordance with IH Report 124, Flood estimation for small catchments (Marshall and Bayliss, 1994). The pro-rata method on the size of catchment detailed in Table 4.2 in The SuDS Manual, CIRIA C697 (2007) must be followed.

Greenfield sites of 50 ha to 200 ha

The calculation of greenfield run-off rates must be in accordance with IH Report 124, Flood estimation for small catchments (Marshall and Bayliss, 1994). Flood Estimation Handbook (Centre for Ecology and Hydrology, 1999) can be used for these sites as an alternative, where there is a preference to do so, but only if the catchment is considered to be suitable for its application.

Greenfield sites of more than 200 ha

The calculation of greenfield run-off rates must be in accordance with the Flood Estimation Handbook (Centre for Ecology and Hydrology, 1999) and any subsequent updates. Where the Flood Estimation Handbook is not considered appropriate for the development, IH Report 124 can be used.

Brownfield sites

The calculation of brownfield run-off rates should be as follows:

- If the existing drainage is known then it should be modelled using best practice simulation modelling, to determine the 1-year and 100-year peak flow rates at discharge points (without allowing surcharge of the system above cover levels to drive greater flow rates through the discharge points).
- If the system is not known, then the brownfield run-off should be calculated using the greenfield run-off models described above but with Soil Type 5.

Calculating volume of run-off

Refer to Chapter 4, Section 4.5.5 of The SuDS Manual (CIRIA C697, 2007) for guidance on calculating the additional volume of run-off created by the development for the 1 in 100-year, 6-hour storm event. Calculations should include an allowance for climate change; this should be made in accordance with current best practice national planning guidance.

Calculating the reduction in impermeable area

1. Calculate the surface area within the development site pre-development and post-development which does not allow water to pass into the ground.
2. Calculate the reduction in impermeable area:

$$\frac{\text{pre-development impermeable area} - \text{post-development impermeable area}}{\text{pre-development impermeable area}} \times 100$$

Scope of assessment

Development site

There are a number of options for assessment:

1. The individual home and its associated hard-standing areas can be assessed independently where the run-off is being dealt with on a home-by-home basis (i.e. each home has its own dedicated sub-catchment that serves only that home).
2. Where assessing groups of homes within a larger development, the drainage assessment must incorporate the local sub-catchment serving all of those homes and there must be a single drainage strategy for all the homes within the group.
3. Where assessing the run-off from a larger site consisting of a number of non-residential buildings or homes, the assessment must take into account the drainage from the local sub-catchment serving all those non-residential buildings or homes. Note that proportioning cannot be used to calculate the percentage of run-off discharging into the local sub-catchment resulting from just the assessed homes.
4. Where highways form part of the development site, refer to Highways that form part of the development site (see section below).

Highways that form part of the development site

The following guidance should also be used where applicable:

1. Where new non-adoptable highways are built, all of the area of the highway must be included in the development site area.
2. Where homes are built beside existing highways or where adoptable highways are built that are part of the development site, the area of the highway does not need to be included in the development site area.
3. Where the drainage serving both the adoptable or non-adoptable highway (be it existing or new) and housing combines before leaving the site boundary, it is not regarded as an 'adoptable' highway for the purposes of this scheme. In this instance the development site area must include the highway.

The same development site area must be consistently used throughout the issue when completing the assessment of this issue.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 2	02 Impermeable area calculations	Pre-development and post-development impermeable area calculations and change in impermeable area calculation	
crit 4	03 Rate of run-off calculations	Calculation results for the pre-development, greenfield and post-development peak rate of run-off.	
crit 5	04 Volume of run-off calculations	Calculation results for the pre-development, greenfield and post-development volume of run-off.	
crit 9	05 Maintenance agreement	No 'specific' evidence applies at Design Stage	Agreements for the ownership, long term operation and maintenance of all specified SuDS.
Where the Managing Rainfall Impact template (BF1844) has been used, it should be submitted as evidence.			

Checklists, Tables & Illustrations

None.

Definitions

Appropriately qualified professional

For the purposes of this issue, a professional or team of professionals with the skills and experience to champion the use of SuDS within the overall design of the development at an early stage.

The professional or team of professionals must be capable of understanding the site's particular surface water management needs and opportunities. In addition, they must have knowledge and experience in using SuDS-based solutions to influence the holistic design of a development's drainage system and provide the robust hydraulic design calculations referred to in key guidance documents such as The SuDS manual (CIRIA C697, 2007) and Preliminary rainfall run-off management for developments (EA/Defra, 2007).

Suitable professionals may be found in a variety of disciplines, such as engineering, landscape design or hydrology or a combination.

Geotechnical advisers or specialists may be required for SuDS techniques that allow infiltration.

Current best practice national planning guidance

These are current at the time of publication:

- Planning Practice Guidance – Flood Risk and Coastal Changes – England.
- Scottish Planning Policy 7 – Scotland.
- Technical Advice Note – Wales.

Discharge point

The discharge point is the point at which the run-off from the site leaves the site boundary and enters a watercourse.

Greenfield run-off rate

The rate of run-off that would occur from the site in its undeveloped and therefore undisturbed state.

Greenfield volume of run-off

The volume of run-off that would occur from the site in its undeveloped and therefore undisturbed state.

Pre-development

The state of the site under assessment immediately prior to purchase of the site by the client or developer (or, where the client has owned or occupied the site for a number of years, its current state).

Treatment

Improving the quality of water by physical, chemical or biological means.

Tidal estuary

A tidal estuary is defined as a semi-enclosed coastal body of water which has a free connection with the open sea and within which seawater is measurably diluted with fresh water derived from land drainage. An estuary should be unconstrained tidal waters, i.e. there should be no barriers or constricted shorelines that would restrict the free flow of water into the open sea in any conditions. The impact on the total volume of run-off from the site (and other sites which may in future discharge into the estuary) should be insignificant in terms of the overall water levels in the estuary. Tidal rivers (i.e. where no or limited measurable seawater content is present during normal tidal movements) cannot be included as part of the estuary for the purposes of HQM.

Surface water run-off

Water flow over the surface of roofs and ground surface to a drainage system. Ground surface run-off occurs if the ground is impermeable, is saturated or if the rainfall is particularly intense.

Volume of run-off

The volume of run-off that is generated by rainfall occurring on the site. This is typically measured in cubic metres. Additional predicted volume of run-off is the difference between the volumes of run-off; pre-development, greenfield and post development.

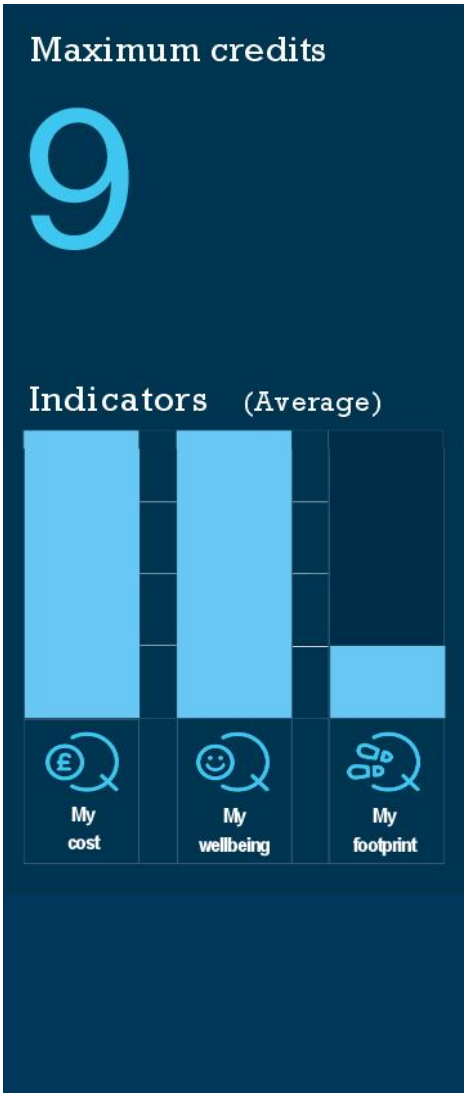
100-year event

A 100-year return period event refers to an event that occurs on average once every one hundred years. This can also be expressed as the 1 in 100 or 1:100-year event[38].It is used to provide a measure of likely risk but does not guarantee specific flood patterns on a year by year basis.

Impermeable area

This includes all areas on the development site that do not allow water to pass into the ground. Impermeable footpaths less than 1.5 m wide which have free drainage to soft landscaped areas on both sides may be excluded.

3.3 Security



Aim

To promote the design of developments where people feel safe and secure, and where crime and the fear of crime does not reduce people's quality of life or sense of community.

Benefit

- Reduces the costs and disruption associated with crime for the occupiers.
- Improves the health and wellbeing of the occupiers by limiting stress from the fear of crime.
- Improves natural surveillance by making sure public spaces are overlooked and avoiding blank walls (walls without openings).
- Helps limit costs for the police.

Context

Feelings of safety and security are essential to successful, sustainable communities. Freedom from crime and the fear of crime has a major impact on quality of life.

The Crime Survey for England and Wales (CSEW) shows the likelihood of being a victim of crime has fallen considerably over time: around 14 in 100 adults were victims when surveyed in 2017 compared with around 24 in 100 adults a decade earlier (survey year ending March 2007). In Scotland, property crime is measured by the Scottish Crime and Justice Survey (SCJS) which estimates that around 13% of adults in Scotland were a victim of property crime in 2014-2015.

For Scotland: This issue builds on the requirements of Domestic Technical Handbook - Safety (Section 4.13, Security). For England: This issue builds on the requirements of Approved Document Q: Security - Dwellings[39].

Credit Summary

Criterion number	Title	Credits
crit 1	01 Home information	Prerequisite
crit 3	03 Security needs assessment	Prerequisite
crit 4–crit 5	04 Security features	up to 9
Total credits available		9

Criteria

01 Home information **Prerequisite**

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 11.2 Home Information.

02 Approved Document Q compliance **Minimum requirement**

For Northern Ireland:

crit 2 Approved Document Q (England) must be complied with.

03 Security needs assessment **Prerequisite**

crit 3 A Suitably Qualified Security Specialist (SQSS) conducts an evidence-based Security Needs Assessment (SNA) during or prior to early design stages (typically RIBA Stage 2 or equivalent).

04 Security features **up to 9 credits**

crit 4 The Suitably Qualified Security Specialist (SQSS) develops a set of recommendations or solutions during or prior to early design stages (typically RIBA Stage 2 or equivalent). These recommendations or solutions aim to ensure that the homes, and external areas within the site's boundary are designed and specified to address the issues identified in the preceding SNA.

crit 5 The recommendations or solutions proposed by the Suitably Qualified Security Specialist (SQSS) are implemented (see Implementing recommendations or solutions):

Table 15 Percentage of recommendation implemented

Percentage of recommendations implemented	Credits
50	4
100	9

Methodology

Late consultation with SQSS

Where an SQSS was consulted at a later stage than early design stages (typically RIBA Stage 2 or equivalent), these credits may still be achievable. If the SQSS confirms that the implementation of security measures has not been restricted or impaired, or it is still possible to implement security measures as a result of their later involvement (i.e. everything that would have been recommended can still be implemented), then the credits can still be awarded (provided all other compliance requirements are met).

Implementing recommendations or solutions

When confirming whether the recommendations or solutions set out by the SQSS have been implemented at the post construction stage, it may be necessary for the HQM Assessor to use one or more of the following evidence types, supplied by the design team:

Desk-based evidence, such as manufacturer's literature or certificates.

Site-based evidence, such as a site inspection report or photographs.

Recommendations made by an SQSS

Where a facility or function (required by the design brief, local authority and other parts of HQM) increases the security risk, the recommendations from an SQSS should seek to reduce the security risk but without significantly diminishing the facility or function. There shall be no recommendation to remove a facility or function. For example if an allotment forms part of the design brief, the SQSS should not recommend it is removed or significantly diminished on the basis that it may be a security risk. They should instead make recommendations to improve the security of the allotment.

Phased or multiple-home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	

Checklists, Tables & Illustrations

None.

Definitions

Secured by Design (SBD)

A police initiative that seeks to encourage the construction industry to adopt crime prevention measures in the design of developments, to assist in reducing the opportunity for, and fear of, crime. Secured by Design is owned by the National Police Chiefs' Council (NPCC) and has the support of the Home Office Crime Reduction and Community Safety Group and other Government Departments. The National Police Chiefs' Council for England, Wales and Police Scotland endorse and support the Secured by Design programme.

Security Needs Assessment (SNA)

The project and site-specific assessment of security needs, including:

1. A visual audit of the site and surroundings, identifying environmental cues and features pertinent to the security of the proposed development.
2. Formal consultation with relevant stakeholders, including the local ALO, CPDA and Counter terrorism security advisers (CTSAs) (as applicable), in order to obtain a summary of crime and disorder issues in the immediate vicinity of the proposed development. Crime data are also publicly accessible at www.police.uk.
3. Identification of security risks specific to the proposed development and its inhabitants or users.
4. Identification of any detrimental effects the development may have on its surroundings and the existing community.

The purpose of the assessment is to aid decision-making and allow the identification and evaluation of security recommendations or solutions. Secured by Design may help the SQSS when developing the recommendations or solutions addressing the issues raised in the SNA. Any deviation from those recommendations shall be justified, documented and agreed with a suitably qualified security specialist.

Suitably Qualified Security Specialist (SQSS)

An individual achieving any of the following can be considered to be 'suitably qualified' for the purposes of compliance with HQM:

1. Minimum of three years' experience in a relevant security profession (in the last five years). This experience must clearly demonstrate a practical understanding of factors affecting security in relation to construction and the built environment, relevant to the type and scale of the project being undertaken.
2. Holds a qualification relevant to security.
3. Maintains a full membership to a relevant professional body, institute or certification scheme that has a professional code of conduct, to which members adhere.
4. A specialist registered with a BREEAM recognised third party licensing or registration scheme for security specialists.

The following licensing/registration schemes are recognised as meeting the requirements of the Suitably Qualified Security Specialist (SQSS) criteria. As such, individuals listed are also eligible to perform the role of SQSS:

- SABRE Registered Professionals with 'SQSS' status
- Chartered Security Professionals (CSyP)
- Register of Security Engineers and Specialists (RSES) 'General Security Advisor' (GSA)

SABRE Registered Professional

SABRE Registered Professionals are deemed to meet the competency requirements of the various specialist deliverables within the SABRE security assessment scheme including: threat assessments, risk assessments, security strategies, technical design & engineering and concepts of operations (CONOPS). The registration is also intended to act as an indicator of professionalism for the benefit of the wider industry.

Chartered Security Professional (CSyP)

The Register of Chartered Security Professionals (CSyP) was established under a Royal Charter granted to the Worshipful Company of Security Professionals in the UK and launched in 2011. Registrants use CSyP as a post nominal. Being admitted to the Register and becoming a CSyP is a means of being recognised and continuing to represent the highest standards and ongoing proficiency. It is the gold standard of competence in security practice. CSyPs must comply with a Code of Conduct, a Professional Disciplinary Code, and also complete Continuous Professional Development each year. The Register is recognised across the UK, including by the Association of Security Consultants (ASC), the International Professional Security Association (IPSA), The Security Industry Authority (SIA) and CPNI (Centre for the Protection of National Infrastructure).

Register of Security Engineers and Specialists (RSES)

The Register of Security Engineers and Specialists (RSES) was established to promote excellence in security engineering by providing a benchmark of professional quality against which its members have been independently assessed. Registration is open to engineers, applied scientists and specialists who apply their knowledge to securing the built environment and infrastructure. RSES is sponsored by the Centre for the Protection of National Infrastructure (CPNI) and administered by the Institution of Civil Engineers' (ICE) Membership Division.

Approved Document Q

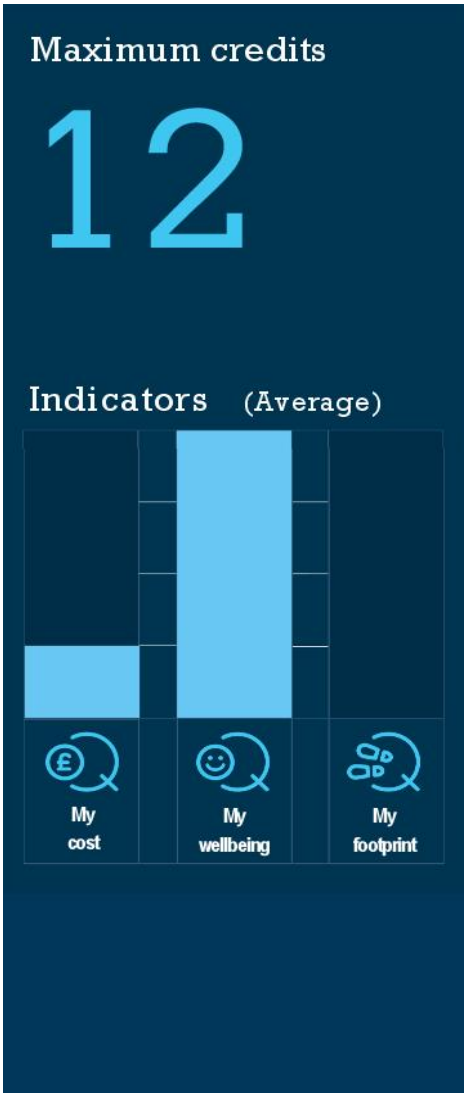
Approved Document Q covers the standards for doors and windows to resist physical attack by a burglar. It includes standards on being both sufficiently robust and fitted with appropriate hardware.

The approved document gives guidance for compliance with the Building Regulations for building work carried out in England. It also applies to building work carried out on excepted energy buildings in Wales as defined in the Welsh Ministers (Transfer of Functions)(No. 2) Order 2009.

My Home

4 Comfort

4.1 Indoor Pollutants



Aim

To increase comfort for occupants and minimise negative impacts on health arising from indoor air pollutants emitted from the building and its materials.

Benefit

- Reduces the risk of pollutants released from a new home which negatively affect an occupant's health and wellbeing.
- Makes occupants more aware of indoor pollutants so they can make better choices with building materials, decorative products, furnishings or cleaning products.

Context

Building materials, coatings and furnishings are significant sources of indoor air pollution, in particular, formaldehyde and volatile organic compounds (VOCs). Building materials can release a wide range of VOCs, especially during the first two years of a new building.(40) The amount of pollution released into indoor air can be reduced by selecting building materials, coatings and furnishings with low pollutant content.

Household products (such as air fresheners, cleaning fluids, polishes) and cosmetics (such as deodorants, powders, and bathing products) are also potential significant sources of indoor air pollution, but are not covered by HQM.

Credit Summary

Criterion number	Title	Credits
crit 1	01 Home information	Prerequisite
crit 2	02 Minimising emissions from space and water heating	Prerequisite
crit 3–crit 6	03 Minimising the effects of cooking	up to 2
crit 7	04 Minimising emissions from building product types	up to 4
crit 8–crit 9	05 Minimising airborne formaldehyde from all sources	3
crit 10–crit 11	06 Minimising airborne TVOCs (total volatile organic compounds) from all sources	3
Total credits available		12

Criteria

01 Home information **Prerequisite**

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 11.2 Home Information.

02 Minimising emissions from space and water heating **Prerequisite**

crit 2 All combustion appliances within a home must have flues that discharge outdoors.

03 Minimising the effects of cooking **up to 2 credits**

Cooker hood **1 credit**

Naturally ventilated homes

crit 3 In each kitchen, a cooker hood is provided that is extractive (discharge air outdoors).

Mechanically ventilated homes

crit 4 In each kitchen, a cooker hood is provided that is re-circulating.

crit 5 Home information needs to be provided as part of this criteria. Please see 11.2 Home Information.

Cooking fuel **1 credit**

crit 6 Only cooking appliances with zero emissions from the fuel are specified (for example electric appliances).

04 Minimising emissions from building product types **up to 4 credits**

crit 7 Credits are awarded where building product types meets the emission limits, testing requirements and additional requirements listed in Table 17. The quantity of credits awarded is based upon how many product types in Table 17 meet these requirements (see Table 16). Where wood-based products are not one of the selected product types for 1 or 2 credits, all wood-based products used for internal fixtures and fittings must be tested and classified as formaldehyde E1 class as a minimum.

Table 16 Quantity of building product types that need to meet the requirements in order to receive credits

Quantity of building products types	Credits
1	1
3	2
All	4

05 Minimising airborne formaldehyde from all sources **3 credits**

crit 8 The formaldehyde concentration in indoor air is measured post construction (but pre-occupancy) and does not exceed 0.1 mg/m^3 (100 µg/m^3), averaged over 30 minutes(41).

crit 9 Where levels are found to exceed these limits, measures must be undertaken to reduce the formaldehyde levels to within the above limits.

06 Minimising airborne TVOCs (total volatile organic compounds) from all sources **3 credits**

crit 10 The TVOC concentration in indoor air is measured post construction (but pre-occupancy) and does not exceed 0.3 mg/m^3 (300 µg/m^3), averaged over 8 hours.(42).

crit 11 Where levels are found to exceed these limits, measures must be undertaken to reduce the TVOC levels to within the above limits.

Methodology

Minimising the effects of cooking-cooker hood

For Northern Ireland, where a system 2 ventilation system (as defined in Technical Booklet K (2012)), i.e. passive stack ventilation (PSV) is installed, this credit is not available.

Accreditation of organisations performing sampling or laboratory analysis

All organisations used for sampling and analysis of indoor air or for analysis of emissions from building products must be accredited to ISO/IEC 17025(43) with specific accreditation covering:

1. Sampling: Pumped sampling for formaldehyde in air; pumped sampling for VOCs in air.
2. Chemical analysis: Determination of formaldehyde; determination of VOCs.

Self-declaration of emission levels from building products

Self-declaration by manufacturers of emission levels from building products in the form of technical specifications or other manufacturer's literature is acceptable if testing has been performed by an independent accredited laboratory in accordance with Accreditation of organisations performing sampling or laboratory analysis OR, where the manufacturer declares that the product contains no formaldehyde or VOCs.

Non-VOC emitting products

Inherently non-VOC emitting products such as brick, natural stone, concrete, ceramic tile, glass, or metal surfaces. do not need to be assessed and can be deemed fully compliant with the criteria, unless organic-based coatings, binders, or sealants are used in their production or finishes.

Furnishings

The scope of the 'Minimising emissions from building product types' credits do not extend to furnishings, such as desks or shelving; it focuses on the key internal finishes and fittings integral to the building.

Representative sampling of indoor air

Representative sampling of indoor air is permitted where there are multiple homes on a site that incorporate the same building products or materials specification. In such cases, at least 1 in 10 homes must be sampled in accordance with the Methodology section. Where there are differences in the size, type, layout or location of homes on a site, the representative sampling must cover each of the different home 'groups' found on the site (for example 1-bed apartment, 2-bed mid-terrace, 3-bed semi-detached, or 4-bed detached). The accredited organisation performing the sampling should advise on grouping of homes and the most appropriate homes to sample on a site.

Products used in small quantities for ad hoc purposes

All products specified for a project that fall within one of the product types listed in Table 17 must be assessed under this issue. However, it is accepted that it may be difficult to control the specification of some products (such as sealants) that are used in small quantities for ad hoc purposes such as 'making good'. As such, any products used in this way do not need to be assessed for this issue. The HQM assessor should use their judgement to determine whether products being used or intended to be used for ad hoc purposes will be used in significant quantities and therefore need to be assessed for this issue.

Scope of 'Minimising emissions from building product types'

Only products that are installed or applied in parts of the building where their emissions are likely to affect indoor air quality need to be assessed. For the purposes of this issue, this means any product installed or applied inside of the inner surface of the building's

infiltration, vapour or waterproof membrane or, where not present, inside of the inner surface of the building envelope's interior facing thermal insulation layer.

Products specified for specialist applications and/or providing a specific function may be exempt from meeting the emission limits in Table 17 and Table 18 where it can be demonstrated that there are no alternative products available that can perform the function and meet the emission limits.

Minimising airborne formaldehyde and TVOCs from all sources (post construction)

Sampling and laboratory analysis should only be performed by organisations accredited to ISO/IEC 17025(44). The two functions may be carried out by different accredited organisations. Measurements should be made after completing the building, but before its occupation following the protocol set out in the calculation method below.

Testing requirements for emission limits

The testing requirements for formaldehyde and TVOC emission limits are based on standard emission test chamber methods. Compliance with the emission limits shall be demonstrated after 28 days in a test chamber or earlier, as stipulated in the relevant testing requirements standard. Compliance may be achieved by alternative means from those in Table 17 providing this is agreed in advance by BRE Global. Perforator, flask, desiccator and other extraction based test methods are specifically excluded.

The finished product as a whole must meet the emission limits. For example if a wood panel has a finish applied to it in the factory, the finished product would need to be tested and meet the emission limits for wood-based products in Table 18.Testing of individual components that make up the finished product is not required (apart from when the finish is a separate product that is applied on site).

Minimising airborne formaldehyde, and airborne TVOCs, from all sources – calculation method

Measurements should be made after completing the building and before its occupation. Before sampling, rooms should be intensively ventilated for 15 minutes and then outer doors and windows closed for at least 8 hours (or overnight) before sampling begins. This is the responsibility of the owner, developer or builder. The outer envelope of the building should remain closed (all windows, doors, trickle vents and other controllable openings) throughout the sampling process. All internal doors and openings within the building should be opened(45).

The indoor temperature must be uniform and at the level expected for occupation for the duration of the test. If necessary, the home should be heated before and during the test to ensure correct operation of the sampling tubes(46). Any heating action taken, and the temperature achieved in each location, should be noted in the test report. Active (pumped) sampling tubes for measuring formaldehyde and TVOCs should be placed in the main bedroom and in the main living area, at about head height (1.50m), at least 1m from a wall, and away from known sources of formaldehyde such as particle board or Medium Density Fibre board (MDF).(47) One sampling tube as a minimum should be placed in each room for each of the formaldehyde and TVOC measurements (i.e. two per room as a minimum if both parameters are being measured).

Sampling for formaldehyde should be in accordance with BS ISO 16000-3 (48). Sampling for TVOCs should be in accordance with BS EN ISO 16017-1(49) or BS ISO 16000-6(50).

The sampling tubes should be exposed for an appropriate time and an appropriate flow-rate in accordance with ISO 16000-3, 16000-6 or 16017-1.(51), then sealed and returned, appropriately labelled, to an accredited laboratory for analysis. Reporting should be in accordance with BS ISO 16000-3(52), BS ISO 16000-6(53) or both.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 7	02 Emissions from building products	Product emission test results demonstrating appropriate testing methods by an accredited laboratory. Where applicable for paints and varnishes, evidence of protection against mould growth.	

Criterion Reference	Title	Design Stage	Post Construction Stage
crit 7	03 Paints used in wet areas	For crit 7, evidence must be provided to show that paints used in wet areas protect against mould growth. Evidence could include appropriate test results (such as fungal or algal resistance testing) or manufacturer's product information or declaration. There are British standard tests which could be used: BS EN 15457(54) and BS EN 15458(55).	
crit 8	04 Indoor air quality testing for formaldehyde	Refer to 01 General evidence	Results of indoor air quality testing for formaldehyde, demonstrating appropriate testing methods by an accredited laboratory. Where representative sampling is undertaken, details of the sampling strategy employed on the site, including any grouping of homes.
crit 10	05 Indoor air quality testing for TVOCs	Refer to 01 General evidence	Results of indoor air quality testing for TVOCs, demonstrating appropriate testing methods by an accredited laboratory. Where representative sampling is undertaken, details of the sampling strategy employed on the site, including any grouping of homes.
crit 9 and crit 11	06 Remedial measures	Refer to 01 General evidence	Written confirmation from the project team of the remedial measures that have been undertaken

Third party certification schemes for emission levels from building products: For crit 7, third party certification schemes for emission levels from building products can be used as evidence to demonstrate compliance with the criteria. Guidance Note 22: *BREEAM Recognised Schemes for VOC Emissions from Building Products* (GN22) lists a number of such schemes that have been assessed to show equivalent or better performance than the criteria. If assessors, clients or scheme operators wish to seek recognition of other schemes not currently listed, please contact the HQM office (hqm@bregroup.com) for details of the application process.

Checklists, Tables & Illustrations

Table 17 Emission criteria by building product type

Building product type^	Emission limits*			Testing requirement	Additional requirements
	Formaldehyde	Total volatile organic compounds (TVOCs)#	Category 1A and 1B carcinogens		
See Accreditation of organisations performing sampling or laboratory analysis				See Accreditation of organisations performing sampling or laboratory analysis and Testing requirements for emission limits	
Interior paints and coatings	0.06 mg/m^3	1.0 mg/m^3	0.001 mg/m^3	BS EN 16402(56) or BS EN ISO 16000-9(57) or BS EN 16516(58) or CDPH Standard Method v1.1(59)	Meet TVOC content limits. Paints used in wet areas (e.g. bathrooms, kitchens, utility rooms) should protect against mould growth (see 03 Paints used in wet areas).
Wood-based products (including wood flooring)	0.06 mg/m^3 (Non-MDF) 0.08 mg/m^3 (MDF)	1.0 mg/m^3	0.001 mg/m^3	BS EN ISO 16000-9 (60) or BS EN 16516(61) or CDPH Standard Method v1.1(62) or BS EN 717-1(63) (formaldehyde emissions only)	N/A
Flooring materials (including floor levelling compounds and resin flooring)	0.06 mg/m^3	1.0 mg/m^3	0.001 mg/m^3	BS EN ISO 10580(64) or BS EN ISO 16000-9 (65) or BS EN 16516(66) or CDPH Standard Method v1.1(67)	N/A

Building product type^	Emission limits* Formaldehyde	Total volatile organic compounds (TVOCs)#	Category 1A and 1B carcinogens	Testing requirement	Additional requirements
Ceiling, wall and acoustic and thermal insulation materials	0.06 mg/m^3	1.0 mg/m^3	0.001 mg/m^3	BS EN ISO 16000-9(68) or BS EN 16516 (69) or CDPH Standard Method v1.1(70)	N/A
Interior adhesives and sealants (including flooring adhesives)	0.06 mg/m^3	1.0 mg/m^3	0.001 mg/m^3	BS EN 13999 (Parts 1-4)(71) or BS EN ISO 16000-9(72) or BS EN 16516(73) or CDPH Standard Method v1.1 (74)	N/A

^The emission limits in this table apply to the finished product, i.e. after any coating or other treatment process has been applied.

*Compliance with emission limits shall be demonstrated after 28 days in an emission test chamber or earlier as stipulated by the relevant testing requirements standard. The emission rate obtained from the chamber test method must be extrapolated to predict what the concentration would be in the air of the theoretical model or reference room (as detailed in the respective testing standard) and this extrapolated concentration compared with the emission limit in this table. Emission limits are for individual building products and not cumulative for all building products that are part of a building product type group.

#Where test results for a product exceed the TVOC emission limit, compliance with the above requirements can still be achieved where the test results demonstrate an R-value ≤ 1 after 28 days.

Table 18 Maximum TVOC content for paints and coatings

Product category	Free TVOC content of ready-to-use product (g/l)	Testing requirements (see Accreditation of organisations performing sampling or laboratory analysis)
Interior matt walls and ceilings (Gloss <25@60°)	10	ISO 11890-2 or ISO 17895 or Calculation based on the ingredients and raw materials
Interior glossy walls and ceilings (Gloss >25@60°)	40	
Interior trim and cladding paints for wood and metal	90	
Interior trim varnishes and wood stains, including opaque wood stains	65	
Interior minimal build wood stains	50	
Primers	15	
Binding primers	15	
One-pack performance coatings	100	
Two-pack reactive performance coatings for specific end use such as floors	80	
Multi-coloured coatings	80	
Decorative effect coatings	80	

Definitions

Category 1A and 1B carcinogens

Carcinogenic compounds detectable by the VOC emission testing requirements in Table 17 and that are classified as category 1A or 1B carcinogens in accordance with Regulation EC No. 1272/2008 on classification, labelling and packaging of substances and mixtures(75), which are listed as Carcinogenic VOCs in Annex H of BS EN 16516(76).

R-value

Sum of all Ri values. Ri is the ratio Ci / LCIi, where Ci is the mass concentration of the individual VOC i. in the air of the reference room, and LCIi is the LCI value of VOC i. The LCI value is the 'Lowest Concentration of Interest', which is the substance-specific value for health-related evaluation of the emission from construction products as agreed by the EU-LCI Working Group (ec.europa.eu/growth/sectors/construction/eu-lci_en).

TVOC

Sum of the concentrations of identified and unidentified volatile organic compounds eluting between and including n-hexane and n-hexadecane on a gas chromatographic column specified as a 5 % phenyl/95 % methyl-polysiloxane column(77).

4.2 Daylight

Aim

To promote access to daylight, which will improve the occupants' quality of life and reduce the amount of energy used to light the home.

Benefit

- Provides mental and physical benefits to the occupier.
- Helps lower energy costs and environmental impacts by reducing the need for artificial light, and makes the home more attractive to potential occupants.

Context

Evidence shows that good daylight is one of the qualities people look for most in a home. Daylight has important health benefits. Exposure to high levels of light during the day helps maintain circadian rhythms, especially in elderly people. This improves the quantity and quality of sleep and may benefit the cardiovascular system. Daylight has also been shown to improve people's mood and reduce depression and stress-related symptoms, including seasonal affective disorder (SAD). Daylight is often associated with view out from the home, which provides contact with the outside and also benefits people's mood.

HQM awards credits for meeting and improving on the minimum acceptable average daylight factor suggested in BS 8206-2.

Credit Summary

Criterion number	Title	Credits
crit 1	01 Average daylight factor (kitchens)	5
crit 2	02 Average daylight factor (living spaces)	up to 5
crit 3	03 View of sky	3
Total credits available		13

Criteria

01 Average daylight factor (kitchens) **5 credits**

crit 1 All kitchens achieve a minimum average daylight factor of at least 2%.

02 Average daylight factor (living spaces) **up to 5 credits**

crit 2 Credits will be awarded based upon the minimum average daylight factor achieved for all living rooms, dining rooms and studies (see Table 19).

Table 19 Minimum average daylight factors and associated credits

Minimum average daylight factor	Credits
1.5%	1
1.8%	3
2.0%	5

03 View of sky **3 credits**

crit 3 80% of the working plane in each kitchen, living room, dining room and study receives direct light from the sky.

Methodology

Calculation procedures

Average daylight factor

The average daylight factor can be calculated using the following equation:

$$\text{Daylight Factor} = \frac{MW\theta T}{(A(1-R^2)}$$

Where:

W = **total glazed area of windows or rooflights (not including frames)**

A = **total area of all the room surfaces (ceiling floor, walls and windows)**

R = **area-weighted average reflectance of the room surfaces**

M = **a correction factor for dirt**

T = **glass transmittance factor**

θ = **angle of visible sky**

Guide values for a typical home with light-coloured walls are as follows (for more accurate values, refer to BS 8206 Part 2[78]):

R = 0.5

M = 0.96 (vertical glazing that can be cleaned easily)

M = 0.88 (vertical glazing with a balcony or overhang above)

M = 0.92 (sloping glazing)

M = 0.88 (horizontal glazing)

T = 0.68 (double glazing with low-emissivity coating)

T = 0.6 (triple glazing)

Calculation procedures for the average daylight factor are detailed in BS 8206 Part 2 and in 'Site layout planning for daylight and sunlight: a guide to good practice'[79] These publications give a formula for calculating the average daylight factor. It is important that external obstructions are correctly modelled.

As an alternative to using the formula for the average daylight factor, computer simulation software can be used. It should use an overcast sky model with a minimum grid size of 250mm, extending over the whole working plane. Computer simulation is recommended for more complex room geometries, for example those with light shelves or redirecting glazing.

No-sky line

Plotting of the no-sky line or estimating the percentage of the working plane that receives direct light from the sky can be carried out using the equation below, using the guidance in Appendix D of 'Site layout planning for daylight and sunlight: a guide to good practice', or using specialist computer simulation software.

Step 1:

Plotting of the no-sky line or estimating the percentage of the working plane that receives direct light from the sky can be carried out using the methodology below, where the obstruction is opposite the window. As an approximation, obstructions that are parallel to the window can be considered infinite. The no-sky line will then be parallel to the window at a distance 'd' from the window wall, which can be calculated as follows:

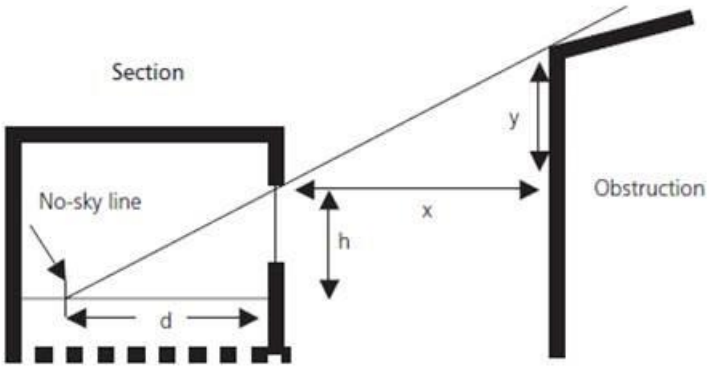
$$d = \frac{xh}{y}$$

Where:

h = **height of the window head above the working plane (0.85m above the floor)**

y = **height of the obstruction above the window head**

x = **distance from the window to the obstruction**



Step 2:

Calculate the percentage (P) of d of the room depth.

$$P = \left(\frac{d}{\text{room depth}}\right) \times 100$$

Any room where P ≥ 80 meets crit 3

This equation is intended for situations where the external obstruction is wide, directly opposite the window, and parallel to it. It will give worst case results in situations where the external obstruction is directly opposite the window but is discontinuous. It cannot be used where the external obstruction is not parallel to the window (for example an extension next door which projects from the line of the window wall). In these cases, the guidance in Appendix D of 'Site layout planning for daylight and sunlight: a guide to good practice', or specialist computer simulation software, should be used.

Where obstructions are not horizontal, parallel to the window or considered infinite, 'Site layout planning for daylight and sunlight: a guide to good practice' (BRE, 2011) gives a more accurate methodology.

θ Angle of visible sky

The angle of visible sky θ is the angle subtended, in the vertical plane normal to the window, by the visible sky from the centre of the window.

For long obstructions parallel to the window:

Where:

$$\theta = 90 - a - b$$

$$\tan(a) = \frac{H}{D}$$

$$\tan(b) = \frac{T_w}{H_w}$$

H_w = the height of the window

T_w = the thickness of the wall

D = the distance from the window to the obstruction

H = the height of the obstruction above the mid-height of the window

Where external obstructions are of complex geometry and cannot be approximated by a continuous object, it is advisable to use the methodology in 'Site layout planning for daylight and sunlight: a guide to good practice' (BRE, 2011). Individual trees can be ignored.

Open-plan rooms

Where two or more spaces (for example, an open plan kitchen-dining-living room) form part of the same room (i.e. no solid partition is present to block the distribution of the daylight), calculate the average daylight factor for the whole room. Where two rooms form part of the same large space (such as an open plan kitchen-dining room), as no solid partition is present to block the distribution of the daylight, calculate the average daylight factor for the whole space (i.e. as one room).

Credits must be awarded by comparing the average daylight factor for the whole space to the relevant assessment criteria.

Site or room level

Calculations for this issue can be completed at either:

1. Site level – calculations are completed for a set of selected worst case homes or rooms on the site. Credits are awarded to all homes based on the performance of these worst case rooms (or homes). To identify worst case rooms for the daylight calculation:
    a. Where rooms A and B have the same layout and window, and room A is more heavily obstructed (being on a lower floor, or with a greater angle of obstruction due to a larger or closer building opposite), then if room A complies, room B will too. Where rooms C and D have the same obstruction, room shape and size, but room D has a larger glazed area, then if room C complies, room D will too. Where rooms E and F have the same obstruction and window, but room F has smaller internal area, then if room E complies, room F will too.

OR

2. Room level – calculations are completed for all relevant rooms on-site. Credits are awarded according to the performance of the actual rooms.

This decision is left to the design team and is likely to be dependent on the particular site being assessed.

Sun pipes

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

Two windows facing different obstructions

When two or more windows in a room face different obstructions (such as vertical windows and roof lights) or differ in transmittance, the average daylight factor must be calculated separately for each window, and the results summed.

Window below working plane

If part of a window lies below the working plane, the average daylight factor for that part of the window must be calculated separately from the part of the window above the working plane.

The average daylight factor for the part of the window below the working plane must be calculated and multiplied by an additional correction factor before being added to the average daylight factor for the part of the window above the working plane.

The default correction factor is 0.15; Appendix C of 'Site layout planning for daylight and sunlight: a guide to good practice' (2011 edition) gives additional correction factors for special situations.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 1–crit 2	02 Daylighting calculations	Daylighting calculations.	
crit 3	03 View of sky calculations	View of sky calculations.	

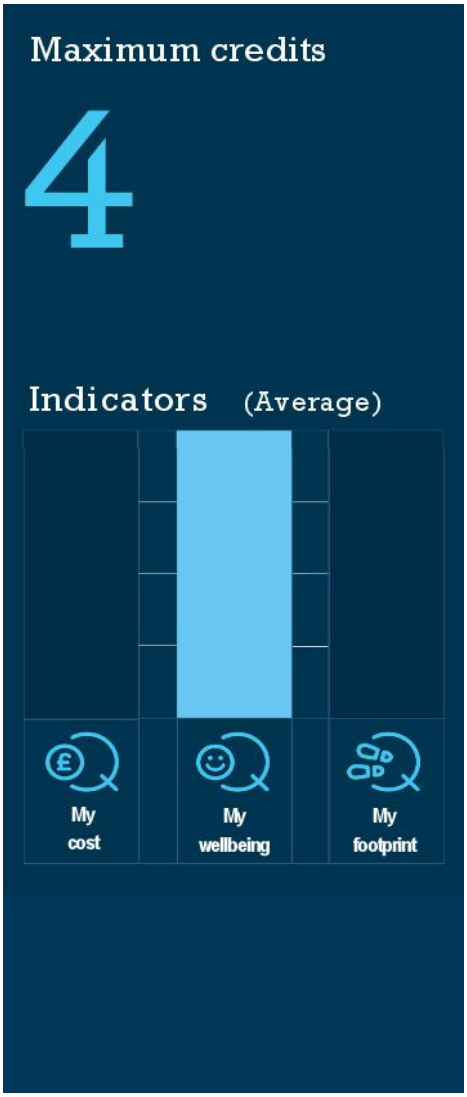
Checklists, Tables & Illustrations

None.

Definitions

None.

4.3 Noise Sources



Aim

To reduce noise disturbance to occupants in both inside and outside areas of homes by promoting low levels of sound from noise sources outside the home and from building services.

Benefit

- Improves occupants' health and wellbeing.
- Reduces costs to the local authority by reducing complaints.
- Helps community unity.

Context

An important underlying quality of any home is managing noise to improve the occupants' comfort, health and wellbeing. A home should provide a quiet environment to allow for effective rest and to allow people to use their home without affecting other spaces or activities. Managing noise levels inside a home improves the comfort of its occupants by limiting disturbance from all sources of environmental noise and building services.

It is widely recognised that noise exposure indirectly affects health and wellbeing. It can result in psychological stress and sleep disorders and other biological effects leading to increased blood pressure and cardiovascular diseases.

Designers generally develop and demonstrate a noise control strategy to the satisfaction of the local planning authority, but quiet spaces are not always included in the finished development. Noise control is usually restricted to managing external noise sources through site layout and design, but does not typically cover monitoring the performance of a finished development. The lack of noise testing can mean there is potential for a performance gap between the intended and achieved outcome.

The internal noise-level criteria attempt to limit disturbance from all sources of environmental noise and building services. The external noise-level criteria aim to lower the risk of disturbance from nearby environmental noise sources such as the local road or rail network.

Credit Summary

Criterion number	Title	Credits
crit 1–crit 2	01 Internal noise levels	2
crit 3–crit 4	02 External noise levels	up to 2
Total credit available		4

Criteria

01 Internal noise levels **2 credits**

crit 1 A Suitably Qualified Acoustician (SQA) is appointed to consider this issue.

crit 2 The home has been designed and built to meet the internal noise requirements outlined in Table 20 in accordance with the methodology section, and this has been confirmed by an SQA.

Table 20 Internal noise levels

Time of day	Habitable rooms $L_{Aeq,T}$	Kitchens $L_{Aeq,T}$	Open plan rooms that a kitchen is part of $L_{Aeq,T}$
Day (07:00-23:00)	35dB	35dB	Lower target: 35dB Upper target: 45dB
Night (23:00-07:00)	30dB (Bedrooms only)	35dB	35dB

02 External noise levels **up to 2 credits**

crit 3 crit 1 has been met.

crit 4 The noise levels of external functional spaces do not exceed the requirements in Table 21 in accordance with the methodology section, and this has been confirmed by an SQA.

Table 21 Noise levels of external functional space

Time of day	Credits	Requirements $L_{Aeq,T}$
Day (07:00-23:00)	1	55dB
Day (07:00-23-00)	2	50dB

Methodology

Internal noise levels—habitable spaces and kitchens

For measurements of internal noise, the following procedures should be used:

1. Generally the measurements of internal noise should be undertaken by an SQA. However, it may be convenient to do this at the same time as other testing such as pre-completion sound insulation testing required for HQM or regulatory purposes. In this case the measurements may be verified by the SQA, if they are made by others.
2. At least one in 10 homes on a development should be subject to on-site acoustic testing.
3. The properties selected for testing shall be those considered by the SQA to be most exposed to environmental noise sources. The selection criteria should be outlined in the report from the SQA detailing the results of the measurements. Where it is not clear which properties would be most exposed to environmental noise, the number of properties tested should be increased to ensure the worst case is tested.
4. Measurements should be made in at least one bedroom and one other habitable room for each home tested. The rooms selected should be those in which noise levels are expected to be greatest, and so generally on the façade most exposed to environmental noise.
5. Windows should be closed for the measurements, apart from when used for the "normal" or designed day-to-day operation/mode for purge ventilation, but trickle vents (if required for the ventilation strategy) should be open during the measurements. Any ventilation means employed within the specific strategy for mitigating overheating of a home should be

included within this noise assessment. This could include (for example): opening windows, opening doors, opening specific apertures, mechanical ventilation or mechanical cooling. The mitigation strategy deployed for a particular building will depend on many factors. Approved Document O (for England) and the ANC Acoustics, Ventilation and Overheating (AVO) guide(80) contain further guidance on this issue.

6. External and internal doors should be shut during the measurements.
7. Noise from building services should be included in the measurements, where they are required for normal background ventilation and heating purposes, i.e. heat pumps, boilers, active ventilation systems. Exclude extractor fan noise in the measurements for kitchens. The continuous mechanical ventilation system needs to run on its minimum low rate required for the ventilation strategy and follow the suggested noise index from Approved Document F1 2021 (for England), Approved Document F1 2022 (Wales), Domestic Technical Handbook 2023 (for Scotland), and Part K Technical Booklet 2012 (for Northern Ireland).
8. Extractor fans within nearby bathrooms, WCs and en-suites should be running when making measurements within bedrooms. The door between the room with the extractor fan and the bedroom should be shut. The continuous operation system needs to run at the minimum high rate required for the ventilation strategy and follow the suggested noise index from Approved Document F1 2021 (for England), Approved Document F1 2022 (Wales), Domestic Technical Handbook 2023 (for Scotland), and Part K Technical Booklet 2012 (for Northern Ireland).
9. Noise from occupants should not be included in the measurements. Where white goods are supplied as part of the home purchase, noise from white goods should be included in the measurements.
10. If the rooms are not carpeted or furnished, then the results of the measurements should be corrected in accordance with ANC GUIDELINES Noise Measurement in Buildings Part 1: Noise from Building Services(81).
11. Measurements need not be made over the full day (07:00–23:00) if a shorter measurement period can be used. In this case, measurements should be made when external noise levels are representative of normal conditions throughout the periods.
12. Measurement periods of less than 30 minutes may give representative values for internal noise levels and may be utilised where this is the case. However, measurement periods shorter than 5 minutes should not be used. The actual duration of measurement shall be determined by the SQA and included within the measurement report.
13. Measurements should be taken in a minimum of three locations in rooms at a height of 1.2m above the floor level and at least 1m away from any surface.
14. Compliance with the daytime criteria is through on-site measurement.
15. Compliance with the night-time criteria can be assumed for bedrooms, provided that they comply with the daytime criteria. This is subject to confirmation from an SQA that any building services noise will not elevate the room levels to above the limit. It may be convenient to quantify the building services noise through a short measurement during the daytime period.
16. ANC Guidelines – Noise Measurement in Buildings Parts 1 and 2 may be used as a source of good practice for undertaking measurements within the home.

Internal noise levels—open-plan rooms that a kitchen is part of

For demonstrating compliance with the specified targets for kitchens which are part of an open plan room, two test conditions are required. The guidance contained above in points 1-3, 5-7 and 9-16 should be followed. In addition:

- The lower target (found in Table 20) should be achieved when the system is operating at the minimum rate* for continuous extract ventilation systems and for intermittent extract ventilation systems, it should not be running.
- The upper target (found in Table 20) should be achieved when the system is operating at the boost rate* for continuous extract ventilation systems or the minimum rate* for intermittent extract ventilation. The noise associated with the upper target can be measured over a reduced time period compared to that for the lower target.
- To achieve the night-time target (found in Table 20), the ventilation system should be operating at the minimum rate* for continuous extract ventilation systems and for intermittent extract ventilation systems, it should not be running.

*For ventilation rates refer to table 5.1a Extract Ventilation rates and table 5.1b in Approved Document F1 2021 or alternatively where 4.6 Ventilation: 03 Ventilation rates on page 109 is met, the rates achieved must be used.

Heating and ventilation systems, and supporting infrastructure (such as pipes, outlets, fans, pumps) can increase noise levels within the home. The following building services have the potential to elevate noise levels, but their impact can generally be mitigated against through

careful placement, design, system selection and appropriate commissioning of:

- Mechanical ventilation systems
- Heat pumps (split unit systems)
- Boilers and heating systems.

External noise levels

For measurements of noise in external functional spaces, the following procedures should be used:

1. Generally, the measurements of external noise should be undertaken by an SQA. However, it may be convenient to do this at the same time as other testing such as pre-completion sound insulation testing required for HQM or regulatory purposes. In this case the measurements may be verified by the SQA if they are made by others.
2. Sufficient measurements should be made in order to determine a reasonable average for the external functional space. The number of measurement points should be determined by the SQA and take account of the general usable space.
3. It may not be necessary to measure the noise in every external functional space; in this case representative sampling as defined by the SQA would be appropriate.
4. Noise from environmental sources (such as traffic noise) should be included and also any mechanical or electrical plant associated with the home or the neighbouring properties such as the external units of a heat pump. Any plant should be running at normal operating duty.
5. Measurements need not be made over the full day (07:00–23:00) if a shorter measurement period can be used. In this case, measurements should be made when external noise levels are representative of normal conditions throughout the periods.
6. Measurement periods of less than 30 minutes may give representative values for external noise levels and may be utilised where this is the case. However, measurement periods shorter than 5 minutes should not be used. The actual duration of measurement shall be determined by the SQA and detailed within the measurement report.
7. If existing external noise level data is available, then calculations by an SQA may also be used to demonstrate compliance with the criteria. External data may take the form of existing noise survey data or local noise modelling or mapping. If this approach is used, then the SQA must take into account any new noise sources introduced as part of the development or associated with the home itself and outline the modelling or calculation basis within their report.
8. Where noisy activities in the vicinity are occurring that would not be expected to be present when the home is occupied, for example construction activities, then the measurements should be made in the absence of the noise source. This may mean that the activity is temporarily suspended for the testing, or the testing is done when the activity is not taking place.
9. Where measurements of environmental noise were required as part of the planning process, the noise levels within external functional spaces can be calculated by an SQA. Full account must be taken of any new sources introduced as part of the development, i.e. mechanical or electrical plant that have the potential to increase noise levels. The report detailing the assessment of external noise should detail the results of the previous survey and the calculation methods used.
10. The ANC Green Book: Environmental Noise Measurement Guide and BS 7445[82] are sources of available good practice and relevant definitions for the measurement of external noise.

Note: When determining the internal and external noise levels associated with the home a degree of tolerance is allowed to account for measurements of uncertainty and variability in sound levels as follows:

- For internal noise levels, a tolerance of + 3 dB is allowed for an individual room. However, the targets in Table 21 should be achieved by the average of rooms within each group.
- The targets in Table 21 should be achieved by the average of all measurements considered necessary to evaluate the overall noise level of the external functional space as a whole.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 2	01 Internal noise levels	1. Calculations or assessment from the SQA taking into account the external noise level and contributions from intended building services (if any) showing that the noise limits presented in Table 20 are likely to be achieved, or 2. Confirmation from an appropriate party that states; no noise-related planning conditions have been imposed and that the home will be naturally ventilated, but also does not have any heating or ventilation systems that have the potential to cause noise disturbance within the relevant spaces.	Testing results from the SQA demonstrating the noise limits presented in Table 20 have been met in line with the methodology section.
crit 4	02 External noise levels	1. Calculations or assessment from the SQA taking into account the external noise level and contributions from intended building services either associated with or close to the home showing that the noise limits presented in Table 21 are likely to be achieved, or 2. Confirmation from an appropriate party that states no noise-related planning conditions have been imposed and that no additional noise sources, such as, electrical or mechanical plant are intended to be introduced in the vicinity. OR Evidence demonstrating that no external functional spaces exist	Testing results from the SQA demonstrating the noise limits presented in Table 21 have been met in line with the methodology section.

Checklists, Tables & Illustrations

None.

Definitions

Suitably Qualified Acoustician (SQA)

An individual achieving all the following items can be considered to be 'suitably qualified' for the purposes of a HQM assessment:

1. Has a minimum of three years relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting acoustics in relation to construction and the built environment; including, acting in an advisory capacity to provide recommendations for suitable acoustic performance levels and mitigation measures.
2. An individual who holds a recognised acoustic qualification and membership of an appropriate professional body. The primary professional body for acoustics in the UK is the Institute of Acoustics.

An SQA may have to use their professional judgment to make decisions to ensure the appropriateness of the noise measurements for the homes or development type. The SQA is ultimately responsible for the noise testing results.

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

1. Represent sound industry practice.
2. Be appropriate given the building being assessed and scope of works proposed.
3. Avoid invalid, biased and exaggerated recommendations. Additionally, written confirmation from the third-party verifier that they comply with the definition of an SQA is required.

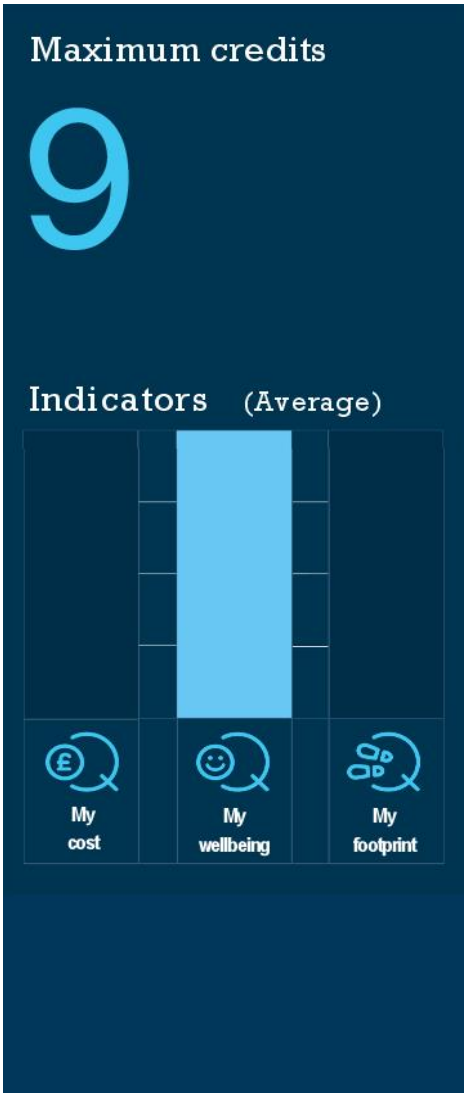
External functional spaces

For the purposes of this issue, this includes:

1. A private garden.
2. A communal garden or courtyard.
3. Balconies.
4. Roof terraces.
5. Patios.

The above list is not exhaustive.

4.4 Sound Insulation



Aim

To reduce noise disturbances for occupants and neighbours by promoting good levels of sound insulation between neighbouring homes and different rooms within the home.

Benefit

- Improves community unity by limiting disturbances from and to neighbours.
- Helps maintain a good quality of life for both occupants and neighbours.
- Reduces local authorities' costs as there will be fewer complaints.

Context

Noise within homes can come from various sources, including building systems, occupants, equipment and sources outside the home. Excessive noise can have a range of adverse effects on occupants including inconvenience and annoyance, loss of concentration, reduced productivity and disturbed sleep. It is important to manage noise within a home to increase occupants' comfort, reduce negative impacts of noise on the occupants' ability to carry out various tasks (for example, when working from home) and to provide privacy. As a result, sound insulation and layout is an important consideration when designing, using and building homes. Good home acoustics should allow rooms to be used as intended, without affecting other areas or activities. Designing a home to meet specific acoustic performance standards for sound insulation and noise levels (both inside and outside) supports comfort for occupants.

Minimum performance requirements for sound insulation are included in national building regulations. The performance requirements vary across the UK but are found within Approved Document E (England and Wales)(83) and Section 5 (Noise) of the Domestic Technical Handbook (Scotland)(84). Within the relevant national building regulations, the issue of sound is split into two parts: sound insulation between adjacent homes; and sound insulation between rooms within homes.

Credit Summary

Criterion number	Title	Credits
crit 1	01 Sound insulation between homes	up to 5
crit 2–crit 3	02 Sound insulation levels for internal walls and floors	up to 4
Total credits available		9

Criteria

01 Sound insulation between homes **up to 5 credits**

crit 1 It must be demonstrated that the home achieves the targets set out in Table 22 for airborne sound insulation (both requirements 1 and 2) and impact sound insulation taking into account both separating walls and floors between homes. This must be demonstrated through a programme of pre-completion testing by a Compliant test body in accordance with the Methodology.

Table 22 Sound insulation levels for separating walls and floors

Credits*	Airborne sound insulation requirement 1 $D_{nT,w} + C_{tr}$ (dB) (minimum values)	Airborne sound insulation requirement 2 $D_{nT,w}$ (dB) (minimum values)	Impact sound insulation $L'_{nT,w}$ (dB) (maximum values)
	Separating walls and floors between homes	Separating walls and floors between homes	Separating floors only between homes
1	48	56	56
3	50	58	54
5	53	60	52

* Credits should be awarded based on the worst performing wall or floor.

02 Sound insulation levels for internal walls and floors **up to 4 credits**

crit 2 The targets set out in Table 23 for airborne sound insulation are met, and this is demonstrated through testing within an acoustics laboratory in accordance with the methodology section.

Table 23 Sound insulation levels for internal walls and floors

Credits*	Airborne sound insulation R_w (dB) (minimum values)
2	43
3	45
4	48

* Credits should be awarded based on the worst performing wall or floor.

crit 3 The Suitably Qualified Acoustician (SQA) must pass on critical information to relevant construction professionals outlining key issues that have the potential to reduce sound insulation during the construction process, including as a minimum:

crit 3.a: Information on the means to ensure that sockets, switches, down lights and other services or other perforations maintain the acoustic performance where otherwise it may be compromised.

crit 3.b: Guidance relating to appropriate junction details at the head, foot and perimeter of the partition or floor.

Methodology

Sound insulation between homes

Where pre-completion acoustic testing is the preferred route for achieving the credits, as a minimum, one set of tests for every 10 homes in a group (houses, apartments or bungalows are defined as the groups) and each sub-group (typically these are different construction type groups) is required.

In the event of less than 10 properties, one set of tests is carried out.

Usually one unit should be 'selected' to determine the number of tests required as follows:

Table 24 Number of tests forming a set of tests

Group Type	Airborne tests, separating walls	Airborne tests, separating floors	Impact tests, separating floors	Total
Houses or bungalows	2	0	0	2
Apartments	2	2	2	6

The actual number of tests possible may be limited by the layout. Where this is the case then the compliant test body should clearly identify why the full number of tests was not feasible within the test report or covering correspondence.

Tests should be carried out in accordance with the test standards referenced by the relevant national regulations and should only be undertaken by a compliant test body.

In the event of a test failure, documented evidence is required to show how widespread the issues are. This should include a report from an SQA identifying the issues, and an extended test series is also required to show how the root cause of the issues has been satisfactorily established. Post-remedial works testing is required to demonstrate that the requirements have been met, and clear statements should be included in the report stating the remediation works that were undertaken.

Detached home

Where a home is detached, crit 1 does not need to be met and five credits can be awarded by default.

Sound insulation between rooms

Testing should be undertaken within an acoustic laboratory accredited by UKAS (or European equivalent) to BS EN ISO/IEC 17025(85) with the relevant part of BS EN ISO 10140(86) (previously BS EN ISO 140) included on their schedule of accreditation. The evidence submitted should include full details of the tested construction and this must match the construction intended for use at the development.

Checks must be undertaken to ensure that the laboratory test report evidence submitted relates to the proposed and built construction (including all key components such as stud type and make, joist type, principal dimensions, board and insulation type and make).

When the construction matches one of the specifications for internal walls or floors outlined in the Scottish Government Building Standards Division publication 'Example Construction and Generic Internal Constructions for use with Section 5: Noise - of the Technical Handbooks' then the construction can be considered to achieve 43 dB, Rw, and further laboratory test evidence is not required unless a higher performance value is being claimed to achieve the higher credit scores.

For England and Wales:

The criteria apply to all internal walls and floors within a dwelling regardless of whether they are covered by the scope of Approved Document E - Resistance to the passage of sound (2003 Edition incorporating 2004, 2010, 2013 and 2015 amendments).

For Scotland:

The criteria apply to all internal walls and floors within a home regardless of whether they are covered by the scope of Section 5 (Noise) of the Domestic Technical Handbook 2023.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	

Criterion Reference	Title	Design Stage	Post Construction Stage
crit 1	01 Sound insulation between homes	Where pre-completion acoustic testing will be carried out; A letter from the relevant party confirming the intent to: 1. Meet the relevant sound insulation performance levels using the methodology prescribed. 2. Use a compliant test body to complete testing.	Where pre-completion acoustic testing has been carried out; copies of the sound insulation field test results or a letter of confirmation that the required sound insulation performance standards as detailed in the assessment criteria have been achieved.
crit 1	01 Sound insulation between homes	Intended layout demonstrating homes are detached	Confirmation that homes are detached.
crit 2	02 Sound insulation levels for internal walls and floors	Confirmation of the intended construction and either: 1. Laboratory test report OR 2. Confirmation of which construction is being used from "Example constructions and generic details". OR 3. Published manufacturer's data reference	As for design stage, however review and compare against as-built.

Checklists, Tables & Illustrations

None.

Definitions

Compliant test body

This includes companies which are:

1. UKAS accredited to undertake testing to BS EN ISO 140-4 & 7:1998*; or
2. A member of the ANC Registration Scheme, for pre-completion sound insulation testing, in accordance with BS EN ISO 140-4 and 7:1998*; or
3. Organisations that can provide evidence that they are a member of a scheme that follows the relevant principles of BS EN ISO/IEC 17024 (Conformity assessment – General requirements for bodies operating certification of persons) in relation to acoustics; or
4. Organisations that can provide evidence that they comply with the requirements of BS EN ISO/IEC 17025 in relation to acoustics.

*Tests to these standards are accepted for the purposes of the HQM, although these standards have been superseded by BS EN ISO 16283-1:2014 and BS EN ISO 16283-2:2015. Tests to BS EN ISO 16283-1:2014 and BS EN ISO 16283-2:2015 will be accepted as well.

Suitably Qualified Acoustician (SQA)

An individual achieving all the following items can be considered to be 'suitably qualified' for the purposes of a HQM assessment:

1. Holds a degree, PhD or equivalent qualification in acoustics or sound testing.
2. Has a minimum of three years' relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting acoustics in relation to construction and the built environment; including, acting in an advisory capacity to provide recommendations for suitable acoustic performance levels and mitigation measures.
3. An individual who holds a recognised acoustic qualification and membership of an appropriate professional body. The primary professional body for acoustics in the UK, is the Institute of Acoustics.

An SQA may have to use their professional judgment to make decisions to ensure the appropriateness of the noise measurements for the home or development type. The SQA is ultimately responsible for the noise testing results.

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

1. Represent sound industry practice.
2. Be appropriate given the building being assessed and scope of works proposed.
3. Avoid invalid, biased and exaggerated recommendations. Additionally, written confirmation from the third-party verifier that they comply with the definition of a Suitably Qualified Acoustician is required.

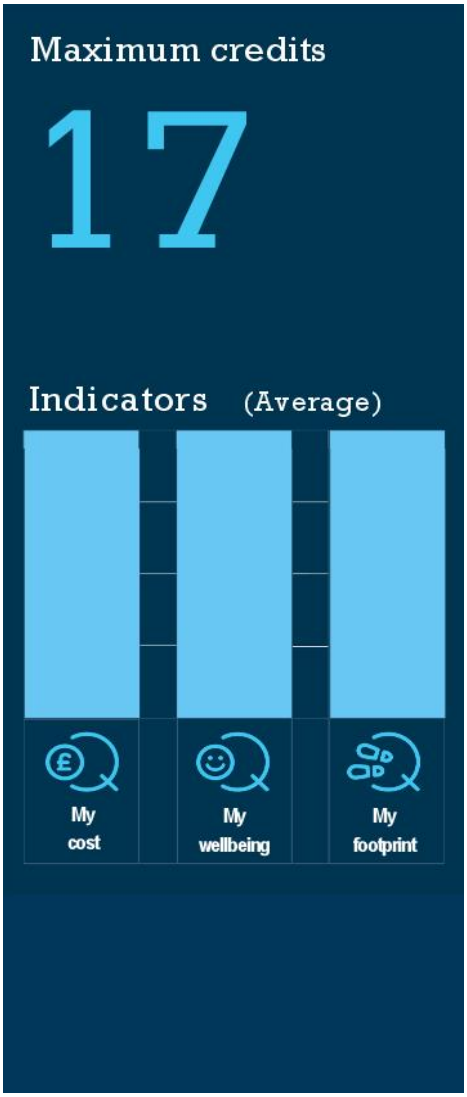
Requirement 1

DnT,w+Ctr was selected for use in AD E. The reason for the change in Building Regulations in 2003 was to ensure better protection for people from low frequency noise sources from nearby homes such as amplified music and surround sound systems(87).

Requirement 2

The DnT,w descriptor has been shown(88) to be generally well correlated with speech frequencies and more general living noises, for example a baby’s cry, telephone ringing, conversation, etc. would be heard more readily through the construction.

4.5 Temperature



Aim

To minimise the risk of uncontrollable high temperatures happening as a result of current and projected future climate scenarios by recognising that this needs to be considered early in the design process.

Benefit

- Reduces the risk to occupants' comfort, health and wellbeing from uncontrollably high indoor temperatures.
- Helps to 'future-proof' homes by making them able to withstand climate change, which will protect the home's long-term value.
- Reduces the impact on the environment and running costs caused by wasted heat or the need for air-conditioning.

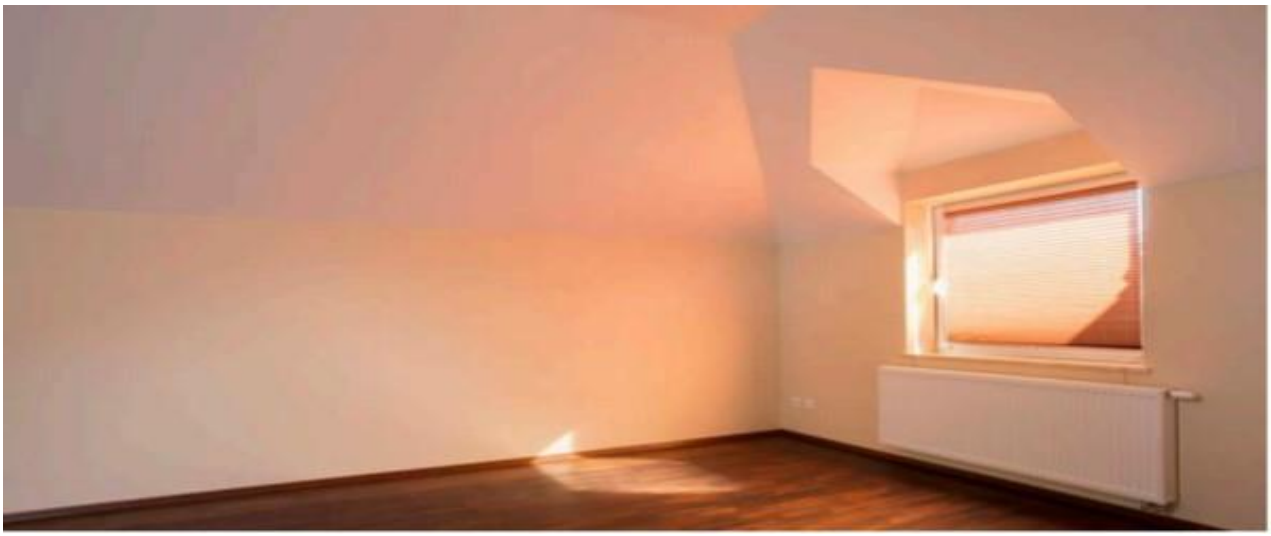
Context

A key part of achieving a comfortable home environment is regulating temperature effectively and reducing the risk of excessive or prolonged exposure to high temperatures (overheating).

Homes are becoming increasingly at risk of overheating,(89) due to a number of reasons, including climate change, increased development, high-rise construction and high standards of energy efficiency.(90)

New homes are at particular risk of overheating as they are becoming more airtight and are built using better insulation, which results in less air getting in and out and so gives people less control over temperature. If the risk of a home overheating is not managed appropriately, the results can be very harmful to health and could be fatal for more vulnerable occupants.(91)

This issue recognises effective temperature regulation that allows for seasonal changes, occupier preferences and global climate change, which are expected throughout the lifetime of the home.



Credit Summary

There are two routes to assessing this issue: foundation route and comprehensive route. These routes represent varying degrees of rigour. The route selected will depend on whether or not compliant thermal modelling has been undertaken. More credits are available through the more rigorous comprehensive route, recognising that compliant thermal modelling represents current industry best practice.

Criterion number	Title	Credits
crit 1	01 Home information	Prerequisite
crit 2	02 Temperature analysis	Minimum requirement
crit 3–crit 10	03 Routes of rigour (follow 03A or 03B): Temperature analysis	up to 17
crit 3–crit 4	– 03A Foundation route: HQM temperature tool	6
crit 5–crit 10	– 03B Comprehensive route: Dynamic thermal modelling	up to 17
Total credits available		17

Criteria

01 Home information **Prerequisite**

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 11.2 Home Information.

02 Temperature analysis **Minimum requirement**

crit 2 Thermal analysis has been carried out using either of the methodologies referred to in the foundation or comprehensive routes for this issue. A summary of the thermal analysis results and recommendations on the control of internal temperatures is provided for the use of the home occupant in line with the requirements in the home information issue.

Note: Credits for this issue do not need to be met for the purposes of complying with this minimum requirement.

03 Routes of rigour (follow 03A or 03B): Temperature analysis **up to 17 credits**

03A Foundation route: HQM temperature tool **6 credits**

For Wales, Scotland, and Northern Ireland:

For England (when using the simplified method in Approved Document O):

crit 3 Six credits are awarded for homes at low risk of overheating according to the HQM temperature tool.

crit 4 Where a home is at high risk of overheating according to the HQM temperature tool, the project team demonstrates how the building has been adapted using passive design solutions to limit the risk of overheating.

03B Comprehensive route: Dynamic thermal modelling **up to 17 credits**

For Wales, Scotland, and Northern Ireland:

Current conditions **11 credits**

crit 5 Thermal modelling has been carried out using software in accordance with CIBSE TM59 Building Performance Modelling.

crit 6 The software used to carry out the simulation at the detailed design stage provides full dynamic thermal analysis.

crit 7 The modelling demonstrates that:

crit 7.a: For air-conditioned buildings: Summer operative temperature ranges in the home are in accordance with the criteria set out in CIBSE Guide A Environmental design(92), Table 1.5.

crit 7.b: For homes that are predominantly naturally ventilated or free running: The home is designed to limit the risk of overheating, in accordance with the adaptive comfort methodology referred to in Section 4.2 of CIBSE TM59 Design methodology for the assessment of overheating risk in homes.

crit 7.c: For homes that are predominantly mechanically ventilated: The home is designed to limit the risk of overheating, in accordance with Section 4.3 of CIBSE TM59.

Predicted climate change environment

For Wales, Scotland, and Northern Ireland: **6 credits**

For England (when using dynamic thermal modelling): **17 credits**

crit 8 crit 5–crit 7 are achieved.

crit 9 The thermal modelling demonstrates that the relevant requirements set out in crit 7 are achieved for a projected climate change environment (see Methodology).

crit 10 Where thermal comfort criteria are not met for the projected climate change environment, the project team demonstrates how the building has been adapted using passive design solutions to subsequently meet the requirements under crit 9.

Methodology

Foundation route: HQM temperature tool

The HQM temperature tool indicates whether a home is at high or low risk of overheating in response to a series of questions about the home. The information used to determine the risk of overheating is based on the factors that make the biggest difference to overheating as determined by modelling using the Standard Assessment Procedure (SAP).

For homes in England, the foundation route can only be used when compliance with Building Regulations is being achieved with the simplified method in Approved Document O (section 1). Homes using dynamic thermal modelling to demonstrate compliance with Approved Document O (section 2) must follow the comprehensive route in HQM.

Comprehensive route: Dynamic thermal modelling

This requires the completion of compliant full dynamic simulation modelling. Please see crit 5–crit 10, the compliance notes and relevant definitions for further details of this route.

For homes in England, no credits are available under the comprehensive route for 'current conditions'. Credits can only be achieved when the criteria are met for 'predicted climate change environment'.

Projected climate change environment

Dynamic thermal simulation software packages provide the facility for building designs to be assessed under external climatic conditions specific to geographic location. Industry standard weather data for the UK is available in the form of Test Reference Years (TRYs) and Design Summer Years (DSYs) provided by CIBSE (2016) (www.cibse.org/weatherdata). This weather data enables thermal analysis of building designs under current climatic conditions, yet no account is taken of the projected variations in weather data that will occur during the building's life cycle as a result of climate change. The following probabilistic DSY weather data files should be used to establish the projected climate change environment against which the design is evaluated:

Naturally ventilated buildings

- Time period: 2050s.
- Emissions scenario: Medium (A1 B).
- 50th percentile DSY 2 and DSY 3

Mechanically ventilated or mixed mode buildings

- Time period: 2020s.
- Emissions scenario: High (A1F1).
- 50th percentile DSY 2 and DSY 3

The above weather files represent the minimum requirements to perform thermal modelling under a climate change scenario and subsequently demonstrate compliance. Where design teams feel that added consideration of building occupant risk or sensitivity to overheating is necessary, weather files can be used that exceed the minimum requirements outlined above. The time periods indicated above have been selected to represent the building services life cycle likely to be present in each building services strategy type. A shorter time period is chosen for mechanically ventilated or mixed mode building types due to consideration of mechanical servicing equipment lifespan (before major upgrade or replacement is required), and to avoid over-specification of plant which could lead to inefficient operation.

Thermal model sampling

For the purpose of meeting crit 5, thermal modelling does not need to be carried out for each individual home, where the thermal modeller uses their professional judgement to ensure that an appropriate sampling approach is adopted, in line with section 3.1 of CIBSE TM59 and the following considerations:

- All house types are adequately sampled.
- The homes and situations most at risk of overheating are modelled (i.e. the worst case scenarios).
- There is no risk of overheating in the homes not modelled.

The modeller needs to provide evidence and justifications that demonstrate how the samples have been determined, with their justifications, in line with the above.

A house type should include homes that are identical in specification, design and location (end/ mid-terrace, ground or mid/ top floor).

Ventilation type

Where it is reasonable to assume windows can be continuously left open, mechanically ventilated homes can be considered as predominantly naturally ventilated and crit 7.b should be followed, for the purposes of assessing overheating risk in crit 7. For example, where there are no security risks, sources of noise nuisance or air pollution (e.g. from traffic) that prevent windows from being left open.

Where it is not reasonable to assume that windows can be left open, crit 7.c should be followed for mechanically ventilated homes.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 3–crit 4	02 HQM temperature tool	A copy of the completed HQM temperature tool and documentary evidence supporting the data used to complete the tool. AND (if required) Evidence to show how overheating will be limited by passive design solutions.	As per design stage, but based on as-built evidence.

Criterion Reference	Title	Design Stage	Post Construction Stage
crit 5–crit 10	03 Thermal modelling output	A copy of the thermal modelling output and documentary evidence supporting the data used to complete the model. AND System specifications demonstrating that the worst case scenario will be met. AND (if required) Evidence to show how overheating will be limited by passive design solutions.	As per design stage, but based on as-built evidence.

Checklists, Tables & Illustrations

None.

Definitions

HQM temperature tool

This has been developed to identify a home's risk of exceeding the threshold temperature.

The intention of this tool is to support the offering of capped credits to homes whose circumstances make them less likely to be at risk of overheating during summer months, where full dynamic thermal analysis is not completed.

It assesses the home on key factors that affect overheating risk on a whole house basis and should not be treated as a detailed tool to identify the presence or absence of localised overheating.

The risk of exceeding the threshold temperature for the home is derived from SAP modelling relating to the following topics:

- Surroundings
- Provision and details of mechanical ventilation
- Capacity for natural ventilation

Please note: this tool will produce an estimated risk founded on basic information inputs. To establish the overheating risk of a home, BRE Global would always recommend completing full dynamic thermal modelling in accordance with best practice.

Passive design

Passive design uses layout, fabric and form to reduce or remove mechanical cooling, heating, ventilation and lighting demand. Examples of passive design include optimising spatial planning and orientation to control solar gains and maximise daylighting, manipulating the building form and fabric to facilitate natural ventilation strategies and making effective use of thermal mass to help reduce peak internal temperatures.

Thermal dynamic analysis

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

For guidance on carrying out dynamic thermal modelling for homes, please refer to CIBSE TM59.

Threshold temperature

The calculated mean 24-hour internal temperature during the warmest summer months, including an increment related to the thermal mass. The threshold temperature is 22°C.

4.6 Ventilation

Aim

To achieve a high standard of air quality in the home to avoid environments that could damage the health and wellbeing of people living in it.

Benefit

- Encourages designs that reduce the risk of pollutants and the health risks associated with this.
- Encourages design that reduces moisture build up in the home and associated respiratory health risks resulting from condensation and mould growth.
- Makes sure that ventilation systems are easy to control so improving effectiveness and usability, occupant understanding and reducing costs.
- Improves access for maintenance access to maintain high performance levels from mechanical and mixed-mode ventilation systems.

Context

It is widely accepted that the quality of air in the home can affect people's health.

Air quality in the home is a complex combination of pollutants generated inside the home and ones from outside. Personal preferences also have a significant impact on the acceptability of ventilation levels. The design of the ventilation system must therefore be robust, and controllable by the occupants, so that a healthy internal environment can be achieved and maintained.

Increasing levels of building airtightness means that the ventilation system must be capable of providing effective continuous ventilation to all areas of a home, for all levels of likely occupancy and without nuisance to avoid issues of poor air quality, stuffiness and high pollutant levels including VOCs and mould spores.

Credit Summary

Criterion number	Title	Credits
crit 1	01 Information sign	Minimum requirement
crit 2–crit 3	02 Ventilation air intakes	4
crit 4	03 Ventilation rates	Minimum requirement
crit 5–crit 7	03 Ventilation rates	5
crit 8	04 Maintenance and controls	Minimum requirement
crit 9–crit 12	04 Maintenance and controls	4
Total credits available		13

Criteria

01 Information sign **Minimum requirement**

crit 1 An information sign (written in plain English) is securely fixed to the rear of a boiler, meter or airing cupboard door (or another door of similar permanence) covering the following:

crit 1.a: Location of all components of the ventilation system and the controls and their design intent.

crit 1.b: How to operate the system, including any automatic or manual control functions and guidance relating to how systems should be operated during summer and winter.

crit 1.c: How to maintain good IAQ in the home through background ventilation (e.g. never leaving trickle vents completely shut, not shutting off a MVHR system) and what happens if good IAQ is not maintained within the home, i.e. the impact on people's health.

crit 1.d: The purpose of boost ventilation.

crit 1.e: Details for the occupant on planned maintenance requirements for mechanical systems (e.g. filter replacement and intervals). If maintenance activities are to be carried out by the occupant, provide clear step by step instructions. Provide contact details for the manufacturer and any potential servicing providers.

crit 1.f: 'Do not remove' must be printed on the sign.

Where the information sign is becoming too long, further details related to the information sign should be included in the home information produced for 11.2 Home Information and this should be printed on the sign.

02 Ventilation air intakes **4 credits**

crit 2 crit 1 has been achieved.

crit 3 The home's ventilation air intakes should avoid drawing in pollution in accordance with CIBSE TM21[93].

03 Ventilation rates **Minimum requirement**

crit 4 The relevant requirements in Table 25 are met.

5 credits

crit 5 crit 1 to crit 3 have been achieved.

crit 6 The relevant requirements in Table 25 are met.

For continuous mechanical extract ventilation and mechanical ventilation with heat recovery (England and Wales) / mechanical systems (Scotland) / systems 3 and 4 (Northern Ireland):

crit 7 The ventilation system achieves an internal noise level of 35dB(A) or less in all non-bedroom spaces within the home and 30dB(A) or less in all bedrooms within the home in line with the methodology in ANC Guidelines Part 1 2011, operating at the minimum rate* for continuous extract ventilation systems and for intermittent extract ventilation system, it should not be running.

*For ventilation rates, the rates achieved in 03 Ventilation rates must be used.

04 Maintenance and controls	Minimum requirement
crit 8	The relevant requirements in Table 28 are met.
	4 credits
crit 9	crit 1to crit 8 are achieved.
crit 10	Any maintenance activity intended to be carried out by the occupant (e.g. changing filters) can be carried out safely by the occupant (see Safe and accessible maintenance of systems).
crit 11	Any maintenance activity intended to be carried out by a building services engineer can be carried out safely by the building services engineer (see Safe and accessible maintenance of systems).
crit 12	For mechanical continuous ventilation systems (e.g. MVHR, MEV), controls are provided that enable sufficient control of the background continuous ventilation rate to meet varying occupancy levels without having to enable 'boost' mode.

Methodology

Applicable minimum ventilation rate

1. Identify the minimum ventilation rate for the home according to:
    a. Number of bedrooms (see Table 26), and
    b. Size of the home.
2. Identify the applicable minimum ventilation rate. This is the larger of the two minimum ventilation rates calculated in step 1 above.
3. Ensure the design of the ventilation system has the capacity to achieve the applicable minimum ventilation rate determined above.
4. At post-construction, test the ventilation system to ensure that the applicable minimum ventilation rate has been achieved (in accordance with the criteria).

Minimum ventilation rate – according to number of bedrooms

To calculate the minimum ventilation rate according to the number of bedrooms, please refer to Table 26.

Minimum ventilation rate – according to size of the home

Using the total floor area of the home, calculate the minimum ventilation rate according to size as below:

For the minimum requirement: MVR_{min} = 0.35l/s/m2 * TFA

For the credits: $MVR_{credits}$ = 0.4l/s/m2 * TFA

Where:

MVR = minimum ventilation rate (L/s)

TFA = total floor area of the home (m2)

Safe and accessible maintenance of systems

Any specified ventilation system requiring maintenance must be designed to allow occupants and building services engineers to easily complete the work in a safe manner in accordance with manufacturer's instructions and any other safety regulations, to prevent systems becoming redundant or being unable to function to their designed intention.

The accessibility and practicalities required to allow for 'easy' completion of any maintenance are key considerations. As these are likely to be dependent on the system installed, HQM does not prescribe these, but sets out below the minimum aspects that must be considered:

1. The needs for access must consider the likely lifetime of each component (i.e. ducts 25+ years).
2. Location and accessibility of all system components.
3. Location of access points to all 'built in' components.
4. Occupants should not require specialised tools in order to carry out any required maintenance.

The assessor must be satisfied that the design has considered the above and is in keeping with the aim of this issue.

Ventilation rates for natural ventilation with background ventilators (England and Wales) / systems 1 and 2 (Northern Ireland)

In order to size the required area of background ventilators, a correction should be made to the standard areas listed in the respective Building Regulations for England, Wales, and Northern Ireland to account for the assumed worst case occupancy levels, in accordance with the guidance notes given in the respective regulations. No correction is necessary for projects in Scotland.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 6	02 Inspection checklist and air flow measurement test sheet	Written commitment from the developer to achieve the requirements of crit 6.	Completed and signed copies of part 1 and part 3 of the 'Inspection checklist and air flow measurement test sheet' from the Domestic Ventilation Compliance Guide(94) demonstrating that the requirements of crit 6 have been met.

Checklists, Tables & Illustrations

Table 25 Ventilation rate criteria

Location	Ventilation system	Minimum requirement	For 5 credits
England, Wales, and Northern Ireland	For natural ventilation with background ventilators (England and Wales) For systems 1 and 2 (Northern Ireland)	None	The following is achieved according to the specified ventilation system: The total equivalent area of background ventilators is sized in accordance with the relevant local Building Regulations for ventilation, and based on assumed worst case occupancy, i.e. two occupants in all bedrooms (see Ventilation rates for natural ventilation with background ventilators (England and Wales) / systems 1 and 2 (Northern Ireland))
	For continuous mechanical extract ventilation and mechanical ventilation with heat recovery (England and Wales) For systems 3 and 4 (Northern Ireland)	The specified ventilation system has the capacity to achieve: – The minimum ventilation rate according to the size of the home (See Methodology) during continuous operation – The boost flow rate for the minimum requirement in Table 27 Home information explaining that the ventilation rate set on the fan is the rate required for Building Regulations compliance and that the ventilation system specified has the capability of being set to a greater rate. Contact details are to be included in the information sign required for crit 1 should the home occupant feel the rate needs to be increased.	The specified ventilation system has the capacity to achieve: – The applicable minimum ventilation rate (see Methodology) during continuous operation – The boost flow rate for credits in Table 27
Scotland	Natural	None	Credits not available
	Mechanical	None	Same requirements as above for continuous mechanical extract ventilation and mechanical ventilation with heat recovery (in England and Wales) and systems 3 and 4 (in Northern Ireland)

Table 26 Minimum ventilation rate – according to number of bedrooms

Number of bedrooms	Assumed occupancy (where credits are sought)	Minimum ventilation rate (L/s) (where credits are sought)
1	2	19
2	4	25
3	6	31
4+	8 + 2 additional occupants per additional bedroom	37 + 8L/s per additional bedroom

Table 27 Boost ventilation rate

	Minimum requirement ventilation rate (L/s)	Ventilation rate for 5 credits (L/s)
Kitchen	14	15
Bathroom/Utility	9	10
WC	7	8

Table 28 Maintenance and controls

Ventilation system	Minimum requirements
England and Wales: For Natural ventilation with background ventilators Scotland: For natural ventilation systems Northern Ireland: For systems 1 and 2	Extractor fans in wet rooms shall be controlled by a humidity sensor (which may be built into the extractor fan unit) in accordance with manufacturer's literature, in addition to a light switch control where required by the Building Regulations (e.g. rooms with WCs).
England and Wales: For continuous mechanical extract ventilation and mechanical ventilation with heat recovery Scotland: For mechanical ventilation systems Northern Ireland: For systems 3 and 4	A ventilation system that has the ability to be manually boosted in wet rooms by the home occupant when required, i.e. increase in humidity levels in the bathroom due to showering or bathing activities taking place, and an information sign explaining when to activate and deactivate the boost function. OR A ventilation system that has the ability to automatically activate boost mode when there are increased humidity levels in wet rooms due to activities such as showering or bathing taking place. The system should prevent activation as a result of abnormally high levels of naturally occurring background humidity (such as can occur on a humid summer's evening).

Definitions

Building Regulations for ventilation

The following table lists the Building Regulations applied for ventilation in each of the four countries of the UK:

Country	Ventilation regulations
England	Approved Document F Volume 1: Means of Ventilation, 2021 edition for England
Scotland	Domestic Technical Handbook 2023 - Environment
Wales	Approved Document F Volume 1: Means of Ventilation, 2022 edition for Wales
Northern Ireland	Technical Booklet K 2012

Continuous mechanical extract ventilation

Mechanically driven ventilation that continuously extracts indoor air and discharges it to the outside.

Habitable rooms

This is a room used for home purposes, but which is not solely a kitchen, utility room, bathroom, cellar or sanitary accommodation.

Mechanical ventilation with heat recovery

A mechanically driven ventilation system that both continuously supplies outdoor air to the inside of the dwelling and continuously extracts indoor air and discharges it to the outside.

Natural ventilation
Ventilation provided by thermal, wind or diffusion effects through doors, windows or other intentional openings without the use of mechanically driven equipment.

Number of bedrooms
The as-built number of bedrooms should be used for the purpose of calculations and must be consistent with other issues assessed based on the number of bedrooms.

System 1
As defined in Northern Ireland Technical Booklet K 2012, a system 1 ventilation system is **background ventilators and intermittent extract fans**.

System 2
As defined in Northern Ireland Technical Booklet K 2012, a system 2 ventilation system is **passive stack ventilation (PSV)**.

System 3
As defined in Northern Ireland Technical Booklet K 2012, a system 3 ventilation system is **continuous mechanical extract (MEV)**.

System 4
As defined in Northern Ireland Technical Booklet K 2012, a system 4 ventilation system is **continuous mechanical supply and extract with heat recovery (MVHR)**.

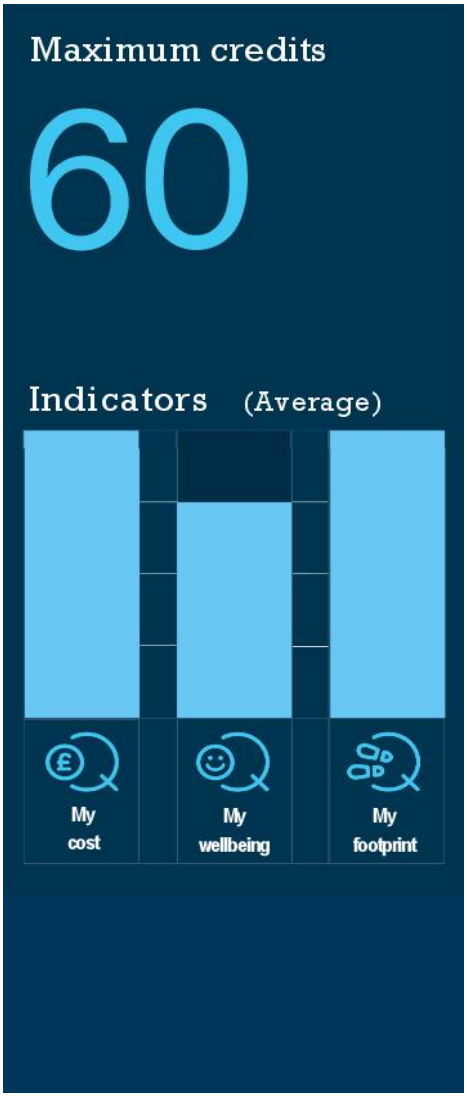
Ventilation
This is defined as the supply and removal of air (either by natural or mechanical means, or both) to and from a space or spaces in a building.

Ventilation rate
The ventilation rate is a measurement of the speed of air movement given in litres per second.

Wet room
This is a room used for domestic activities (such as cooking, clothes washing and bathing) which give rise to significant production of airborne moisture, e.g. a kitchen, utility room or bathroom(95). For the purposes of HQM, drying space is also regarded as a wet room.

5 Energy

5.1 Energy and Carbon Performance



Aim

To improve energy performance and reduce costs associated with running the home, and encourage more thorough energy calculations during the design stage.

Benefit

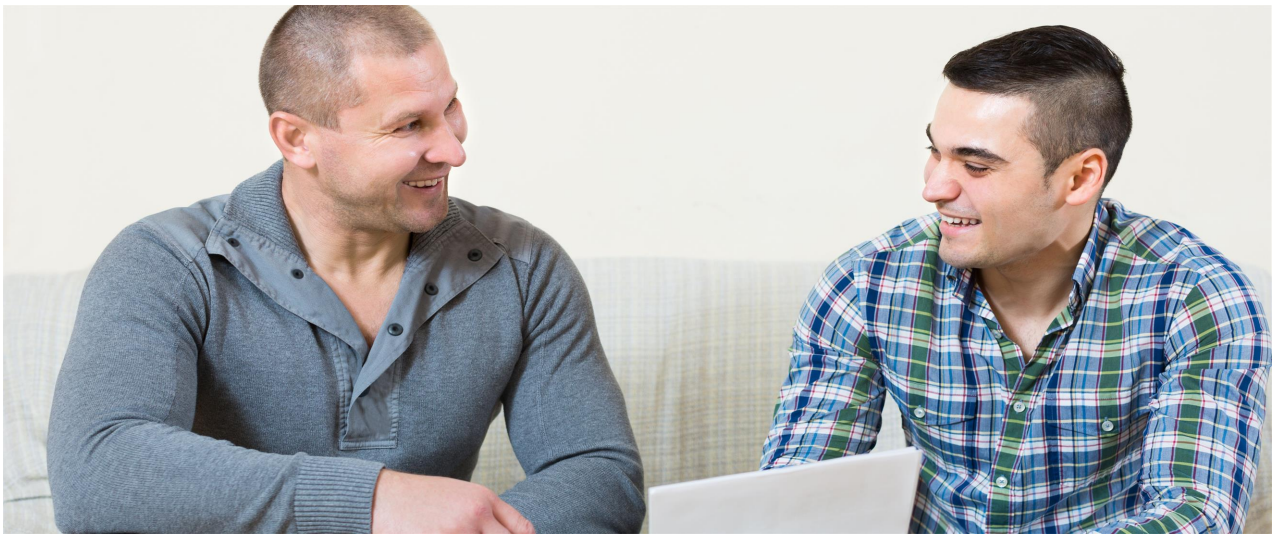
- Reduces energy costs.
- Supports health and wellbeing by keeping homes comfortable and warm.
- Reduces the effect the home has on the environment, by reducing carbon emissions.

Context

It is well recognised that the energy efficiency of homes has significant impact on human health. It is estimated that in 2020, in England alone, around 3.16 million households were suffering from fuel poverty.[96] Energy use is also a major contributor to global carbon dioxide (CO_2) emissions, with homes contributing a significant proportion of the UK's total carbon emissions (16% of UK greenhouse gas emissions in 2020).[97]

This makes reducing CO_2 emissions and energy costs a key challenge for homes in the UK and an essential part of meeting the Government's target to reduce CO_2 emissions by 80% by 2050 (against 1990 levels).[98]

This issue focuses on encouraging energy-efficient design and construction, and making sure that homeowners and tenants are well informed on how to run their home as energy efficiently as possible.



Credit Summary

Criterion number	Title	Credits
crit 1	01 Home information	Prerequisite
crit 2	02 Energy performance	up to 52
crit 3–crit 4	03 Beyond zero net regulated carbon	up to 8
Total credits available		60

Criteria

01 Home information **Prerequisite**

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 11.2 Home Information.

02 Energy performance **up to 52 credits**

crit 2 Credits are awarded according to the home energy performance ratio (HEPR) in line with Table 29.

Table 29 HEPR benchmark scale

Credits	HEPR	Credits (contd.)	HEPR (contd.)
1	0.017	27	0.467
2	0.035	28	0.485
3	0.052	29	0.502
4	0.069	30	0.519
5	0.087	31	0.537
6	0.104	32	0.554
7	0.121	33	0.571
8	0.138	34	0.588
9	0.156	35	0.606
10	0.173	36	0.623
11	0.190	37	0.640
12	0.208	38	0.658
13	0.225	39	0.675
14	0.242	40	0.692
15	0.260	41	0.710
16	0.277	42	0.727
17	0.294	43	0.744
18	0.312	44	0.762
19	0.329	45	0.779
20	0.346	46	0.796
21	0.363	47	0.813
22	0.381	48	0.831
23	0.398	49	0.848
24	0.415	50	0.865
25	0.433	51	0.883
26	0.450	52	0.900 AND zero net regulated CO_2-eq emissions

03 Beyond zero net regulated carbon **up to 8 credits**

crit 3 The home achieves a HEPR ≥ 0.9 and zero net regulated CO_2-eq emissions.

crit 4 Credits are awarded according to the percentage of the home unregulated operational energy consumption that is generated by low or zero-carbon technologies on-site or near site sources, in line with Table 30.

Table 30 Beyond zero net regulated carbon benchmark scale

Credits	Percentage of the building's unregulated operational energy consumption
1	≥ 12.5
2	≥ 25
3	≥ 37.5
4	≥ 50
5	≥ 62.5
6	≥ 75
7	≥ 87.5
8	> 100

The Energy Performance methodology considers three metrics of the modelled performance of a new building when determining the number of credits achieved for this issue. It is a ratio that defines the performance of a HQM assessed home in terms of its:

- Heating and cooling energy demand (the fabric performance).
- Primary energy consumption (system efficiency).
- Total resulting CO_2-eq emissions.

The four countries of the UK have their own Building Regulations for energy and while they use the same methodology, each country has different definitions of the notional building and they set different requirements for regulatory compliance, i.e. baseline performance. This is accounted for in the HEPR calculation methodology by applying a consistent baseline heating system of a notional gas boiler and through the 'translator curves' defined for each country. Therefore, the HEPR and the HQM credits are determined by comparing the assessed building's modelled operational energy performance relative to the adjusted regulatory baseline for the country in which the building is located (see definitions). This can result in slightly different credits being achieved for the same home in different countries.

Table 31 Best practice performance improvement and 'n' values for each metric

Parameter	England & Wales		Scotland		Northern Ireland	
	Performance improvement	'n' value	Performance improvement	'n' value	Performance improvement	'n' value
Heating and cooling energy demand	15%	9.52	33%	4.39	32%	4.13
Primary energy consumption	21%	6.57	17%	8.99	29%	4.66
Carbon dioxide (CO_2) emissions	21%	6.56	17%	9.01	40%	3.16

To benchmark the performance improvement for each metric the following equation is used:

$$EPR\ (unweighted) = 1 - (A/N)^n$$

where:

EPR = Energy Performance Ratio (unweighted)

A = actual building performance

N = notional building performance

n = 'n' value

The EPR for each of the three metrics is equally weighted (1/3) and added together to generate an overall HEPR and award the corresponding credits in HEPR benchmark scale on page 117.

Methodology

The HQM energy calculation uses SAP outputs to calculate the energy performance ratios (EPRs) for three metrics: heating and cooling energy demand, primary energy consumption, and carbon dioxide emissions. The EPR is calculated for each metric based on the performance improvement of the actual building compared to a notional version of the building that just complies with Building Regulation requirements. The overall HEPR (Home Energy Performance Ratio) is determined based on the combined weighted EPR for each of the three energy performance metrics. The energy calculations must be carried out at the individual home level. Energy averaging cannot be applied.

Gathering inputs

1. Obtain the SAP worksheet for each individual dwelling, from approved SAP software via an accredited energy assessor (see Definitions).
2. Where heated common areas are present, obtain the Building Regulation UK Part L (_BRUKL.inp) output file (see Heated common areas).

Setting up the assessment tool

3. Set up all the individual homes in the 'Dwellings' section of the online assessment tool.
4. Complete the inputs for the 'dwelling details' section of the online assessment tool, to ensure shared common areas are taken into account if they are present (see Heated common areas).

Uploading and entering inputs

5. Select the assessed dwelling within the 5.1 Energy and Carbon Performance part of the assessment tool.
6. Manually enter the SAP worksheet data that corresponds to the selected home.
7. Where common areas have been confirmed as present, inputs for these areas will be visible. Enter the number of homes per common area then upload the corresponding BRUKL input file.
8. Select 'calculate score' and outputs will be generated for 02 Energy performance.
9. Repeat the process for each assessed dwelling.

Heated common areas

Where homes are served by heated common areas (assessed under ADL2), these must be included in the energy calculations.

In these cases, a copy of the BRUKL Output Document for the heated common area must be input into the calculations and linked to the relevant homes (i.e. those served by the heated common area). The performance of the heated common areas is calculated using the BREEAM UK New Construction Version 6 Ene 01 methodology (see Guidance Note 39 for more information).

For the purposes of the HQM assessment, the performance of the heated common areas will be distributed equally across the total number of homes served by this area and reflected in the individual home's outputs.

Low or zero carbon technologies

Low or zero carbon (LZC) technologies can be used to offset CO_2-eq emissions arising from regulated and, in the case of crit 3 and crit 4, unregulated energy consumption. Any contribution from LZC technologies present in the HQM SAP XML files, are automatically accounted for in the online assessment tool outputs.

The LZC technology can be installed on-site or near site (see Definitions) where a private wire arrangement is in place. In cases where a building is supplied by a communal installation, no carbon benefit can be allocated to buildings which are not connected to the communal installation.

Estimating home unregulated energy demand

HQM offers additional credits where the home has zero net regulated CO_2 emissions and the unregulated CO_2 emissions are offset by energy generated by on-site or near-site LZC sources via a private wire arrangement (electricity generated is fed directly to the building being assessed, by dedicated power supplies) to meet the home's demands prior to any excess generation being exported.

At present there is no standard or national calculation methodology for modelling unregulated energy demands in a building. To demonstrate compliance with the 'exemplary level criteria' a default value can be used as a proxy for its unregulated CO_2 emissions. The default values based on GIFA are:

- ≤ 60m² = 310 $kgCO_2$-eq/year
- > 60m² = 340 $kgCO_2$-eq/year

Where unregulated energy demand for the building can be accurately predicted, this data can be used to determine the percentage of unregulated CO_2 emissions offset via renewable energy sources. Unregulated energy demand can be estimated based on metered data from a similar or the same building type with typical new home appliances included:

- Cold appliances (fridges, freezers etc)
- Wet appliances (dishwasher, washing machine etc)
- Cooking
- Lighting (lamps and lighting)
- Consumer electronics (TV, computers etc)
- ICT and other appliances

Where the home has zero net regulated CO_2 emissions, the resulting percentage of unregulated operational energy CO_2 emissions figure offset by on-site or near-site LZC sources is then compared against the 'beyond zero net regulated carbon benchmark scale' to determine credits awarded for this criterion.

SAP section 16

Outputs from section 16 should be used to determine the percentage of the building's unregulated operational energy consumption figure required for 03 Beyond zero net regulated carbon part of the criteria.

Phased or multiple home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
All	02 SAP outputs	Copies of the SAP output documents.	As per design stage, but based on as-built evidence.
All	03 BRUKL outputs	Copies of the BRUKL output document where relevant, see Methodology	

Checklists, Tables & Illustrations

None.

Definitions

Accredited energy assessor

A person registered with an accredited energy assessment scheme provider. The scheme provider will be licensed by the relevant government department to accredit competent persons in the energy assessment of non-domestic or domestic buildings for the purposes of demonstrating compliance with the Building Regulations in the country of origin. The energy assessor should be appropriately accredited for the building being assessed.

For a full list of approved accreditation schemes or organisations for energy assessors and links to registers of accredited energy assessors visit:

1. England, Wales, and Northern Ireland: www.gov.uk/get-new-energy-certificate
2. Scotland: www.scottishepcregister.org.uk

Only individuals that appear on the relevant national register are qualified as accredited energy assessors.

Approved building energy calculation software

Software approved for the purpose of demonstrating compliance with the energy efficiency and carbon emission requirements of the Building Regulations.

For domestic buildings, this refers to approved SAP software a list of which can be found at the following www.bregroup.com/sap10.

A list of approved software for non-domestic buildings is as follows:

1. England, Wales, and Northern Ireland: www.uk-ncm.org.uk
2. Scotland: www.gov.scot

Building Regulations for energy

For England:

The current Building Regulations applied for energy in England are:

- Domestic: Approved Document L1: Conservation of fuel and power in new dwellings, 2021 edition – for use in England.
- Non-domestic: Approved Document L2: Conservation of fuel and power in new buildings other than dwellings, 2021 edition – for use in England.

For Scotland:

The current Building Regulations applied for energy in Scotland are:

- Domestic: Technical Handbook 2023 Domestic, Section 6 Energy.
- Non-domestic: Technical Handbook 2023 Non-Domestic, Section 6 Energy.

For Wales:

The current Building Regulations applied for energy in Wales are:

- Domestic: Approved Document L1: Conservation of fuel and power, New dwellings, 2022 edition – for use in Wales.
- Non-domestic: Approved Document L2: Conservation of fuel and power, New buildings other than dwellings, 2022 edition – for use in Wales.

Carbon negative

A building or site that generates, surplus to its own energy demand, an excess of renewable energy and exports that surplus via the national grid to meet other, off-site energy demand, i.e. the building is a net exporter of zero carbon energy.

Surplus in this respect means the building or site generates more energy via renewable or LZC sources than it needs to meet its own regulated and unregulated energy needs.

This definition of carbon negative focuses only on energy and carbon dioxide emissions resulting from the operational stage of the building life cycle, as this is the stated aim of this assessment issue. It does not take into account the embodied carbon, in terms of carbon fixing, or emissions resulting from the manufacture or disposal of building materials and components. These impacts and benefits are dealt with in 6.2 Environmental Impact of Materials.

Energy demand

The building energy provided for end uses in the building such as space heating, hot water, space cooling, lighting, fan power and pump power. Energy demands are the same as room loads. One of the outputs from the Building Regulations Output Document is for heating and cooling energy demand only, not for any other building energy uses. Heating and cooling energy demands are influenced by factors including building fabric heat loss, air permeability, glazing and shading.

Home energy performance ratio (HEPR)

A metric that is unique to the HQM that is calculated by the HQM energy engine using modelled outputs from approved building energy calculation software, against which HEPR credits are awarded.

A description of how to obtain a home's HEPR is summarised in Methodology.

Low or zero carbon (LZC) technologies

A low or zero carbon technology provides a source of energy generation from renewable energy sources or from a low carbon source such as combined heat and power (CHP) or a ground source heat pump (GSHP).

Near-site LZC

A low or zero carbon source of energy generation located near to the site of the assessed building. The source is most likely to be providing energy for all or part of a local community of buildings, including the assessed building, for example decentralised energy generation linked to a community heat network or renewable electricity sources connected via private wire.

On-site LZC

A low or zero carbon source of energy generation which is located on the same site as the assessed building.

Primary energy

Energy from fossil fuel and renewable sources that has not undergone any conversion or transformation process. Primary energy is transformed by the means of energy generation used and its transmission to the building.

Private wire arrangement

In the context of the HQM for low or zero carbon technology installations, a private wire arrangement is where any electricity generated on or near the site is fed directly to the building being assessed, by dedicated power supplies. If electricity is generated which is surplus to the instantaneous demand of the building, this electricity may be fed back to the national grid. The carbon benefit associated with any electricity fed into the grid in this manner can only be allocated against an individual installation or building.

Regulated energy

This is building energy consumption resulting from the specification of controlled, fixed building services and fittings, including space heating and cooling, hot water, ventilation and lighting.

Standard Assessment Procedure (SAP)

The Standard Assessment Procedure (SAP) is the methodology used by the Government to assess and compare the energy and environmental performance of homes. Its purpose is to provide accurate and reliable assessments of home energy performances that are needed to underpin energy and environmental policy initiatives.

SAP works by assessing how much energy a home will consume, when delivering a defined level of comfort and service provision. The assessment is based on standardised assumptions for occupancy and behaviour. This enables a like-for-like comparison of home performance. Related factors, such as fuel costs and emissions of carbon dioxide (CO_2), can be determined from the assessment.

SAP quantifies a home's performance in terms of: energy use per unit floor area, a fuel-cost-based energy efficiency rating (the SAP Rating) and emissions of CO_2 (the Environmental Impact Rating). These indicators of performance are based on estimates of annual energy consumption for the provision of space heating, domestic hot water, lighting and ventilation. Other SAP outputs include estimates of appliance energy use, the potential for overheating in summer and the resultant cooling load.

SAP section 16

Section 16 of SAP extends the SAP calculations to account for CO_2-eq emissions associated with unregulated operational energy consumption. It calculates the CO_2-eq emissions from appliances and cooking. Section 16 also allows for site-wide electricity generating technologies.

The Simplified Building Energy Model (SBEM)

SBEM is software developed for DLUHC by BRE. SBEM is a computer program that provides an analysis of a building's energy consumption. It calculates monthly energy use and carbon dioxide emissions of a building (excluding homes) based on a description of the building geometry, construction, use and HVAC (Heating, ventilation and air conditioning) and lighting equipment.

SBEM is accompanied by a basic user interface, iSBEM. There also exists alternative approved software 'front-end' interfaces for SBEM (see definition of Approved building energy calculation software).

Unregulated energy

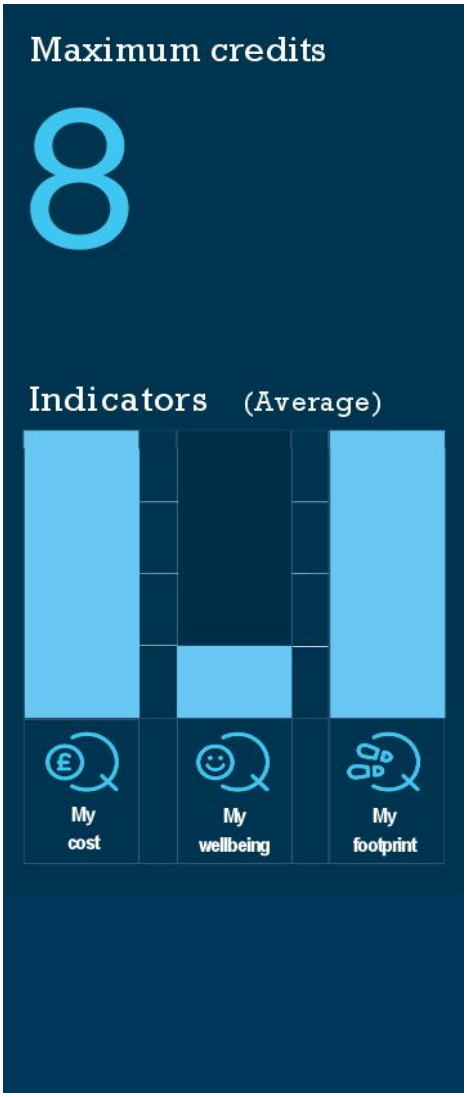
This is the energy consumption of the home that is not 'controlled', i.e. energy consumption from aspects of the home on which Building Regulations do not impose a requirement.

For the purposes of the HQM assessment, this includes energy associated with lighting, appliances and cooking.

Zero net regulated carbon (CO_2-eq) emissions

The annual building net regulated CO_2-eq emissions (kg CO_2/m²/yr) arising as a result of annual energy consumption from fixed building services, i.e. space heating and cooling, domestic hot water, ventilation and lighting, also referred to as controlled services and fittings, as a result of requirements imposed on such systems by the Building Regulations. In aiming to achieve a zero regulated carbon status, the building energy modelling can take account of contributions of energy generated from on-site and near-site renewable and low carbon installations. Energy generated and supplied from off-site renewable and low carbon installations cannot be used to meet this definition.

5.2 Decentralised Energy



Aim

To maximise the cost and carbon-saving benefits of generating energy from low and zero carbon (LZC) technologies by encouraging best practice when selecting, installing, or enabling easy future installation.

Benefit

- Reduces the home's running costs.
- Promotes good-quality installation to reduce the chance of defects.
- Protects consumers from varying energy costs and incentives by making them less reliant on national grid electricity.
- Helps reduce peak demands on the central energy network.

Context

There can be significant differences between how well LZC technologies perform in practice when compared with their specification, due to inappropriate technologies being specified during the design stage and inconsistent quality of installation.[99] These differences can reduce customer trust and the cost and carbon benefits associated with LZC technology.

Good practice relating to selecting LZC technologies, improving on requirements in Building Regulations Part L1 and carrying out appropriate feasibility studies all help to make the most of the benefits of LZC technology. Nationally recognised schemes like the Microgeneration Certification Scheme (MCS) and Combined Heat and Power Quality Assurance (CHPQA) are recognised as valid ways of monitoring design and installation quality. In circumstances where it is not appropriate to install LZC technologies during the construction phase, it is good practice to make sure they can be easily installed at a later date.

LZC technologies are developing quickly, with continuous improvements in performance and reductions in upfront costs. Further innovative solutions are expected so there is flexibility in this issue to acknowledge technologies not covered by the schemes mentioned.

Credit Summary

Criterion number	Title	Credits
crit 1	01 Home information	Prerequisite
crit 2	02 Feasibility study	Prerequisite
crit 3–crit 4	03 Implementation of feasibility study findings	up to 8
crit 3	– 03A Infrastructure	4
crit 4	– 03B Installation	8
Total credits available		8

Criteria

01 Home information **Prerequisite**

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 11.2 Home Information.

02 Feasibility study **Prerequisite**

crit 2 An independent assessment prepared by an appropriately qualified professional (AQP) is carried out to establish the most feasible recognised local (on-site or near-site) low or zero carbon (LZC) energy sources for the home or development, as well as any suitable infrastructure for future retrofit (see Methodology and Table 32).

03 Implementation of feasibility study findings **up to 8 credits**

03A Infrastructure **4 credits**

crit 3 Where the feasibility study confirms the installation of LZC technologies is not currently a viable option, appropriate infrastructure is installed to allow the future retrofit of at least one LZC technology, in accordance with the feasibility study recommendations outlined in Table 32.

Table 32 Infrastructure for future installation

Infrastructure installed for	Provided for future installation as part of recommendations
Photovoltaics (PV)	1. Architectural drawings and electrical diagrams detailing the proposed and installed system components. 2. Designated area for mounting the inverter and balance of system components. 3. Designated conduit area for the DC cable run from the proposed array location to the proposed inverter location. 4. Designated conduit area for the AC cable run from the proposed inverter location to the electrical service panel. 5. Labelled slot for monitoring and metering equipment. 6. Labelled slot for a circuit breaker or a pre-installed circuit breaker. 7. Confirmation of the space and load (weight) capability, such as loft floors or gable walls that are strong enough for panel retrofit. 8. If applicable, confirmation that the landscape planting uses low-growth trees and bushes, to avoid any potential shading issues in future.
Solar thermal	1. Architectural drawings and plumbing diagrams detailing the pre-installed and proposed system components. 2. Designated area adjacent to the twin coil cylinder for mounting the balance of system components or pumping package. 3. Designated conduit area from the utility room to the attic space below the proposed array space. 4. An electrical outlet near the designated wall area. 5. A solar bypass valve on the cold water feed of the water heater. 6. If applicable, confirmation that the landscape planting uses low-growth trees and bushes, to avoid any potential shading issues in future.

Infrastructure installed for	Provided for future installation as part of recommendations
Heat networks (e.g. District heating)(100)	1. Heating and hot water systems sized based on a maximum flow temperature of 70°C and a return temperature of 40°C. 2. Designated area for the hydraulic interface unit (HIU). 3. Provision of an electrical outlet and lighting near the designated wall area and a fused spur on a dedicated circuit to feed the HIU. 4. Heating system primary pipework arranged and shown on schematics to facilitate the future connection to the heat network pipework. For example, main flow and return primary pipework to be routed from the designated area into the building heat emitter system. 5. Designated area for pipework conduit to ensure assessed homes have the site-wide infrastructure to allow for the retrospective connection to heat networks in the local area.
For LZC technologies options not covered above	Please contact BRE Global.

03B Installation **8 credits**

crit 4 Where LZC technologies are designed and installed in line with the feasibility study findings in crit 2 and meet the following:

crit 4.a: There is a direct supply of energy produced to the home under assessment.

crit 4.b: Complies with the relevant requirements outlined in Table 33.

Table 33 LZC technology requirements

Technology	Requirement
Technologies covered by MCS and under 50kWe or 45kWth	Uses MCS (or equivalent) certified products installed by MCS (or equivalent) certified installers.
Combined heat and power (CHP) schemes above 50kWe	Certified under the Combined Heat and Power Quality Assurance (CHPQA) standard. CHP schemes fuelled by mains gas are eligible to contribute to performance against this issue.
Other, not listed	An equivalent certification scheme.

Methodology

Feasibility study

The feasibility study referred to in crit 2 should cover the following as a minimum:

1. Energy generated from LZC technologies per year.
2. Carbon dioxide savings from LZC technologies per year.
3. Life cycle cost of the potential specification, accounting for payback.
4. Local planning criteria, including land use and noise.
5. Feasibility of exporting heat or electricity from the system.
6. Take into account any available green tariffs (Feed-In Tariff and Renewable Heat Incentive) and other grants.
7. All technologies appropriate to the site and energy demand of the development.
8. Reasons for excluding other technologies.
9. Where appropriate to the building type, consideration of: connecting the proposed home to an existing local community CHP system, or source of waste heat or power, or specifying a building or site CHP system or source of waste heat or power with the potential to export excess heat or power via a local community energy scheme.

Note: Please see CIBSE Code of Practice for Heat Networks, for guidance on quality specification, design, installation, commissioning and operation of heat networks.

Phased or multiple home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 2	02 Feasibility study	A copy of the feasibility study and a summary of the required criteria in line with Methodology.	
crit 3–crit 4	03 Installation and commissioning certificates	Copies of the relevant architectural drawings, plumbing and electrical diagrams.	

Checklists, Tables & Illustrations

None.

Definitions

Appropriately qualified professional (AQP)

For the purposes of carrying out a feasibility study for this issue, an AQP is someone with substantial expertise or a recognised qualification for undertaking assessments, designs and installations of low and zero carbon solutions in the domestic buildings sector. They are not someone who is professionally connected to a particular low or zero carbon technology, manufacturer or installer. In order to complete the design and specification of the mechanical and electrical details, the individual will have acquired the relevant industry training and qualifications.

For Scotland:

A Competent Person must be registered with a scheme that has been approved by The Scottish Government. Schemes authorised by the Scottish Government, the Building Standards Division website at www.certificationregister.co.uk.

For England & Wales:

A Competent Person must be registered with a scheme that has been approved by the Department for Communities and Local Government (DCLG) for developments in England and Wales. They are listed on DCLG's website at www.communities.gov.uk.

Low and zero carbon (LZC) technologies

Eligible technologies must produce energy from renewable sources and meet all other ancillary requirements as defined by Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (www.eur-lex.europa.eu/en).

Near-site LZC

A low or zero carbon source of energy generation located near to the site of the assessed building. The source is or will be providing energy for all or part of a local community of buildings, including the assessed home, e.g. decentralised energy generation linked to a community heat network or renewable electricity sources connected via private wire.

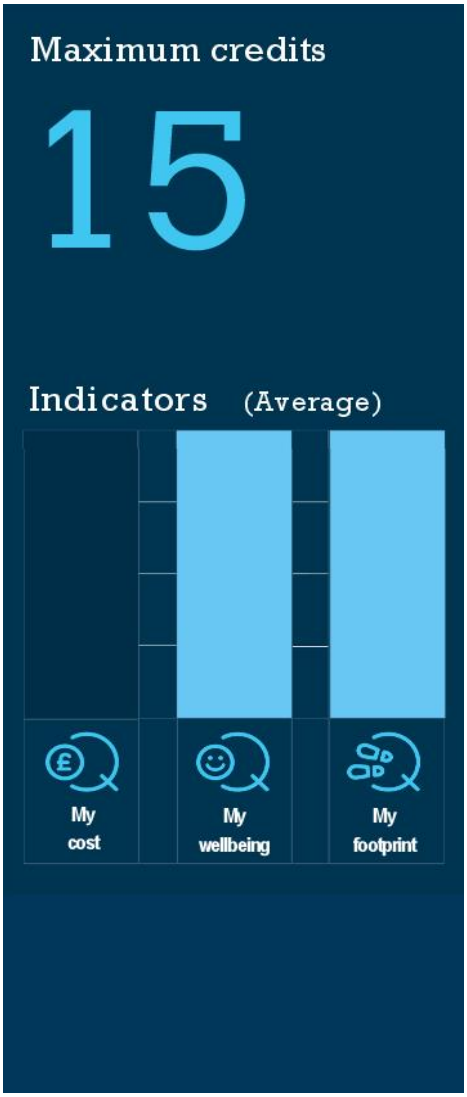
On-site LZC

A low or zero-carbon source of energy generation which is located on the same site as the assessed home.

Recognised evaluation tools and methodologies

Tools and methodologies recommended by the relevant professional bodies and trade associations.

5.3 Impact on Local Air Quality



Aim

To promote the use of heating and hot-water generating appliances which have little or no impact on local air quality.

Benefit

- Reduces the impact on local air quality helping to protect human health.
- Reduces the risk of harmful effects on sensitive ecosystems.

Context

The quality of the air we breathe affects our health and the health of people in our community, particularly the young. There are significant numbers of early deaths and diseases associated with poor air quality. The World Health Organisation estimates that, each year, there are 500,000 early deaths across Europe associated with, or as a result of, poor air quality[101].

Combustion processes in vehicle engines, power generation, homes and industry generate air pollutants, including carbon dioxide (CO_2), nitrous oxides (NO_x), sulphur oxides (SO_x) and small particulates, (particles smaller than 10 and 2.5 microns). These emissions are managed by local authorities through the Local Air Quality Management (LAQM) framework, as part of the Environment Act (1995).

While the main sources of air pollutants are road transport and large combustion plants, homes and the choice of heating and hot water systems do have an impact. NO_x levels vary considerably across the UK, with levels in built-up areas and close to major roads being much higher than in rural areas. This means that emissions from heating systems will have a much greater impact in areas where NO_x emissions are already high.

Credit Summary

Criterion number	Title	Credits
crit 1–crit 2	01 Impact on local air quality	up to 15
Total credits available		15

Criteria

01 Impact on local air quality **up to 15 credits**

15 credits

crit 1 Where all heating and hot water within a home is supplied by non-combustion appliances such as appliances powered by electricity.

up to 10 credits

crit 2 All installed plant must meet the following emission levels (Table 34 and Table 35). The measurements must be provided by manufacturers, following the labelling requirements of European Directive 2009/125/EC (for local space heaters(102), solid fuel local space heaters(103), boilers and combination heaters(104) and solid fuel boilers(105)).

Table 34 Maximum NO_x emission levels by appliance type and fuel

Appliance type and unit	Fuel	NO_x 7 credits (Low pollution locations)	7 credits (High pollution locations)	10 credits(Low pollution locations)	10 credits (High pollution locations)
Boiler (mg/kWh)	Gas	27	27	24	24
Boiler (mg/kWh)	Oil	73	56	67	50
Boiler (mg/m^3)	Biomass and solid fossil fuel	130		70	
Cogeneration or heat pumps using external combustion (mg/kWh)	Gas	34	34	30	30
Cogeneration or heat pumps using external combustion (mg/kWh)	Oil	96	56	70	50
Cogeneration - using internal combustion engine(mg/kWh)	Gas	119			
Cogeneration - using internal combustion engine(mg/kWh)	Oil	140			
Local space heaters (mg/kWh)	Gas and oil	76			
Closed fronted local space heaters (mg/m^3)	Biomass, solid fuel and wood pellets	130			

Table 35 Maximum particulate matter and volatile organic compound (VOC) emissions for appliances using biomass, solid fuel, and wood pellets

Appliance type and unit	Fuel	7 Credits (Low pollution locations)		7 Credits (High pollution locations)		10 Credits (Low pollution locations)		10 Credits (High pollution locations)	
		PM10	VOC	PM10	VOC	PM10	VOC	PM10	VOC
Boiler (mg/m^3)	Biomass	14	7	6	7	11	5	4	5
Boiler (mg/m^3)	Solid fossil fuel	19				17			
Closed fronted local space heater (mg/m^3)	Wood pellets	26	26	20	20	22	22	10	10
Closed fronted local space heater (mg/m^3)	Biomass and solid fossil fuel	50	50			25	25		

PM10 = particulate matter < 10µm (micrometres) and VOC = volatile organic compounds. For the purposes of HQM, PM10 and VOC emissions are only relevant to the assessment of biomass and solid fuel fired technologies.

Methodology

To identify whether the site is in a low or high pollution area, see uk-air.defra.gov.uk/data/gis-mapping.

- Select data type = Background.
- Select a layer to view = NO_x (as NO_2) annual mean.
- Select a year = 2015.
- Use 'Draw Area' to draw a line around the site boundary for the development.
- The tool then displays the results for the selected area.
- Use the 'Max' value displayed for the selected area to determine whether the site is in a low or high pollution area.
- Take a screenshot which shows the area of the development and the max NO_x for an area and retain for audit purposes.

For all locations repeat the above where:

- Select a layer to view = PM10.
- Take a screenshot which shows the area of the development and the max PM10 for an area and retain for audit purposes.

Phased or multiple home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Open-flued appliance

No credits may be awarded for open-flued appliances used for heating or hot water.

District heating

Where a project is connected to a district heating system which is outside the scope of the project or the wider development (for example phased developments), the system does not need to be included in the assessment and 15 credits can be awarded by default. This is on the basis that the development's design team do not have control over the specification of the system. Where the development's design team do have control over the specification of the system, then it must be assessed.

Multiple appliances (including appliances for secondary or back-up heating and hot water)

Where multiple appliances are specified, the number of credits awarded is determined by the appliance with the lowest number of credits.

Appliances fuelled by biomass, solid fossil fuel and wood pellets

The number of credits awarded to an appliance is determined by the worst performing of PM10, VOCs and NO_x for an appliance. If, for example, the NO_x and PM10 requirements are achieved for the 7 credit (low pollution location) scale but the VOC requirements are not

met, then no credits can be awarded.

Combustion appliances not listed (including secondary and back-up appliances)

No credits can be awarded for combustion appliances that are not listed in Table 34 and Table 35.

Note: Emergency back-up heating and hot water systems are outside the scope of this issue and should not be assessed.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	

Checklists, Tables & Illustrations

None.

Definitions

High pollution location

Any developments where any portion of the site is within a local authority air quality management area (AQMA) are automatically considered to be high pollution locations.

For developments that are wholly outside of an AQMA, the following levels define high pollution locations:

NO_x = >15µg/m^3 averaged over a year.

PM10 = >10µg/m^3 averaged over a year.

Please refer to the methodology section to identify whether a site is in a low or high pollution location.

Where the ambient emission level for either pollutant exceeds the high threshold, the development is considered to be in a high pollution area.

Low pollution location

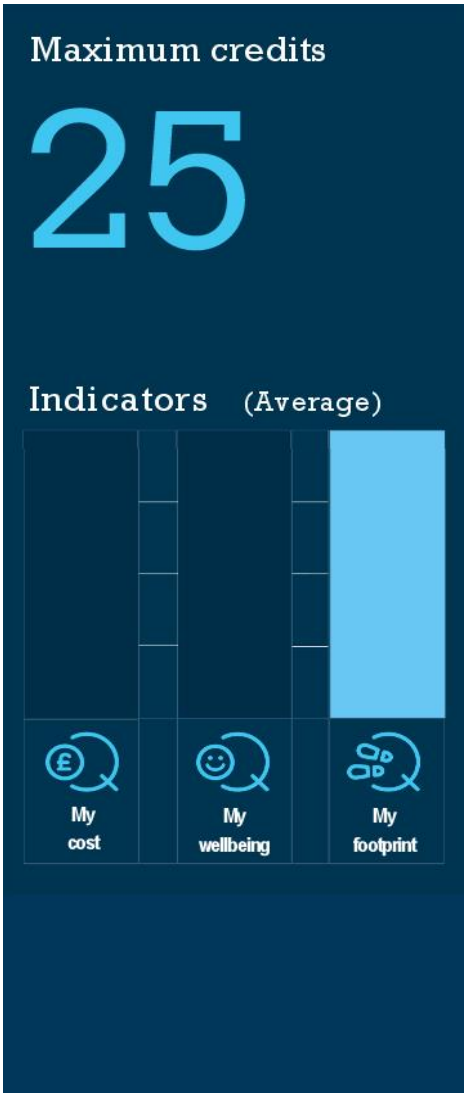
Any location that does not meet the definition of a high pollution location.

Open-flued appliance

An open-flued appliance is one which draws its combustion air from the room or space within which it is installed and which requires a flue to discharge its products of combustion to the outside air.

6 Materials

6.1 Responsible Sourcing



Aim

To encourage the selection of construction products where sustainable development principles have been followed across the supply chain, including when extracting, processing and manufacturing materials and parts.

Benefit

- Promotes economically, socially and environmentally responsible practices in the supply chain and manufacturing processes of construction products and reduces the impacts of housebuilding.
- Encourages the use of credible and comparable schemes to evaluate responsible sourcing practices.
- Helps manufacturers and developers to show they are managing their business fairly and ethically.
- Helps consumers understand the environmental, economic and social issues in the supply chain of the construction products used in their home.

Context

Manufacturing construction products typically involves a long and complex supply chain that results in a wide range of impacts. These may be environmental (such as toxicity or biodiversity), economic (such as corruption, for example buying or selling of wood from protected forests) or social (such as slave labour or inequality) or issues that affect all three, such as climate change. The complete supply chain of construction products may extend to areas of the world where it is difficult to track . Responsible sourcing certification schemes (RSCS) provide a robust report on the impact of construction products. If products are covered by a credible RSCS, consumers and those involved in designing and constructing a home can be confident that risks have been avoided or minimised.

Credit Summary

There are two routes to assessing this issue: Foundation route and Comprehensive route. These routes represent varying degrees of rigour. The route selected will depend on whether quantity information is available. More credits are available through the more rigorous comprehensive route.

Criterion number	Title	Credits
crit 1	01 Legally harvested and traded timber	Prerequisite
crit 2	02 Product procurement policy	2
crit 3	03 Responsible sourcing of construction products assessment	up to 23
Total credits available		25

Criteria

01 Legally harvested and traded timber **Prerequisite**

crit 1 All timber and timber-based products used in the buildings meet the definition of Legally harvested and traded timber.

02 Product procurement policy **2 credits**

crit 2 By the end of early design stage (typically RIBA stage 2 or equivalent), the client or developer has a documented policy and procedure that:

- crit 2.a: Sets out procurement requirements for all suppliers and trades to adhere to relating to the responsible sourcing of construction products.
- crit 2.b: Is disseminated to all relevant internal and external personnel.
- crit 2.c: Is included within the construction contract to ensure that they are enforceable on the assessed project.
- crit 2.d: Encourages the specification of products with responsible sourcing certification over similar products without certification.

03 Responsible sourcing of construction products assessment **up to 23 credits**

crit 3 The home has been assessed to either the foundation route, comprehensive route or a combination of the two routes in accordance with the methodology. Credits are awarded according to Table 36.

Table 36 Credit allocation

% of available points achieved	Credits
≥ 05	5
≥ 10	7
≥ 15	9
≥ 20	11
≥ 25	13
≥ 30	15
≥ 35	17
≥ 40	19
≥ 45	21
≥ 50	23

Methodology

Product procurement policy

This may be prepared and adopted at an organisational level or be site or project specific. It is recommended (but not a requirement) that the documented policy follows the principles of BS 8900-1:2013[106] Managing sustainable development of organisations – Guide or BS ISO 20400:2017[107] Sustainable procurement – Guidance. This policy may form a part of a broader Sustainable Procurement Plan or be in the form of a standalone document.

Responsible sourcing of construction products assessment

To determine the number of credits achieved for crit 3, the HQM Responsible Sourcing of Construction Products tool must be completed with all relevant information based on the route followed (see Definitions for more information on the different routes). The foundation route must be followed where quantity information is not available. The comprehensive route should be followed where quantity information is available.

It may be the case that across an assessment there will be a combination of routes for products. For example, the foundation route may be used for the timber or timber- based category and the comprehensive route for the metal category. Only one route can be used per material category.

The responsible sourcing score is calculated at the whole building level. This means that a separate calculation is required for each building to determine the responsible sourcing score and associated credits. Where the building comprises more than one home (for example, semi-detached, clustered, terrace and apartments), specific calculations are not required for each home; the building's score and credit award is used for each home in the building.

For all routes, the HQM Responsible Sourcing of Construction Products tool is used according to the following steps.

Step 1: Complete all required inputs in the 'Overview details' tab in the responsible sourcing tool.

Step 2: Complete the 'Input' tab by following the steps below.

For each construction product in the building* that is in scope (see Scope of assessment):

*For semi-detached, clustered, terrace and apartment building types, 'the building' means the whole building or block and landscaping associated with it. For detached homes, 'the building' means the detached home only and landscaping associated with it.

For the foundation route, only the following steps are required: Step 2.1, Step 2.3, Step 2.5, Step 2.6, Step 2.7 and Step 2.9. For the foundation route and comprehensive route, Step 2.4 is optional.

Step 2.1. Estimate if the quantity is above the cut-off volume (see Cut-off volume thresholds and exclusions). If it is, enter the construction product in the responsible sourcing tool and assign it a 'location and use' category, then proceed to the next step. If not, the construction product need not be assessed.

Step 2.2. (Comprehensive route only): Estimate the quantity (mass or volume, see Quantities precision) in the building.

Step 2.3. Obtain the BREEAM recognised responsible sourcing certification schemes (RSCS) certificate or environmental management system (EMS) certificate, if any (see Checking responsible sourcing certificates). Compare the certification with Guidance Note 18: *BREEAM Recognised Responsible Sourcing Certification* (GN18) and obtain the certification scheme point score and enter the score in the tool. Where the construction product:

- Has no certification, it is non-compliant with the broken chain requirements (see Broken chain) or the certification type is not listed in Guidance Note 18, the score is 0.
- Is a reused product, obtain the score from Guidance Note 18 for these products.

Step 2.4. (Optional, if not followed go to Step 2.5): Where a constituent construction product has a better certification score (see Checking responsible sourcing certificates) than the overall construction product and it complies with the broken chain requirements, the following steps should be followed:

Step 2.4.1. Identify the material categories that make up an estimated ≥ 80% of the constituent construction product's volume.

Step 2.4.2. Include each identified materials category in the responsible sourcing tool (by creating new entries).

Step 2.4.3. If ≥ 5% of the volume is unaccounted for in Step 2.4.1, include the 'Other' material category.

Step 2.4.4. (Comprehensive route): For each material category following the comprehensive route and identified in Step 2.4.1, enter the building-wide quantity into the responsible sourcing tool. This may be based on a % of the overall construction product's quantity estimated in Step 2.1.

Step 2.4.5. For each material category (including 'Other'), enter the constituent's certification score identified in Step 2.4 into the responsible sourcing tool.

Step 2.5. Identify the materials category(ies) that make up an estimated ≥ 80% of the product's volume (excluding quantities entered for Step 2.4.1, if applicable).

Step 2.6. Include each identified materials category in the responsible sourcing tool (by duplicating the entry made in Step 2.1).

Step 2.7. If ≥ 5% of the volume is unaccounted for in Step 2.5 (and Step 2.4.1, if applicable), include the 'Other' material category.

Step 2.8. (Comprehensive route only): For each material category following the comprehensive route and identified in step 2.5, enter the building-wide quantity into the responsible sourcing tool. This may be based on a % of the overall construction product's quantity estimated in Step 2.1.

Step 2.9. For each material category (including 'Other'), enter overall construction product's certification score (from step 2.3) into the responsible sourcing tool.

Refer to Guidance Note 24 for further explanation of this method and worked examples.

Step 3. For each home in the building:

Step 3.1 Once all required inputs in the 'Overview' tab have been completed, create an XML file.

3.2. Upload the XML file created under step 3.1 into BREEAM Projects online assessment tool for HQM. Click 'Calculate score'. The online tool will indicate the score achieved and award credits according to Table 36. For semi-detached, clustered, terraced and apartment building types, the same credit result is used for each home in the building.

Scope of assessment

Table 37, based on the New Rules of Measurement (NRM) classification system, indicates the building elements that must be included in the scope of the assessment. Including these elements (and only these) is necessary to ensure an appropriate level of comparability. All construction products that are installed as part of one or more of these building elements are in-scope and must be included in the HQM responsible sourcing tool. For each building element, the respective 'Location and use' category for use in the tool is provided in the table.

For external works building elements, only construction products (and their quantities) that are for the private use of the building occupants should be included in the scope.

Table 37 Scope of assessment, common building element designation, location and use categories

RICS NRM Level 2 Element		RICS NRM Level 3 Sub-element		BREEAM 'Location and use' category	To be included
1 Substructure					
1	Substructure	1	Standard foundations	7. Structure, primary and secondary	✓
		2	Specialist foundation systems		✓
		3	Lowest floor construction		✓
		4	Basement excavation	N/A	
		5	Basement retaining walls	7. Structure, primary and secondary	✓
2 Superstructure					
1	Frame	1	Steel frames	7. Structure, primary and secondary	✓
		2	Space decks		✓
		3	Concrete casings to steel frames		✓
		4	Concrete frames		✓
		5	Timber frames		✓
		6	Other frame systems		✓
2	Upper Floors	1	Floors	3. Floor (including floor finishes)	✓
		2	Balconies		✓
		3	Drainage to balconies	11. Other	✓

RICS NRM Level 2 Element		RICS NRM Level 3 Sub-element		BREEAM 'Location and use' category	To be included
3	Roof	1	Roof structure	6. Roof (including roof finishes)	✓
		2	Roof coverings		✓
		3	Specialist roof systems		✓
		4	Roof drainage		✓
		5	Rooflights, skylights and openings	2. Door, window	✓
		6	Roof features	6. Roof (including roof finishes)	✓
4	Stairs and Ramps	1	Stair and ramp structures	7. Structure, primary and secondary	✓
		2	Stair and ramp finishes	3. Floor (including floor finishes)	✓
		3	Stair, ramp balustrades and handrails	11. Other	✓
		4	Ladders, chutes, slides		✓
5	External Walls	1	External enclosing walls above ground floor level	8. External wall	✓
		2	External enclosing walls below ground level	7. Structure, primary and secondary	✓
		3	Solar, rain screening	8. External wall	✓
		4	External soffits		✓
		5	Subsidiary walls, balustrades, handrails, railings and proprietary balconies	11. Other	✓
		6	Façade access, cleaning systems		✓
6	Windows and External Doors	1	External windows	2. Door, window	✓
		2	External doors		✓
7	Internal Walls and Partitions	1	Walls and partitions	5. Internal partition, internal walls (including finishes)	✓
		2	Balustrades and handrails	11. Other	✓
		3	Moveable room dividers	5. Internal partition, internal walls (including finishes)	✓
		4	Cubicles		✓
8	Internal Doors	1	Internal doors	2. Door, window	✓
3 Internal Finishes					
1	Wall Finishes	1	Finishes to walls	5. Internal partition, internal walls (including finishes)	✓
2	Floor Finishes	1	Finishes to floors	3. Floor (including floor finishes)	✓
		2	Raised access floors		✓
3	Ceiling Finishes	1	Finishes to ceilings	1. Ceiling (including ceiling finishes)	✓
		2	False ceilings		✓
		3	Demountable suspended ceilings		✓
4 Fittings, Furnishings and Equipment					
1	Fittings, Furnishings and Equipment	2	Domestic kitchen fittings, fixed furniture and equipment	11. Other	✓
5 Services					
				N/A	
6 Complete Buildings and Building Units					
				To be broken down into other classifications.	
8 External Works					
2	Roads, Paths and Pavings	1	Roads, paths and pavings	10. Hard landscaping	✓
		2	Special surfacings and pavings		✓

The material categories, for use in the HQM responsible sourcing tool, must be in accordance with Table 38. For each construction product, identify the closest matching category.

Table 38 Materials categories

Material category	Uniclass equivalent code
1. Timber or timber-based	P5
2. Concrete or cementitious	P2*
3. Metal	P4
4. Stone or aggregate	P1, P3*
5. Clay-based	P33
6. Gypsum	P232
7. Glass	P314
8. Plastic, polymer, resin, paint, chemicals and bituminous	P7, P34
9. Animal fibre or skin, cellulose fibre	P6
10. Other	

*Except subsets listed separately.

Checking responsible sourcing certificates

Confirmation of manufacturer's and supplier's claims should be sought from the relevant responsible sourcing scheme provider. Many of the organisations who administer these schemes will, via their website, list companies and products that have been certified against their standards, including the scope of any such certification. Some schemes, including BES 6001 via www.greenbooklive.com, will provide downloadable copies of the relevant certificate, which can in turn be used as evidence for this issue.

Broken chain

To recognise responsible sourcing certification where it does exist in the supply chain, while reducing the risks associated with a broken chain, it is permissible to use the upstream certification score in the HQM responsible sourcing tool where the downstream risk to responsible sourcing is considered to be low. Specifically, it is acceptable for the following types of organisations in the supply chain (that are downstream of the organisation with certification) not to have their own responsible sourcing certification:

1. Organisations that only handle or transport, or
2. Organisations that only fabricate, assemble or install and are using a recognised quality management system to ensure the mixing and substitution of the certified upstream source with uncertified sources has not occurred.

And

3. Are operating in a jurisdiction that can demonstrate relatively robust and well enforced environmental, social and economic controls. For example:
    - States which are members of the EU.
    - States that have declared adherence to the OECD Guidelines for Multinational Enterprises.

Cut-off volume thresholds and exclusions

Any construction product which clearly accounts for less than 0.1m^3 per 100m^2 Gross Internal Floor Area (GIFA) (see definitions) can be excluded from the assessment. The volume considered should be taken as the construction product's overall external dimensions, including any internal voids or air spaces. Minor fixings (such as brackets, nails, or screws), adhesives, seals and ironmongery would normally fall below this threshold.

Quantities precision

The degree of tolerance accepted for estimating quantities is ±20% of the final installed quantity.

It is not necessary for the assessor to submit calculations in order to justify estimates. In particular, the cut-off estimation for many construction products that are clearly below the cut-off volume may be done without the need for any calculations at all.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 1	02 Legally harvested and legally traded timber	Evidence that all timber and timber -based products used in the building meet the definition of 'legally harvested and legally traded timber'.	
crit 2	03 Product procurement policy	– A copy of the documented product procurement policy. – Evidence that the policy was developed before the end of early design (typically RIBA stage 2 or equivalent). – Evidence that the policy is disseminated, or a written commitment to do so. – Evidence that the policy is included in the construction contract, or a written commitment to do so. – Evidence that there is a policy to encourage the specification of products with responsible sourcing certification.	– Evidence that the policy was disseminated. – Evidence that the policy was included in the construction contract.
crit 3	04 Responsible sourcing of construction products assessment	– A copy of the completed HQM Responsible Sourcing of Construction Products tool. – A copy of all responsible sourcing certificates. – A copy of all EMS certificates. – For affected certified construction products, evidence on how the broken chain requirements are met.	

Checklists, Tables & Illustrations

None.

Definitions

BREEAM recognised responsible sourcing certification schemes (RSCS)

These are third party schemes evaluated by BRE Global for recognition under BREEAM. Refer to Guidance Note 18: *BREEAM Recognised Responsible Sourcing Certification Schemes* (GN18). Refer to the BREEAM website for information on the evaluation criteria and the process for the verification and acceptance, including application and appeals.

Broken chain

Where a construction product (or constituent construction product) is certified, but is supplied via one or more downstream organisations that have no relevant certification. In this situation, unless the broken chain requirements are met, the certification is not accepted by BREEAM.

Comprehensive route

The comprehensive route provides a more accurate measurement of the risks in the building design associated with construction products by taking account of the quantity of each construction product within a location and use category. It requires quantities to be entered into the HQM responsible sourcing tool rather than using the lowest 'location and use' category score per material category. The improvement in rigour justifies the comprehensive route having the potential to produce better scores that the foundation route.

Constituent construction product

A manufacturer specific construction product (i.e. with a manufacturer reference number) that is not specified by the designer or selected by the constructor, but is used in the manufacture of a specified construction product.

Construction product

A manufacturer specific construction product (i.e. with a manufacturer reference number) that is specified by the designer (e.g. architect, engineer, interior designer, quantity surveyor, landscape architect), or selected by the constructor (principal or sub-contractor), and installed on the project.

Foundation route

The foundation route does not require the quantities of each construction product to be entered into the HQM responsible sourcing tool. This reduces the time taken per construction product but, because the varying quantities of each construction product in the building cannot be taken into account when the credit score is calculated, the lowest 'location or use' category score per material category is used for the overall materials category score.

Gross Internal Floor Area (GIFA)

Gross internal floor area as defined by the RICS (www.rics.org).

Legally harvested and traded timber

HQM follows the UK Government's definition of 'legally harvested and traded timber', as outlined in the Central Point of Expertise on Timber (CPET) 5th Edition report(108) on the UK Government Timber Procurement Policy.

To be considered 'legally harvested and traded timber' all sources of timber used on a project assessed under the HQM scheme must fulfil the requirements set out by CPET available from: www.gov.uk/guidance.

New Rules of Measurement (NRM)

NRM provides a standard set of measurement rules and essential guidance for the cost management of construction projects and maintenance works. For more information visit: www.rics.org.
IMPACT Compliant tools currently use NRM classification as a default.

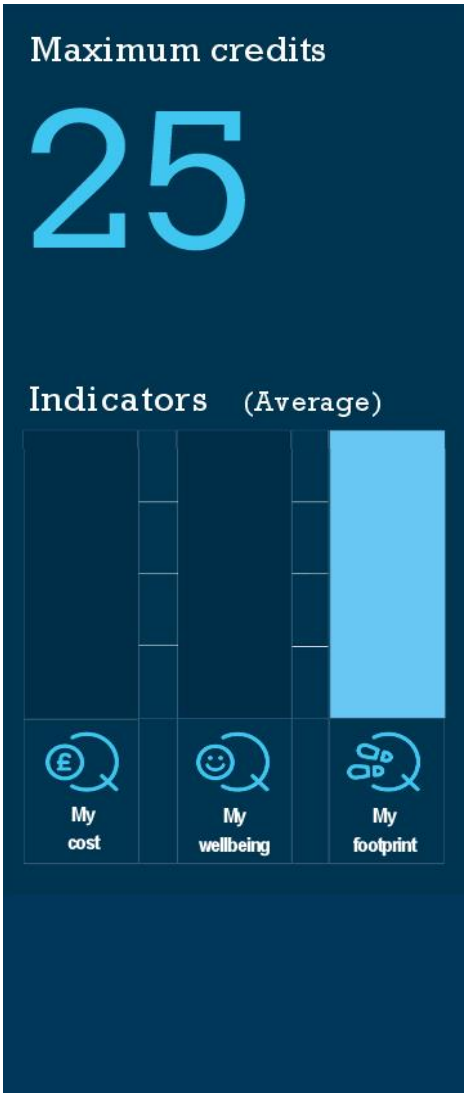
Responsible sourcing of construction products

A graded scale to reflect the rigour of the certification scheme used to demonstrate responsible sourcing, forming the basis for awarding credits in this issue. Refer to Guidance Note 18 for an up-to-date table of responsible sourcing certification schemes recognised by BRE Global for the purposes of HQM assessments.

Reused construction products

Construction products that can be extracted from the waste stream and used again without further processing, or with only minor processing, that does not alter the nature of the construction product (e.g. cleaning, cutting, fixing to other construction products).

6.2 Environmental Impact of Materials



Aim

To reduce the effect construction products have on the environment by recognising and encouraging the selection of products with a low environmental impact, including embodied carbon over the life cycle of the building.

Benefit

- Helps consumers understand the overall environmental impact of their home.
- Encourages an integrated approach to assessing carbon by making sure all carbon emissions (including those from the home's structure) are taken into account not just emissions from using the home.
- Encourages measures to manufacture construction products in the best possible way to reduce impacts of housebuilding and construction products.

Context

Introducing and tightening Part L of the Building Regulations has led to reductions in the CO_2 emissions from using energy in homes. Typically, in a home with basic internal fit-out, embodied carbon during the construction phase and once the home is being used makes up 69% of the emissions over the whole life of the home.[109] As a result, it is becoming increasingly important to reduce embodied carbon emissions from a home's structure.

Life cycle assessment (LCA) is a tool to measure and evaluate the environmental impact of a product or activity by assessing the energy used, raw materials used, and pollutants released to the environment over its life cycle. An LCA can help people understand the impact of materials based on how (and in what quantities) they are used in a building and can help identify designs with the lowest environmental impact over the whole life of the building. Environmental Product Declarations (EPDs) provide measurable environmental information about a specific product that is checked by a third party. Using products with an EPD can help make LCAs more accurate and improve understanding of a home's environmental impact.

Credit Summary

There are two routes to assessing this issue: Foundation route and Comprehensive route. These routes represent varying degrees of rigour. Both routes are accepted for calculating the home's environmental impact. The foundation route uses a tool that requires basic design information to be entered and is appropriate for standard or simple designs. The comprehensive route requires the use of an IMPACT compliant tool and more detailed design information, and can be used for any home. This gives greater accuracy and hence a higher score can be awarded where this route is followed.

Criterion number	Title	Credits
crit 1	01 Product procurement policy	2
crit 2	02 Product environmental information	up to 4
crit 3–crit 4	03 Routes of rigour (follow 03A or 03B) – Building life cycle assessment	up to 19
crit 3	– 03A Foundation route	up to 7
crit 4	– 03B Comprehensive route	up to 19
Total credits available		25

Criteria

01 Product procurement policy **2 credits**

crit 1 By the end of early design stage (typically RIBA stage 2 or equivalent), the client or developer has a documented product procurement policy (see Methodology) and procedure that:

crit 1.a: Sets out procurement requirements for all suppliers and trades to adhere to relating to the sourcing of construction products with lower environmental impact.

crit 1.b: Is disseminated to all relevant internal and external personnel.

crit 1.c: Is included within the construction contract to ensure that they are enforceable on the assessed project.

crit 1.d: Encourages specification of products with an Environmental Product Declaration (EPD) over similar products without EPDs.

02 Product environmental information **up to 4 credits**

crit 2 Where a range of products specified at the Design Stage (DS) and installed by the Post Construction Stage (PCS) are covered by verified EPD (see Methodology). Credits are awarded according to Table 39. Only two EPDs per material type can be counted.

Table 39 Environmental Product Declaration (EPD) credit allocation. Credits are awarded on the basis of the number of products covered across product categories.

Number of EPDs	Credits
4	1
6	2
8	3
10	4

03 Routes of rigour (follow 03A or 03B) – Building life cycle assessment **up to 19 credits**

One of the following routes have been used to determine the home's impact.

03A Foundation route **up to 7 credits**

crit 3 The home is assessed using the HQM Environmental Impact of Construction products tool in accordance with Methodology. This route is suitable for the assessment of standard, simple homes or buildings. Credits are awarded based on the home's impact benchmark achieved according to Table 40.

Table 40 Building life cycle assessment credit allocation table

Homes Impact Benchmarks* (Ecopoints per Occupant)	Houses		Apartments		Credits	
	Detached	Terraced, Semi, Clustered	Low Rise	High Rise	Foundation route	Comprehensive route
Threshold Benchmark	≤ 135	≤ 98	≤ 113	≤ 172	1	5
	≤ 132	≤ 95	≤ 110	≤ 168	1	6
	≤ 128	≤ 93	≤ 107	≤ 164	1	7
	≤ 125	≤ 91	≤ 104	≤ 161	2	8
	≤ 122	≤ 89	≤ 101	≤ 157	2	9
	≤ 119	≤ 86	≤ 99	≤ 154	3	10
	≤ 116	≤ 84	≤ 96	≤ 150	3	11
	≤ 112	≤ 82	≤ 93	≤ 147	4	12
	≤ 109	≤ 80	≤ 90	≤ 143	4	13
	≤ 106	≤ 77	≤ 87	≤ 139	5	14
	≤ 102	≤ 75	≤ 83	≤ 134	5	15
	≤ 97	≤ 72	≤ 79	≤ 130	6	16
	≤ 92	≤ 68	≤ 75	≤ 124	6	17
	≤ 86	≤ 64	≤ 69	≤ 117	7	18
	≤ 76	≤ 57	≤ 61	≤ 106	7	19

*The home's impact benchmark is a reference of average environmental impact for a home in the UK as calculated using an IMPACT compliant tool and average construction data for homes built since 2006. The unit used for comparison is BRE Ecopoints (based on a range of EN 15804 indicators) and national average occupancy for the type of home being assessed. Occupancy is based on the number of bedrooms, see Methodology.

*Values in the table are rounded to the nearest integer so in some cases values may repeat. The HQM Tools use precise values for allocation of credits.

03B Comprehensive route **up to 19 credits**

crit 4 The home has been assessed using an IMPACT compliant tool in accordance with the methodology. Credits are awarded based on the home's impact benchmark achieved according to Table 40.

Methodology

Documented product procurement policy

This may be prepared and adopted at an organisational level or be site or project specific. It is recommended (but not a requirement) that the documented policy follows the principles of BS 8900-1:2013 Managing sustainable development of organisations – Guide(110) or BS ISO 20400:2017 Sustainable procurement – Guidance(111). This policy may form a part of a broader Sustainable Procurement Plan or be in the form of a standalone document.

Environmental Product Declaration (EPD) classification

Step 1 Classify each product EPD as per Table 43.

Where a product and its associated EPD is comprised of more than one material, the EPD should be allocated to the material that makes up the larger volume of the product. Where materials are present in equal quantities the assessor should decide which material category the EPD should be allocated to at their own discretion. Where an EPD covers more than one material, it must only be counted once.

Step 2 Check EPD certificates are valid (unexpired) at the point of specification and installation, or delivery to site.

Step 3 Ensure EPD is compliant with ISO 14025(112), ISO 21930(113) or EN 15804(114).

Building life cycle assessment

To determine the number of credits achieved for the building life cycle assessment, either the foundation route or the comprehensive route must be followed.

Foundation route

This route uses the HQM Environmental Impact of Construction Products tool and is suitable for the assessment of standard, simple homes or buildings. It is not suitable for non-standard or complex homes or buildings. If significant issues are encountered in modelling the actual design in the HQM tool, such as selecting constructions that are similar to those in the design or where the design requires greater control over the way quantities are entered, then the comprehensive route should be followed.

Method for detached, semi-detached, clustered and terrace home types

Each home or House type shall be modelled separately in the HQM materials reporting tool as follows:

Step 1: Identify the elements/ BREEAM Location use categories that form the home and are in-scope, based on the Scope of assessment.

Step 2: In a copy of the HQM tool complete all required inputs in the 'Crit 03-04 Overview Details' tab.

Step 3: In the 'Crit 03-04 Input' tab, for each of the elements identified in step 1, select the elemental construction/ system classification description that is the most similar to the actual elemental construction. If an element has more than one type of construction, then select an elemental construction for each type.

Step 4: For each of the elemental constructions, enter the total quantity in the home (see Quantities precision and exclusions). Enter any further information required by the tool. Semi-detached, clustered and terrace only: For party elements (such as walls, foundations), adjust the quantity of these elements by multiplying by the home's % share of the overall building's Gross internal floor area (GIFA). For example, if the building's GIFA is 400m² and the home's is 100m² then the % share is 25%. See Gross Internal Floor Area (GIFA).

Step 5: Once all the required inputs have been completed, create an XML file.

Step 6: Upload the XML file created in step 5 into the BREEAM Projects online HQM assessment tool. Click 'Calculate score'. The online tool will generate an Ecopoint score and allocate credits based on Table 40.

Method for apartment home types

For apartments, to streamline the process, the complete building can be modelled in the HQM tool and then each home or house type's result produced as follows:

Step 1: Identify the elements/ BREEAM Location use categories that form the building and are in - scope, based on the Scope of assessment.

Step 2: In a copy of the HQM tool, complete all required inputs in the 'Crit 03-04 Overview Details' tab.

Step 3: In the 'Crit 03-04 Input' tab, for each of the elements identified in step 1, select the elemental construction/ system classification description that is the most similar to the actual elemental construction. If an element has more than one type of construction, then select an elemental construction for each type.

Step 4: For each of the elemental constructions, enter the total quantity in the building. Enter any further information required by the tool.

Step 5: Once all required inputs have been completed, create an XML file.

Step 6: Upload the XML file created in step 5 into the BREEAM Projects online HQM assessment tool. Click 'Calculate score'. The online tool will generate a Ecopoint score and allocate credits based on Table 40.

The Ecopoints score is generated based on the home's share of the building's total GIFA (taking figures reported for home GIFA, total building GIFA, number of homes and number of bedrooms inputs in the tool). For example, if the building's GIFA is 400m² and the home's is 100m² then the % share is 25%.

Comprehensive route

All home types

The comprehensive route requires the use of an IMPACT compliant tool. See IMPACT compliant tool requirement. It is suitable for simple and complex buildings. The complete building is modelled in the IMPACT compliant tool as follows:

Step 1: Using an IMPACT compliant tool, produce a building Life Cycle Assessment (LCA) model for the building (see IMPACT compliant tool requirement). Ensure all of the in-scope elements are included, based on the 'Scope of assessment' section, below. The building elemental constructions shall be categorised in the IMPACT compliant tool as closely as possible to the classification system shown in Scope of assessment.

Step 2: Obtain the total Ecopoints result for the building, excluding the constructions (or parts thereof) in the following elements that are not located in or forming common areas : internal wall or partition, internal floor finish and internal wall finish, internal doors, ceiling finishes.

Step 3: Obtain the total Ecopoints result for each home for just the constructions (or parts thereof) excluded in step 2 that are located in the home. All of the exclusions in step 2 should be allocated by this step.

Step 4: Adjust the Ecopoints score from step 2 by multiplying it by the home's % share of the total GIFA of all homes (but excluding areas in common). Where a home has sole use of an area in the building that is separated from the home (for example, an internal parking or storage space), this area should be included in the home's GIFA.

For example, if the building's total GIFA is 400m² and the home's is 100m² then the % share is 25%. This manual calculation may not be required in all cases.

Step 5: In a copy of the HQM tool complete all required inputs in the 'Crit 03–04 Overview Details' tab and the 'Crit 03–04 Inputs' tab and generate an XML file.

Step 6: Upload the XML file created in step 5 into the BREEAM Projects online HQM assessment tool. Click 'Calculate score'. The online tool will generate a Ecopoint score and allocate credits based on Table 40.

Step 7: From the IMPACT compliant tool, export or extract all of the elemental construction descriptions (used in the model) and their respective classifications, quantities, total CO_2 and Ecopoints. Produce a simple Constructions Schedule according to the following example (note: the elemental construction descriptions in this example are not prescriptive). Depending on the IMPACT compliant tool used, the data required for this Constructions Schedule may be readily exportable.

Table 41 Example Constructions Schedule

Elemental construction description	Classification	Quantity in the building or home	Total CO_2	Total Ecopoints
External wall type 1 (Brick, insulation, block, mortar, plasterboard, paint)	2.5.1	1000m²	456	34
East façade (Blogs System type 1)	2.5.1	500m²	2222	555
Foundation type 1 (RC 35)	1.1.1	2000m^3	455	44

If required, the Constructions Schedule can be used by those who do not have access to the IMPACT compliant tool to compare what is modelled with other sources of design information (such as bills of quantities, drawings, specifications), and to see the breakdown of environmental impact.

Gross Internal Floor Area (GIFA)

The Gross Internal Floor Area (GIFA) reported for the home should match throughout the HQM assessment.

IMPACT compliant tool requirement

The following requirements apply when using an IMPACT compliant tool :

1. The LCA data used must be the following version: IMPACT_CMP_15804 Dataset_V5. For more information on IMPACT database please visit bregroup.com/products/tools/.
2. The data must be compliant with EN 15804.

3. All elemental constructions are to be created by the user from individual products using the closest matching product data in the tool. Pre-calculated element level constructions are not acceptable (such as Green Guide specifications).
4. Where default values for the following product parameters are known to differ from the design they should be adjusted accordingly: Thickness; Density; Adjustments; Site wastage; Service life. A precision of ±10% on actual values is acceptable.
5. The study period is set at 60 years.

Number of bedrooms

The number of bedrooms entered into the BREEAM Projects online HQM assessment tool must be consistent with other issues assessed based on the number of bedrooms. Where there are rooms that can be converted to bedrooms at a future date, these rooms should not be considered as bedrooms for the purpose of this issue.

Quantities precision and exclusions

Quantities are to be within ±10% of the actual quantities. Minor fixing (such as brackets, nails, screws), adhesive, seals and ironmongery items may be excluded.

Scope of assessment

Table 42 indicates the building elements that must be included in the model. Inclusion of these elements (and only these) is necessary to ensure an appropriate level of comparability with the benchmark home.

If following the Foundation route, the constructions available in the HQM materials reporting tool may cover more than one item identified in the table below. A completed HQM materials reporting tool (that includes one or more constructions for each building element identified as present in the building) is compliant with these in-scope requirements.

In addition, the table shows the classification codes that must be used for the comprehensive route, based on the New Rules of Measurement (NRM) classification system. For example, the code for 'Standard foundations' is '1.1.1'.

If an element is not present in the building, it does not need to be included in the model.

Table 42 Scope of assessment

RICS NRM Level 2 Element		RICS NRM Level 3 Sub-element		BREEAM 'Location and use' category	To be included
1 Substructure					
1	Substructure	1	Standard foundations	7. Structure, primary and secondary	✓
		2	Specialist foundation systems		✓
		3	Lowest floor construction		✓
		4	Basement excavation	N/A	
		5	Basement retaining walls	7. Structure, primary and secondary	✓
2 Superstructure					
1	Frame	1	Steel frames	7. Structure, primary and secondary	✓
		2	Space decks		✓
		3	Concrete casings to steel frames		✓
		4	Concrete frames		✓
		5	Timber frames		✓
		6	Other frame systems		✓
2	Upper Floors	1	Floors	3. Floor (including floor finishes)	✓
		2	Balconies		✓
		3	Drainage to balconies	11. Other	✓
3	Roof	1	Roof structure	6. Roof (including roof finishes)	✓
		2	Roof coverings		✓
		3	Specialist roof systems		✓
		4	Roof drainage		✓
		5	Rooflights, skylights and openings	2. Door, window	✓
		6	Roof features	6. Roof (including roof finishes)	✓

RICS NRM Level 2 Element		RICS NRM Level 3 Sub-element		BREEAM 'Location and use' category	To be included
4	Stairs and Ramps	1	Stair and ramp structures	7. Structure, primary and secondary	✓
		2	Stair and ramp finishes	3. Floor (including floor finishes)	✓
		3	Stair, ramp balustrades and handrails	11. Other	✓
		4	Ladders, chutes, slides		✓
5	External Walls	1	External enclosing walls above ground floor level	8. External wall	✓
		2	External enclosing walls below ground level	7. Structure, primary and secondary	✓
		3	Solar, rain screening	8. External wall	✓
		4	External soffits		✓
		5	Subsidiary walls, balustrades, handrails, railings and proprietary balconies	11. Other	✓
		6	Façade access, cleaning systems		✓
6	Windows and External Doors	1	External windows	2. Door, window	✓
		2	External doors		✓
7	Internal Walls and Partitions	1	Walls and partitions	5. Internal partition, internal walls (including finishes)	✓
		2	Balustrades and handrails	11. Other	✓
		3	Moveable room dividers	5. Internal partition, internal walls (including finishes)	✓
		4	Cubicles		✓
8	Internal Doors	1	Internal doors	2. Door, window	✓
3 Internal Finishes					
1	Wall Finishes	1	Finishes to walls	5. Internal partition, internal walls (including finishes)	✓
2	Floor Finishes	1	Finishes to floors	3. Floor (including floor finishes)	✓
		2	Raised access floors		✓
3	Ceiling Finishes	1	Finishes to ceilings	1. Ceiling (including ceiling finishes)	✓
		2	False ceilings		✓
		3	Demountable suspended ceilings		✓
4 Fittings, Furnishings and Equipment					
1	Fittings, Furnishings and Equipment	2	Domestic kitchen fittings, fixed furniture and equipment	11. Other	✓
5 Services					
				N/A	
6 Complete Buildings and Building Units					
				To be broken down into other classifications.	
8 External Works					
2	Roads, Paths and Pavings	1	Roads, paths and pavings	10. Hard landscaping	✓
		2	Special surfacings and pavings		✓

Table 43 Materials categories

Material category	Uniclass equivalent code
1. Timber or timber-based	P5
2. Concrete or cementitious	P2*
3. Metal	P4
4. Stone or aggregate	P1, P3*
5. Clay-based	P33
6. Gypsum	P232
7. Glass	P314
8. Plastic, polymer, resin, paint, chemicals and bituminous	P7, P34
9. Animal fibre or skin, cellulose fibre	P6
10. Other	

*Except subsets listed separately.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 1	02 Product procurement policy	– A copy of the documented product procurement policy. – Evidence that the policy was developed at the end of early design (typically RIBA Stage 2 or equivalent) – Evidence that the policy is disseminated, or a written commitment to do so. – Evidence that the policy is included in the construction contract, or a written commitment to do so. – Evidence that there is a policy on EPDs.	– Evidence that the policy was disseminated. – Evidence that the policy was included in the construction contract.
crit 2	03 Environmental Product Declaration certificates and details	– A schedule of specified products in the building with accepted EPDs, and their product categories. – The EPD certificates.	
crit 3	04 Foundation route	– The completed HQM materials tool.	
crit 4	05 Comprehensive route	– The IMPACT compliant tool name. – The version of the data used in the IMPACT compliant tool for modelling the building. – A copy of the IMPACT compliant tool model in its native format OR, if stored on the tool provider's online server, written permission for BRE to access the model. – A copy of the Constructions Schedule in XLS, XLSX or CSV format.	

Checklists, Tables & Illustrations

None.

Definitions

Comprehensive route

A detailed route that uses an IMPACT compliant tool to determine the Ecopoints for the home. Greater modelling detail is possible through this route compared with the foundation route. Therefore, more credits are available to recognise the level of rigour.

Ecopoints

Ecopoints are used as the metric for assessing this issue. It is an indicator that is made up of a broad set of individual environmental indicators which are then combined into a single value. For more information about Ecopoints, visit: www.bre.co.uk or contact BRE.

Embodied carbon

This includes emissions caused by impacts related to extraction, manufacture, transportation, assembly, maintenance, replacement, deconstruction, disposing of materials and systems used in a building.

Environmental Product Declaration (EPD)

An EPD is an independently verified environmental label (i.e. ISO Type III label) according to the requirements of ISO 14025[115].

House type

House type should include homes that are identical in specification, design and location (end/ mid-terrace, ground or mid/ top floor).

High rise

High rise is considered to be a building that is 18 meters or over.

IMPACT (Integrated Material Profile and Costing Tool)

IMPACT is a specification and database for software developers to incorporate into their tools to enable consistent life cycle assessment (LCA) and life cycle costing (LCC). IMPACT compliant tools work by allowing the user to attribute environmental and cost information to drawn or scheduled items in the BIM.

Further information about IMPACT is available from: www.impactwba.com.

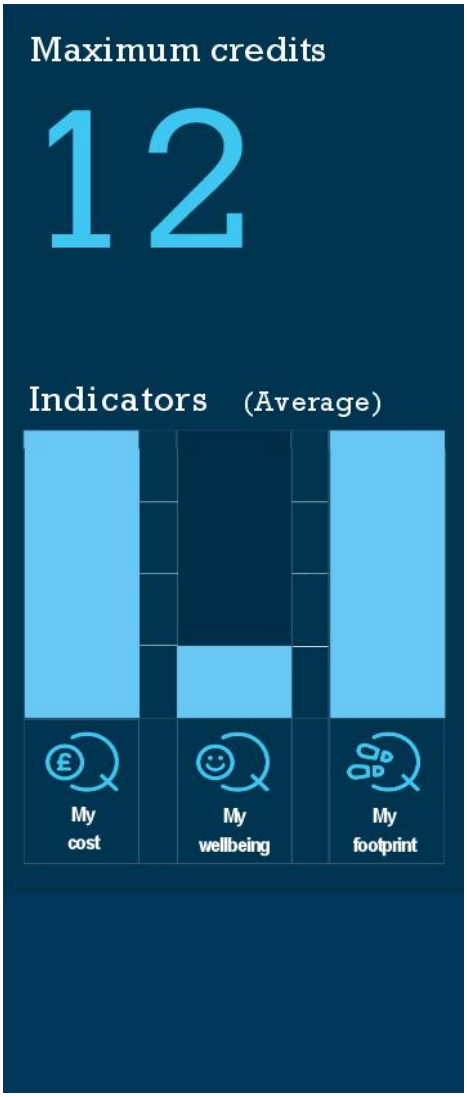
IMPACT compliant tool

An IMPACT compliant tool is a tool that has been tested for compliance with the IMPACT specification, and is listed here: www.impactwba.com.

New Rules of Measurement (NRM)

NRM provides a standard set of measurement rules and essential guidance for the cost management of construction projects and maintenance works. For more information visit: www.rics.org.
IMPACT Compliant tools currently use NRM classification as a default.

6.3 Life Cycle Costing



Aim

To encourage economic sustainability by recognising and encouraging people to use and share life cycle costing analysis data to reduce maintenance and operational costs and deliver value over the whole life of a home.

Benefit

- Reduces maintenance and operational costs for the homeowner and the occupant.
- Better informs the homeowner and occupant of the running costs of the home.
- Better informs the homeowner of the relationship between cost of buying a home and the cost of running it.
- Reduces the effects of embodied carbon over the whole life of a home by reducing the need for frequent maintenance, repairs, and replacements.

Context

Life cycle cost (LCC) analysis is useful for the occupant because it can provide valuable information on the maintenance and operational costs of the home before and after it is sold. As a result, the occupant will be better informed about the running costs of the home.

This issue presents opportunities for developers, registered social landlords and asset managers to prolong the life of the building. It will also help them to efficiently and economically provide a comfortable, safe and well-maintained environment for tenants and other residents.

Credit Summary

Criterion number	Title	Credits
crit 1–crit 3	01 Occupant's life cycle cost report	6
crit 4	02 Component level life cycle cost optimisation	6
Total credits available		12

Criteria

01 Occupant's life cycle cost report **6 credits**

crit 1 At the end of early design (typically RIBA stage 2 or equivalent), a life cycle cost (LCC) analysis (to PD 156865:2008)(116) is produced by a suitably qualified cost consultant (SQCC) at a level of detail suitable to inform the occupant of key maintenance and operational costs (see Assumptions, exclusions and contingencies). The scope is as defined in Assessment scope. It is kept updated up to the end of detailed design (typically RIBA stage 4 or equivalent).

crit 2 An Occupant's report, based on the most up-to-date LCC analysis (see crit 1), is available to potential occupants prior to a commitment to purchase. The report includes a summary which requires no expert knowledge to understand and, as a minimum, includes:

crit 2.a: Costs (current prices) broken down according to the items listed in Assessment scope, reported at intervals of 1 year, up to year 60 (see Period of analysis).

crit 2.b: A summary highlighting the most significant findings of the LCC analysis, including significant planned maintenance, as determined by the cost consultant.

crit 3 A final version of the occupant's report (see crit 2) is included within the 'Home Information' (see 11.2 Home Information). It must be updated based on the final LCC analysis at the end of detailed design (typically RIBA stage 4 or equivalent) (see crit 1).

02 Component level life cycle cost optimisation **6 credits**

crit 4 By the end of detailed design (typically RIBA stage 4 or equivalent), a component level LCC appraisal (to PD 156865:2008) is carried out by an SQCC. Appropriate examples are provided by the design team to demonstrate how the component level LCC optimisation has been used to influence building and systems design or specification to reduce the overall maintenance and operational costs to the occupant. The analysis is provided as a report to the client.

Methodology

Assessment scope

The LCC shall include the following items from PD 156865:2008, Table 3.1 UK LCC data structure and definitions. Items not applicable to the home may be denoted 'N/A' in the LCC analysis and report.

2.0 Maintenance costs
2.1 Major replacement costs
2.4 Minor replacement, repairs and maintenance costs
2.5 Unscheduled replacement, repairs and maintenance costs
2.6 Grounds maintenance

3.0 Operation costs
3.1 Cleaning costs*
3.2 Utilities costs
3.3 Administrative costs*
3.4 Overhead costs*

*If outside the control of the homeowner or occupant, for example, when included in a service charge.

Assumptions, exclusions and contingencies
Any assumptions, exclusions or contingencies (in-line with the methodology set in PD 15686-5:2008) considered for the assessment should be declared in the Occupant's report.

Occupant's report
HQM does not prescribe the format for presenting the results of LCC analysis and how it has been utilised to improve design and specification, recognising that this may vary from project to project, where solutions and approaches are largely influenced by building specific factors.

Period of analysis
The 60 year minimum period of analysis set under crit 2.a follows the industry norm and has been set to ensure that the analysis identifies any major replacements of the building fabric and services , which may not be captured in a shorter period of analysis.

Pre-defined specifications
Where the building is constructed to a pre-defined standard specification, the LCC plan for this specification may be used to demonstrate compliance.

Compliance Notes
Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 1	01 Life cycle costing analysis	Evidence that a life cycle costing analysis was carried out by an SQCC at the end early design (typically RIBA stage 2 or equivalent).	
crit 2–crit 3	02 Occupant's life cycle cost report	– A copy of the occupant's report. – Evidence that it is available to potential purchasers, such as a website link or marketing materials.	A copy of the 'Home information' including the final occupant's report.
crit 4	03 Component level life cycle cost optimisation	1. A copy of the component level LCC optimisation report. 2. Evidence that the report was developed before the end of detailed design (typically RIBA stage 4 or equivalent)	

Checklists, Tables & Illustrations
None.

Definitions

Component level LCC analysis
A component level LCC is commonly used for cost planning specification choices of systems, elements and products during design development.

Economic sustainability
This is the third aspect of sustainability. It makes sure our economic growth maintains a healthy balance with our environmental systems and that resources are fairly distributed and used efficiently.

Life cycle cost (LCC)
The cost of an asset, or its parts throughout its life cycle, while fulfilling the performance requirements; a methodology for systematic economic evaluation of life cycle costs over a period of analysis, as defined in the agreed scope.

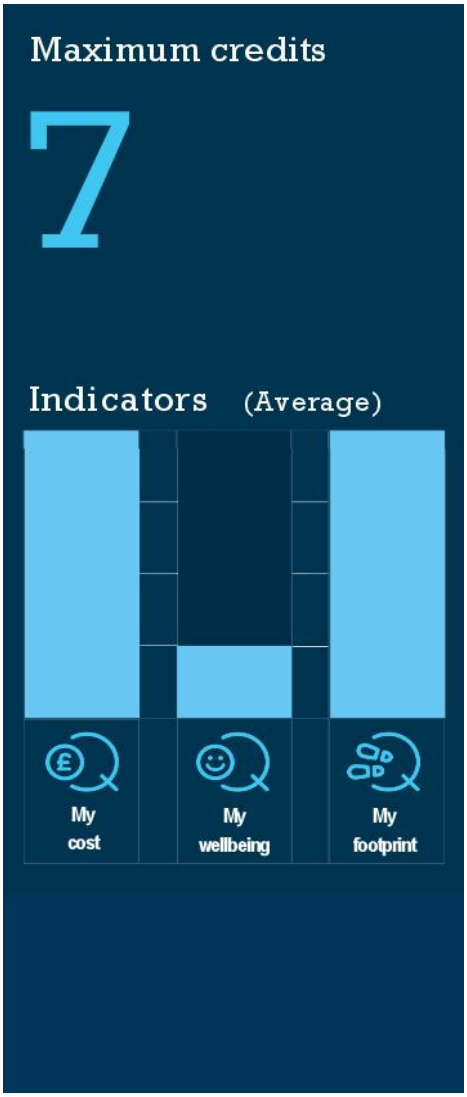
Process stage
Process stages are referred to in the PD156865 guidance. This corresponds to the RIBA stages in the RIBA plan of work.

Suitably Qualified Cost Consultant (SQCC)

An individual achieving all the following items can be considered to be 'suitably qualified' for the purpose of a HQM assessment:

1. Holds a BA or BSc (Hons) degree or postgraduate or equivalent qualification in quantity surveying, construction economics, engineering or architecture.
2. Has a minimum of three years relevant experience (within the last five years). The experience must clearly demonstrate a practical understanding of life cycle costing in construction and the built environment, and show an ability to identify and demonstrate cost and performance enhancement measures.

6.4 Durability



Aim

To reduce the need for maintenance, repairs and frequent replacement of materials resulting from damage to exposed elements of the building and landscape.

Benefit

- Helps to reduce maintenance costs for occupiers, homeowners and facilities managers.
- Helps developers to build new homes that are strong enough to last their intended lifetime.
- Helps show and communicate that construction products have been considered and specified according to location of the site to minimise the need for replacement.
- Helps reduce disruption to occupier and homeowners resulting from maintenance, repairs and replacements.

Context

Durability of materials is a complex issue, requiring various related aspects to be taken into consideration.

This issue encourages designers to consider and declare how the climate can affect how long the materials last.

It is important to consider climate change, as it can significantly speed up deterioration of materials used in a building. The effect can be reduced by good design and specification so that stakeholders can have increased confidence that their home is hard-wearing and long-lasting.

It is important to consider any likely 'wear and tear' within and around the home, and measures to reduce. This can mean fewer replacements and less maintenance. The performance of a home within this issue depends on the risks it faces. For example, homes in coastal areas will face different risks to those in inner city locations.

Credit Summary

Criterion number	Title	Credits
crit 1	01 Integral elements	5
crit 2	02 Finishing elements	2
Total credits available		7

Criteria

01 Integral elements **5 credits**

crit 1 Appropriate measures to limit degradation have been incorporated into the design and specification of integral building elements at risk of severe material degradation (see Methodology).

02 Finishing elements **2 credits**

crit 2 crit 1 has been achieved.

crit 3 Appropriate measures to limit degradation have been incorporated into the design and specification of surface building elements at risk of cosmetic material degradation (see Methodology).

Methodology

General

The primary focus for assessing this issue is to determine how the selection of materials has mitigated degradation. Credits are not given for demonstrating how the factor that causes the degradation has been reduced (such as measures that reduce humidity).

The following steps outline the process for assessing criteria:

Step 1. Identify from Table 44, the applicable elements that are relevant to the home.

Table 44 Applicable elements

Applicable building elements	
Integral elements	**Finishing elements**

– Substructure:
  – foundations
  – lowest floor
  – basement and retaining walls
– Superstructure:
  – external finishes
  – external fixings
  – external walls
  – external openings
  – stairs
  – roof
  – roof drainage
  – upper floors and balconies
  – internal walls
– Services:
  – piped supply systems (within ownership boundary)
– External works:
  – boundary fences (within ownership boundary)
  – hardstanding, paving, car parking (within ownership boundary)
	– External finishes:
	  – cladding
	  – render
	– Internal finishes:
	  – floor coverings and finishes
	  – wall finishes
	  – skirting boards
	  – architraves
	  – trimmings
	  – hinges and handles
	  – sockets and switches
	  – towel rails and radiators
	– Built-in fittings:
	  – sanitary fittings
	  – built-in wardrobes, cupboards and stores

Step 2. Identify from Table 45, the factors that are likely to cause material degradation effects (listed in Table 46) in the identified applicable building elements (established from step 1).

Table 45 Material degradation causes: Factors to consider

Factors to consider Integral elements	Finishing elements

(Including, but not limited to the following)
 	
Environmental agents, including:
 	
– Solar radiation
– Temperature variation
– Humidity, water or moisture
– Hard water
– Extreme weather conditions:
  – high wind speeds
  – flooding
  – driving rain
  – snow
– Biological agents, including:
  – vegetation
  – pests, insects
– Pollutants, including:
  – air contaminants
  – ground contaminants
– Social agents, including:
  – Malicious damage (e.g. graffiti, arson)
	(Including, but not limited to the following)
	
	Environmental agents, including:
	
	– Hard water
	– Water, moisture
	
	Social agents, including:
	
	– Accidental damage
	– Abrasion (wear and tear)

Step 3. Confirm that the design and specification incorporates ways to limit material degradation effects.

Table 46 Material degradation effects

Material degradation effects Integral elements	Finishing elements
(Including, but not limited to the following) – Corrosion – Limescale build-up – Dimensional change, e.g. swelling or shrinkage, thermal expansion, cracking – Rotting – Leaching – Melting – Salt crystallisation – Abrasion – Blockage – Fatigue, shatter and breakage – Combustion	(Including, but not limited to the following) – Blistering – Staining or marking – Fading or discolouration – Limescale build-up – Corrosion – Leaching – Scratches – Dimensional change, e.g. swelling or shrinkage, thermal expansion

Step 4. Assessors should use their professional judgement in determining whether the design team have adequately demonstrated that they have designed and specified materials or measures which will be effective in preventing unnecessary deterioration, thus reducing frequent replacements, repairs and maintenance throughout the life cycle of the home.

Appropriate measures must be in relation to performance beyond the guidance contained within the Building Regulations Approved Documents. This includes accounting for future changes in the risk associated with the factors (likely to cause material degradation effects), such as changes in assumptions around weather related to climate change predictions and influenced by the project's specific circumstances.

Step 5. At post-construction stage, where the design and specification measures installed differ from the proposal at design stage, the assessor must ensure that these measures still meet the aims of the criterion.

Common areas

Where there are common areas associated with the home, the relevant integral and surface building elements within common areas should form part of the assessment of this issue.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 1 and crit 3	02 Appropriate measures	Appropriate measures documentation.	As per design stage and based on as-built information.

Checklists, Tables & Illustrations

None.

Definitions

Appropriate measures

An appropriate measure is determined by reviewing the following information as a minimum:

- What factor the element will withstand.
- How the element has been designed to withstand it.
- Declared service life and design life as defined in BS EN 15804: 2012+A1:2013[117] and BS EN 15978:2011[118].
- A 'Plain English' statement of how the design will help the building owner or occupier.
- A clear graphical or written description of the element's location in the home.
- Where an element will require regular maintenance, there is evidence that easy access to carry out maintenance works has been considered.
- Supporting information showing that the element is likely to do what is being claimed, such as a combination of information listed within the manufacturer's technical specification literature, manufacturer's declaration of performance, third party certification or appropriate calculations provided by members of the design team, where necessary.

Design life

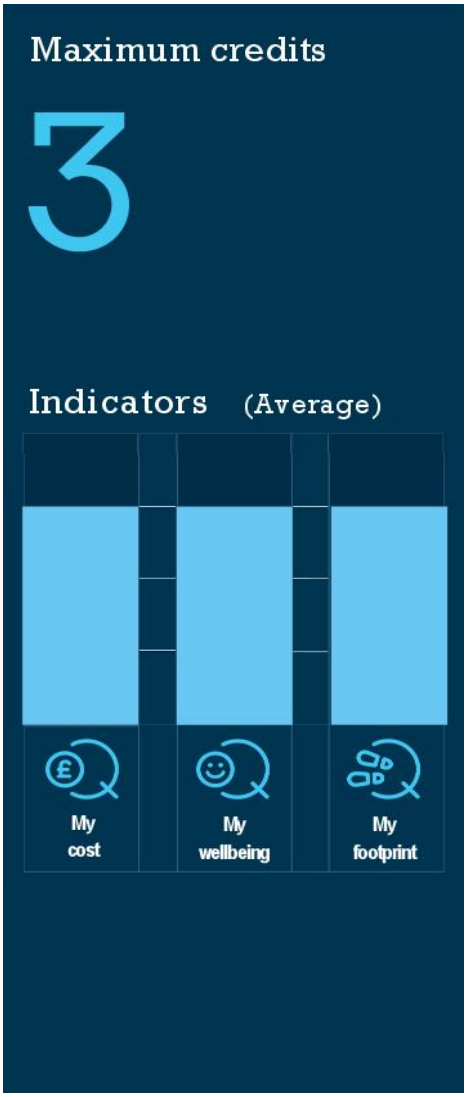
Service life intended by the designer, which a product is anticipated to last.

Service life[119]

The period of time after installation during which a building, or its part, meets or exceeds the performance requirements.

7 Space

7.1 Drying Space



Aim

To provide access to sufficient and convenient drying space to reduce the effect drying clothes inside has on occupants' health and the amount of energy used.

Benefit

- Reduces energy costs and emissions associated with drying clothes mechanically (in a tumble dryer or central heating).
- Helps to protect the inside of the property against moisture build-up which result in increased risks to health from mould growth, poor air quality and damage to the fabric of the home and its finishes.

Context

Providing adequate drying space has been identified by numerous organisations, including the World Health Organization, as a key preventative measure for reducing indoor moisture levels.(120) This improves the wellbeing of the occupants by reducing the risk of condensation build up and mould growth associated with respiratory illnesses.(121) Providing adequate outdoor drying space reduces the need to rely on using tumble dryers. And if a tumble dryer is used, choosing energy-efficient models also helps to reduce the energy costs and carbon emissions associated with drying clothes mechanically.

Credit Summary

Criterion number	Title	Credits
crit 1	01 External drying	1
crit 2	02 Internal drying	2
Total credits available		3

Criteria

01 External drying **1 credit**

crit 1 External drying facilities are provided (such as a rotary dryer). The drying space is a Secure space and has a minimum length that meets the requirements set out in Table 47.

Table 47 External drying minimum lengths

House with private external space	House without private external space	Flat or Apartment
30m	20m	20m

02 Internal drying **2 credits**

crit 2 A tumble dryer or washer-dryer, that is energy efficient and has an acceptable level of condensation, is installed prior to handover. Credits are awarded according to Table 48.

Table 48 Internal drying credit allocation

Number of credits	Type of specified appliance	Energy Efficiency Class (as per EU energy label)	Condensation Efficiency Class (as per EU energy label)	Other requirements
2	Tumble dryer	A+	B (where required by EU energy label)	Vented tumble dryers must vent moist air outside
1	Washer-dryer*	D (for drying cycle)	-	

*The rating for washer-dryers uses the new EU energy labels that came into force on 1 March 2021.

Methodology

None.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	

Checklists, Tables & Illustrations

None.

Definitions

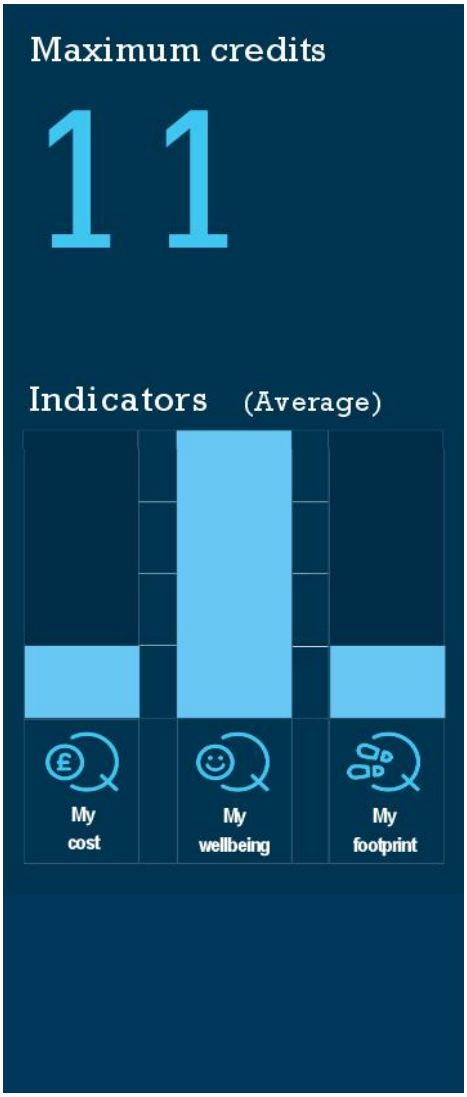
Secure space

This is an enclosed space that:

1. Is accessible only to the residents of the home.
2. Is accessed directly from an external door of the home.
3. Has permanent fixings or fittings.

A communal drying space is acceptable only if such space is enclosed, is only accessible to the residents and has a secure entrance.

7.2 Access and Space



Aim

To provide an acceptable and effective internal space that is accessible to all and supports the function of the home.

Benefit

- Makes sure homes are accessible to, and can be used by, as many people as reasonably possible.(122)
- Helps protect the home against needing expensive work in the future that is necessary to meet changing needs.
- Improves occupants' wellbeing by providing enough space for their needs.

Context

This issue considers that spaces need to be well designed and big enough to meet occupants' everyday and future needs. Homes need to allow adaptability and accessibility for all types of users and their needs. The UK government have streamlined the approach to setting space standards for new homes. The new nationally described space standard replaces the existing different space standards used by local authorities.(123) Also, new optional building regulations requirements for access have also been introduced.(124)

Credit Summary

Criterion number	Title	Credits
crit 1	01 Home information	Prerequisite
crit 2–crit 3	02 Nationally described space standards	5
crit 4–crit 6	03 Accessible and adaptable design	3
crit 7	04 Accredited access consultant confirmation	3
Total credits available		11

Criteria

01 Home information **Prerequisite**

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 11.2 Home Information.

02 Nationally described space standards **5 credits**

crit 2 The home meets the Technical Housing Standards - Nationally Described Space Standard(125).

crit 3 Where the built in storage provided shows an improvement over the requirement stated in Technical Housing Standards – Nationally Described Space Standards by 0.5m².

03 Accessible and adaptable design **3 credits**

crit 4 The internal functional space and external space associated with the home meet the requirements of the Building Regulations in Approved Document M - Access to and use of buildings Category 2 OR Approved Document M, Category 3 - Wheelchair user dwellings, where required by the local authority.

crit 5 An Accredited Access Consultant is appointed prior to early design stages (typically RIBA Stage 2 or equivalent).

crit 6 The Accredited Access Consultant advises on Nationally recognised design guidance relating to accessible and inclusive design (that meet every day needs and long-term demands) with regard to the Internal functional space and External space aspects of the home. They:

crit 6.a: Conduct an assessment and provide advice on the concept AND detailed design stages (typically RIBA Stage 2 and 3 or equivalent).

crit 6.b: Communicate and agree necessary changes within the design team where the assessment shows requirements are not fulfilled.

04 Accredited access consultant confirmation **3 credits**

crit 7 The Accredited Access Consultant confirms that the homes have been built following the advice given in crit 6 via one (or more) of the following according to the level of assurance they deem required based on the nature of the development:

- Confirmation from the developer that the homes have been built to the final design.
- Completion of a site inspection.
- Completion of an as-built evidence review.

Methodology

None.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.
crit 7	02 Written confirmation	Written confirmation from the designer, client and consultant.

Checklists, Tables & Illustrations

None.

Definitions

Accredited Access Consultant

An individual who is a member of the National Register of Access Consultants (NRAC). If assessors or clients wish to seek recognition of other accreditations or schemes, please contact the HQM team (hqm@bregroup.com).

External space

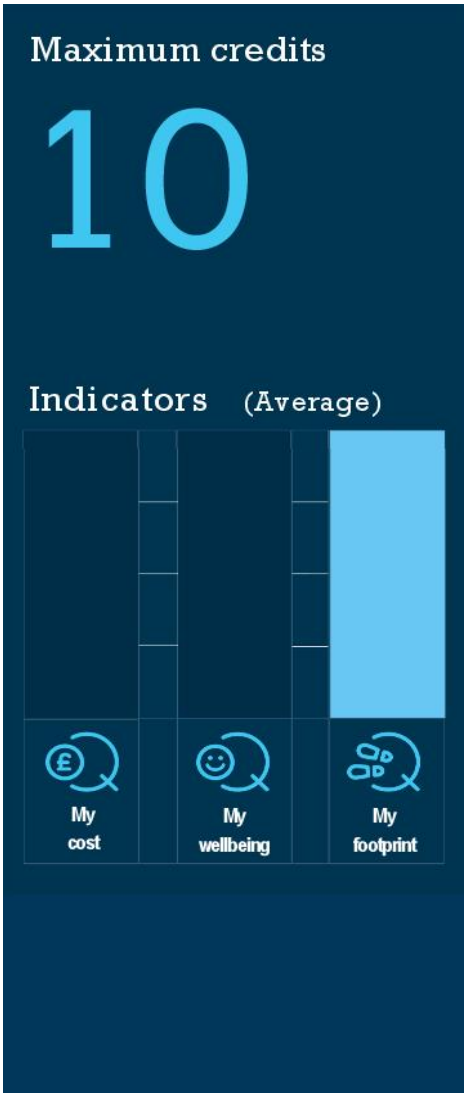
For the purposes of this issue, external space includes not only the approach to the home (such as the driveway), but also access to other functional spaces around or outside the home (for example access to the waste storage, parking, and external drying space).

Internal functional space

This refers to internal occupied space, including:

1. Bedrooms.
2. Kitchens.
3. Living rooms.
4. Dining rooms.
5. Bathrooms.

7.3 Recyclable Waste



Aim

To provide occupiers with suitable options for storing and disposing of recyclable waste, and reducing the amount of waste that goes to landfill by making it more convenient to store recycling in the home before it is collected.

Benefit

- Encourages occupants to recycle, which reduces their environmental footprint.
- Provides convenient, well-integrated waste- storage areas in suitable areas that do not affect health and safety in the home.

Context

The aim for this issue is to encourage and reward developments that reduce, recycle or re-use their waste. To encourage the reduction of waste sent to landfill, it is important to provide enough storage areas in the home for the types of recyclable waste that are collected by the local waste authority. This makes it as clear and convenient as possible for occupants to separate waste accordingly.(126)(127)(128)

Credit Summary

Criterion number	Title	Credits
crit 1	01 Home information	Prerequisite
crit 2	02 Consultation with the waste collection authority	2
crit 3–crit 4	03 Internal waste storage	5
crit 5	04 Composting facilities and management	3
Total credits available		10

Criteria

01 Home information **Prerequisite**

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 11.2 Home Information.

02 Consultation with the waste collection authority **2 credits**

crit 2 The waste collection authority is consulted to determine the waste collection patterns, identifying the:

crit 2.a: Number of recyclable waste streams, for example, paper, plastic, glass, food waste, composting and general waste.

crit 2.b: Type and size of waste collection containers (such as dedicated wheelie bins, boxes and communal bins).

03 Internal waste storage **5 credits**

crit 3 Dedicated internal space, with fixed units to store recyclable waste, is provided. The number of internal recyclable waste facilities should reflect the number of recyclable waste streams collected by the waste collection authority. Each individual bin (provided for different recycling waste streams) must be a minimum of 10L in volume.

crit 4 The combined capacity of internal recyclable waste facilities should be a minimum of:

crit 4.a: 30 litres for homes with 1–2 bedrooms.

crit 4.b: 40 litres for homes with 3 or more bedrooms.

crit 4.c: All homes are provided with dedicated internal space, with fixed units to store food waste that are a minimum of 10 litres in volume.

04 Composting facilities and management **3 credits**

crit 5 All homes are provided with composting facilities, for garden or food waste, in the form of one or more of the following:

crit 5.a: Individual home-composting facilities.

crit 5.b: Local communal facilities within 50m from the main entrance to the home via Safe pedestrian routes .

crit 5.c: Composting collection services run by the waste collection authority.

Methodology

Phased or multiple home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Frequency of collection

Where collection frequencies are greater than once a week, the size of recyclable waste storage can be amended accordingly.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 2	02 Consultation outputs	Documentary evidence of the consultation process, including the content and findings from this.	

Checklists, Tables & Illustrations

None.

Definitions

Composting

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

Recycling and composting facilities

All recycling and composting waste facilities must be:

1. Located in a dedicated position.
2. Easily accessible to all users.
3. Integrated within the design of the home achieving reduced visual impact.
4. Storage locations are durable, low maintenance and cleanable.
5. Managing odour and noise issues.
6. Addressing health and safety issues (including fire and vermin).

Safe pedestrian routes

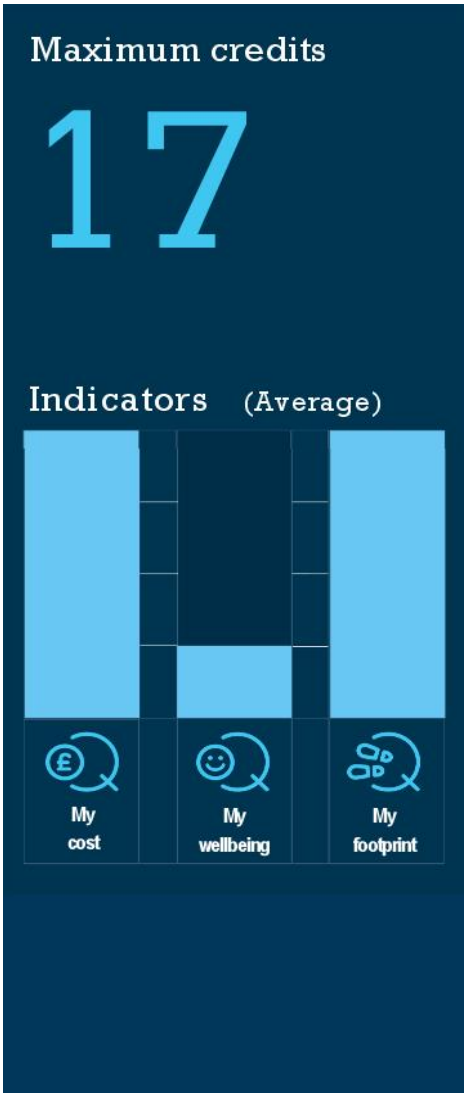
Pedestrian routes on the development site, within control of the developer are deemed to be safe and accessible for all pedestrian users (including people with disabilities, the elderly and children), where they take into account physical limitation of those who may use them, for example, providing steps appropriately supported by slopped access and dropped curbs positioned at crossing points. These routes and associated spaces are appropriately sized, with good visibility of the route ahead. Alongside these principles they should also meet the following requirements:

1. Where required, lighting design must be in accordance with BS 5489-1:2020 *Design of road lighting - Lighting of roads and public amenity areas*[129] (rural areas are exempt from this requirement).
2. At crossing points there must be appropriate pedestrian crossings (such as zebra or pelican crossings) in place or a clear line of sight for at least 50m in each direction on roads with a 30mph speed limit or 100m in each direction on roads with a speed limit greater than 30mph).
3. On roads with a speed limit of 30mph (or higher) there is a clearly defined footpath.
4. All footpaths provided should be at least 900mm wide. In rural areas, on single track roads, a grass verge can be accepted in place of a footpath.
5. On clearly defined home zones, it is acceptable for pedestrian routes to use the road.

Pedestrian routes that are outside of the development site and therefore not within the control of the developer do not need to meet the above requirements. However, it must be demonstrated that there is a pedestrian route, which is not shared with vehicular traffic, from the site boundary to the composting facility (for example, via pavements, footpaths, pedestrian crossings). The route shall be signposted.

8 Water

8.1 Water Efficiency



Aim

To reduce the amount of mains water used in the home.

Benefit

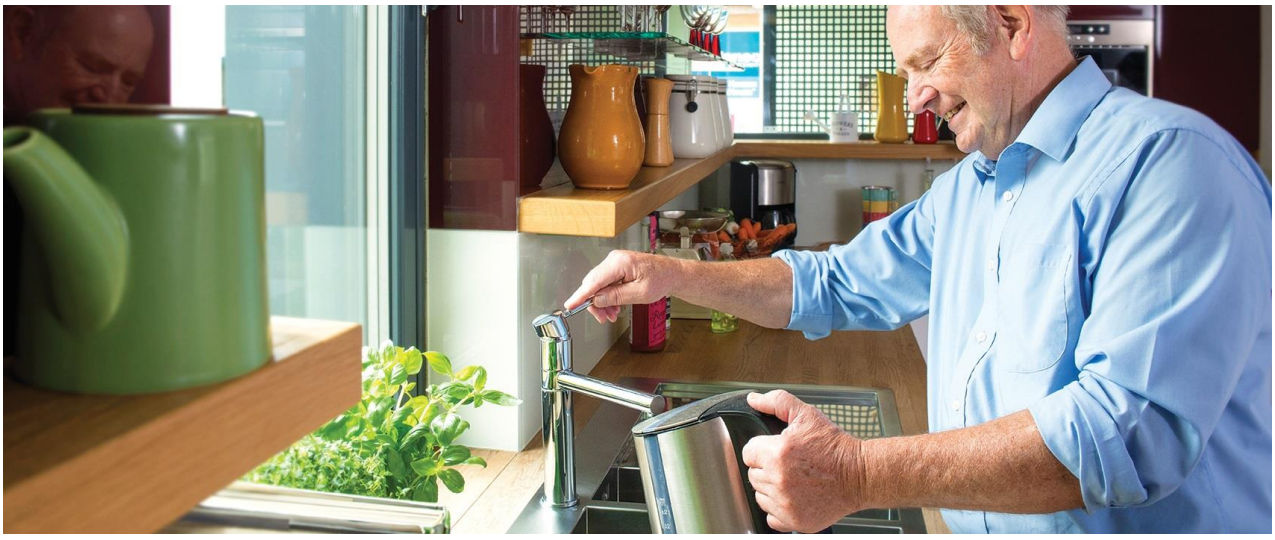
- Reduces occupants' costs for both water bills and energy bills (through heating water).
- Reduces environmental impact by making sure that valuable resources are used efficiently.
- Reduces planning limitations and costs associated with improving local water infrastructure for developers where homes within a new development use less mains water.

Context

The availability of water to meet occupiers' demands is a basic expectation for any home. The UK is expected to face a shortfall of up to 16% of the total water demand in the 2050s and up to 29% in the 2080s, leading to major effects on cost and resource levels.(130)

We need to use our water supplies efficiently to reduce the effect homes have on water resources, helping to make sure there is enough water for everyone. This is mainly influenced by how people use water in the home, but can also be helped by providing water-efficient fittings and water recycling systems (in that order of priority) within our homes.

For England, this issue builds on Approved Document G of the building regulations by first encouraging people to use water efficiently, and then to recycle greywater (water from baths, showers, washing machines and so on) and rainwater. The optional fittings standard (see Table 51) is from Approved Document G.



Credit Summary

Although Approved Document G[131] is only applicable in England, for the purposes of HQM it should be applied to Scotland, Wales, and Northern Ireland where required by the criteria.

Criterion number	Title	Credits
crit 1	01 Water efficient fittings	up to 11
crit 2–crit 3	02 Water recycling	up to 6
Total credits available		17

Criteria

01 Water efficient fittings **up to 11 credits**

crit 1 The requirements in Table 49 are met:

Table 49 Water efficient fittings

Credits	Water fittings standard (see Table 51)	Modelled water consumption (l/p/d) calculated in accordance with Appendix A of Approved Document G[132]
5	6 water fitting categories in the Optional fittings standard	110
8	All water fitting categories in the Optional fittings standard	110
11	All water fitting categories in the Advanced fittings standard	100

02 Water recycling **up to 6 credits**

crit 2 crit 1 has been achieved.

crit 3 Rainwater or greywater recycling systems have been specified and it is demonstrated that there is sufficient water supplied by these systems to offset the total demand for WC flushing for the home in accordance with Appendix A of Approved Document G[133]and Table 50.

Table 50 Demand for WC flushing met by rainwater or greywater

Credits	Percentage of total demand for WC flushing met by rainwater or greywater
3	≥50
6	100

Methodology

For the purposes of a HQM assessment, the water consumption for a washer dryer should be determined using the 'Water consumption (total)' and the 'Capacity (kg) Washing' figures quoted on the EU Energy Label. To calculate the water consumption (litre or kilogram figure) divide Water consumption (total) by Capacity (kg) Washing.

Water fittings efficiency performance data

The water efficiency of fittings should be determined from the figure quoted on the Unified Water Label (see uwla.eu).

Products that do not have a Unified Water Label can be recognised. However, in order for such products to be recognised, the following evidence for the purposes of HQM is required:

1. Confirmation of the water consumption figure (for example from manufacturer's literature).
2. Confirmation that the water consumption figure has been calculated in line with the methodology used for the Unified Water Label.

Rainwater recycling is specified

Where individual or communal rainwater recycling systems are specified, the system has been designed and installed in accordance with BS EN 16941-1:2018 *On-site non-potable water systems - Systems for the use of rainwater*(134).

To demonstrate compliance with crit 3,water collected by rainwater recycling systems must be reused in the home. Where this is not the case, the rainwater recycling system is not reducing the potable water consumption within the home and therefore cannot contribute to compliance within 02 Water recycling.

Greywater recycling is specified

Where individual or communal greywater recycling systems are specified, the system has been designed and installed in accordance with BS 8525-1:2010 - Greywater systems. Code of practice(135).

To demonstrate compliance with crit 3, water collected by greywater recycling systems must be reused in the home. Where this is not the case, the greywater recycling system is not reducing the potable water consumption within the home and therefore cannot contribute to compliance within 02 Water recycling.

Phased or multiple home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
All	02 Water efficiency calculator for new homes	A completed copy of the tool.	
All	03 Data used to complete the calculator tool	Documentary evidence supporting the data used to complete the calculator tool.	

Checklists, Tables & Illustrations

Table 51 Water fittings standards

Water fitting	Optional fittings standard	Advanced fittings standard
WCs	≤ 4/2.6 litres dual flush	4/2 litres dual flush (maximum 3 litres effective flushing volume)
Showers	≤ 8L/min	≤ 6L/min
Baths	≤ 170 litres	≤ 170 litres
Basin taps	≤ 5L/min	≤ 5L/min
Kitchen sink taps	≤ 6L/min	≤ 6L/min
Dishwashers	≤ 1.25L/place setting	≤ 1.25L/place setting
Washing machines and washer dryers	≤ 8.17L/kilogram	≤ 8.17L/kilogram

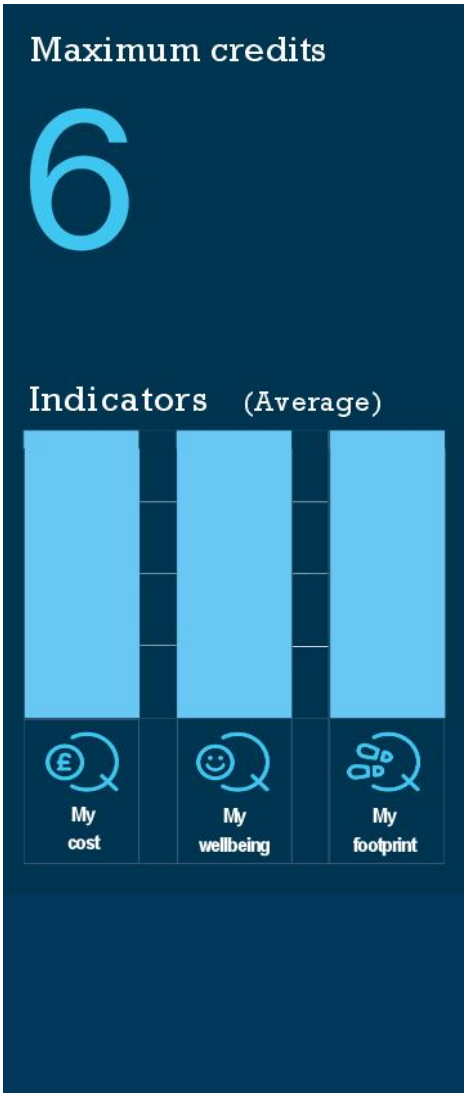
Definitions

None.

Delivery

9 Quality Assurance

9.1 Project Preparation



Aim

To encourage procedures that improve the overall quality of the home and reduce the difference between predicted and actual performance in the home.

Benefit

- Helps developers provide homes that perform closer to their predicted performance levels.
- Gives confidence to consumers, developers, regulators and policymakers on the likely effects and benefits of new homes.
- Increases the build quality of homes and reduces the likelihood of both short and long-term construction-related difficulties that cause increased costs and disruption to occupants.
- Makes sure that homes are as affordable as they can be for consumers while meeting their needs.

Context

The gap between designed and actual performance is well recognised by building industry and Government as a key challenge to improving the quality of homes. This gap is especially recognised in connection with energy performance, but it goes much further than this, affecting the ability of homes to meet occupants' needs across a wide range of performance requirements, including health and wellbeing and long-term build quality. Among others, Zero Carbon Hub's research[136] and the principles of soft landings (developed by BSRIA[137] and Government[138] to help encourage decisions made during projects that improve building performance and meet occupiers' expectations), identify methods of reducing this gap. This includes promoting working in partnership, applying lessons learned from previous projects and making sure a 'golden thread' of quality control is maintained throughout the project to provide a quality development.

Credit Summary

Criterion number	Title	Credits
crit 1–crit 2	01 Feedback from previous projects	4
crit 3–crit 4	02 Project delivery plan	Minimum requirement
crit 5	03 Product procurement and substitution policy	Minimum requirement
crit 6	04 Dissemination of information	Minimum requirement
crit 7–crit 9	05 Site worker feedback	2
Total credits available		6

Criteria

01 Feedback from previous projects **4 credits**

crit 1 Where it is demonstrated that lessons learnt from previous projects have been incorporated into the assessed home following the process set out in the Methodology.

crit 2 During design brief (typically RIBA stage 1 or equivalent) an outline delivery plan (see Outline delivery plan) has been developed which is kept up to date as the project progresses.

02 Project delivery plan **Minimum requirement**

crit 3 Before detailed design has started (typically RIBA stage 3 or equivalent) the Project delivery stakeholders have met to discuss:

- crit 3.a: Project design and client requirements with regards to meeting HQM compliance.
- crit 3.b: Roles, responsibilities, and the contribution of each member of the project delivery team to meet the above.
- crit 3.c: HQM performance targets to be achieved are Formally agreed.

Refer to Checklists, Tables & Illustrations section to see topics to be covered under each of the above areas.

crit 4 Before any activities (including clearance/ demolition or any other construction activity) have started on-site (typically RIBA stage 4 or equivalent):

- crit 4.a: A set of actions to manage the construction process and build quality are established and an inspection routine and the format of the construction record have been set.
- crit 4.b: A set of actions are established for managing risks of poor performance by adapting design or introducing procedures to ensure appropriate site operatives are aware of how to manage these risks during construction and handover.
- crit 4.c: A schedule of commissioning and testing that identifies and includes a suitable time scale for commissioning of all building services and control systems and testing building fabric, in line with appropriate commissioning best practice guidance.
- crit 4.d: The principal contractor accounts for the commissioning and testing programme, responsibilities and criteria within their budget and main programme of works, allowing for the required time to complete all commissioning and testing activities prior to handover.
- crit 4.e: A target for the home's air permeability (m^3/hm^2at 50Pa) is agreed and a strategy for how it will be met is established, including: roles and responsibilities, how performance will be monitored and details of any testing that will be carried out.

Where fabric pre-testing (crit 4-crit 5) or post construction (crit 6) criteria under issue 9.2 Commissioning and Testing are pursued, an AQP (in line with Table 54), agree the testing strategy to ensure there is enough time and resources for: carrying out testing, giving feedback, and carrying out adequate remedial work if testing reveals this is needed.

crit 4.f: A set of actions have been established to manage fabric commissioning and testing, fabric pre-testing and commissioning of building services and controls.

crit 4.g: The project delivery stakeholders have discussed and agreed on the project's post -construction and handover requirements.

03 Product procurement and substitution policy **Minimum requirement**

crit 5 The client or the principal contractor has a product procurement policy that:

crit 5.a: Sets out performance requirements for products and specifications to be procured for the assessed project. The performance requirements should:

crit 5.a.i: Encourage products and specifications, to be procured according to best practice standards.

crit 5.a.ii: Encourage specifications that lead to high build quality.

crit 5.b: Sets out instances where substitutions will be allowed and what should be taken into account when considering substitutions (see Product substitutions).

crit 5.c: States clearly that any substitution of products or specification will need to meet the performance requirements set out for the project. It should set out clear approval and verification procedures for the contractor to follow when substituting products. It should include a requirement for the contractor to provide details of substitutions and recorded evidence to demonstrate that substituted products meet performance requirements.

04 Dissemination of information **Minimum requirement**

crit 6 Processes are in place to ensure communication of crit 3 & crit 4 and Key considerations to all relevant trades (for example via toolbox talks, briefings, meetings, BIM, graphic examples of good workmanship on-site) as appropriate for their specific involvement. Information should be communicated in an understandable way, in an appropriate language, which includes the following content as a minimum in order to:

crit 6.a: Promote good practice of workmanship and highlight potential issues that can undermine build quality for the elements at key stages throughout construction.

See the ZCH Builders Book for examples of good practice for many of the elements within the scope of this issue.

crit 6.b: Explain processes for ensuring quality on- site, including the role of the appropriately qualified person and how they can help.

crit 6.c: Explain what the construction record is for and how site operatives need to contribute to it.

crit 6.d: Clarify the process for making design and materials substitutions.

crit 6.e: Highlight areas where their work could impact (positively or negatively) on performance of other elements in terms of areas such as energy performance, and health and wellbeing.

05 Site worker feedback **2 credits**

crit 7 The client or the principal contractor has a documented policy and procedure in place to enable staff to make protected disclosures.

crit 8 The policy should clearly:

crit 8.a: Communicate the significance that the company attaches to identifying and resolving wrongdoing.

crit 8.b: Encourage workers to raise concerns within their organisation as soon as possible and to give them the confidence to do so.

crit 8.c: Remind workers of the standards of behaviour expected of them.

crit 8.d: Ensure workers know whom to approach with a concern, and enable them to bypass the person, management level or part of the organisation to which the concern relates.

crit 8.e: Include an option to raise concerns anonymously and set out a process for it.

crit 8.f: Outline the procedures for investigating disclosures and what steps might be taken if wrongdoing is uncovered.

crit 8.g: Set out safeguards for those making genuine disclosures.

crit 8.h: Communicate what will happen to those who victimise genuine disclosures or abuse the system by making malicious allegations.

crit 8.i: Provide access to further sources of advice and guidance on making disclosures.

crit 9 The principal contractor is responsible for prominently displaying the policy and contact details on the construction site and has ensured all site workers and the client (where a policy has been put in place by the principal Contractor under crit 7) have been made aware of the policy.

Methodology

Feedback from previous projects

The steps to assess crit 1 are as follows:

1. An individual has been appointed who will be responsible for facilitating the lessons learnt activities and its implementation in the assessed project.
2. Residential projects completed in the past two years that are similar (for example, in size, budget, location, or project brief) to the assessed project have been identified. Mixed use developments (mix of residential and commercial) can be considered.
3. In the early stages of the project the following information is gathered about the selected past projects:
    a. Best practice in design specification, construction and procurement.
    b. Areas of improvements.

    One or more of the sources below can be used to collect information on the previous project: customer satisfaction surveys, performance reviews, aftercare support records, complaints received, post occupancy evaluations, seasonal commissioning activities, snagging issues identified in past projects, record of repair works carried out and warranty claims.

    c. Risks to avoid.
4. The causes of issues in past projects have been investigated and solutions identified to address them in the assessed project to avoid defects or mistakes, or to repeat successes.

    Identified solutions can include improvement to one or more of the following areas as relevant: design, project delivery process, construction techniques, construction process or sequencing, procurement, testing procedures and monitoring, methods, training and upskilling of labour, handover procedures and services.

    Improvements can also relate to organisation wide improvements to address recurring issues.

5. A report detailing all lessons learnt activities is developed and made accessible to all in the organisation for future reference. The report should include as a minimum:
    a. Details of the selected previous projects.
    b. Feedback and records used from previous projects.
    c. Issues investigated and solutions identified to address them along with justification as to why the particular solution was thought to be the best way to resolve the issue.
    d. Improvements in the assessed project.
    e. Expected results.
    f. A framework for monitoring improvements and measuring success of the solution.

Outline delivery plan

This could be a generic document adopted by an organisation which has been adapted as far as possible to suite the assessed project.

Product substitutions
When substituting products, the following should be considered: any applicable requirements for product performance and compliance, the substituted product's interaction with other building products and systems and its overall impact on HQM requirements and targets, in order to avoid any negative impact on performance of this or any other design features.

Key considerations
The Zero Carbon Hub (2014) outlines the following general guidance regarding key considerations relating to reducing the performance gap, which must form part of what is disseminated to site operatives in crit 6:

- The importance of closely following the details within the drawings and specification.
- Feeding information back to the site management team where drawings are inadequate.
- Sequencing the installation of specific materials into difficult areas such as complex roof construction and loft eaves.
- Helping individuals to understand their role in maintaining items such as the airtight barrier.

Compliance Notes
Please visit the BREEAM Knowledge Base to access the compliance notes related to this issue.

Evidence

Criterion Reference	Title	Design Stage
All	General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.
crit 1–crit 2	01 Feedback from previous projects	A copy of the reports detailing all lesson learnt activities and an outline of the specification.
crit 5	03 Product procurement and substitution policy	A copy of the procurement policy and recorded evidence (for example, photographs) that the substituted products installed have been approved.
crit 6	04 Dissemination of information	Evidence of dissemination of all required information to relevant parties.
crit 7–crit 9	05 Site worker feedback	Evidence of documented policy for making protected disclosures.

Checklists, Tables & Illustrations
The following topics should be covered as a minimum under each of the areas for crit 3:

- Project design and client requirements:
  - design aims and design strategy.
  - budget.
  - end user requirements.
  - project phases.
  - maintainability and adaptability of the proposals.
  - lessons learnt from previous projects (where relevant).
  - specific system requirements (where relevant).
  - HQM performance targets.
- Project delivery requirements:
  - construction process and approach.
  - quality management.
  - inspections.
  - construction record.
  - general and specific risks to the project, relating to typical sources of poor performance including the elements outlined in 9.3 Inspections and Completion.

- Post-construction and handover requirements:
  - requirements for specific commissioning.
  - testing.
  - aftercare support.
  - Post occupancy evaluation (where pursued).
  - end user documentation including home information.

Definitions

Formally agreed

The term 'formally agreed' relates to the performance strategy targets crit 3. In addition to the strategy itself, formal agreements may include a contract or letters of appointment with the architect and with other relevant project team members.

HQM performance targets

HQM performance targets refer specifically to the HQM rating and key performance indicators targeted. Although individually targeted HQM issues or credits may be traded over the course of the project as it evolves, it is recommended that these are targeted or prioritised to ensure that the agreed performance target is achievable and achieved without potentially costly alterations to the design at a later stage.

Post occupancy evaluation

Post Occupancy Evaluation (POE) is the umbrella term for the process of obtaining feedback on the performance of a recently completed new building or refurbishment. Over time the value of POE has been recognised not only as a one-off evaluation of a recently completed project, but as an ongoing assessment process for any building in use that should be conducted at regular intervals over the building's life cycle.

For further guidance regarding POEs, please refer to the references outlined in 11.4 Post Occupancy Evaluation.

Project delivery stakeholders

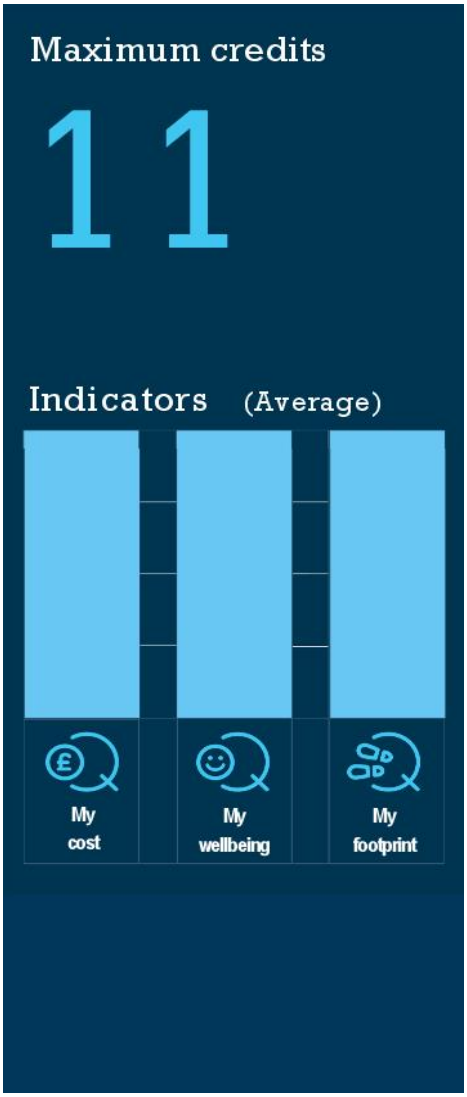
The purpose of the project delivery plan criteria is to reflect the need to consider the input of all the major project stakeholders from the earliest practical stage, to ensure smooth and successful delivery of the project's sustainability objectives.

Project delivery stakeholders therefore include the client, the building occupier or their representative (where known), the design team, the principal contractor and their sub-contractors (where their involvement is deemed necessary by the principal contractor). Concerning contractors' involvement, it ensures their input in terms of formulating sustainable design solutions, commenting or inputting on the practicality and buildability of (one or more) design solutions and their impact on factors such as programming or cost.

It is recognised that traditionally for some projects, the contractor for the works might not be appointed at the early stages of the project and therefore compliance with some criteria within this issue would not be possible. In these instances, to ensure the aim of the criterion is upheld, a suitably experienced person with substantial construction or contracting experience in projects similar to the proposed works should be involved prior to appointment of the contractor.

A suitably experienced person could be a contractor appointed as a consultant for this stage or a construction project manager.

9.2 Commissioning and Testing



Aim

To make sure that homes and their systems are performing as designed when they are handed over to the occupiers.

Benefit

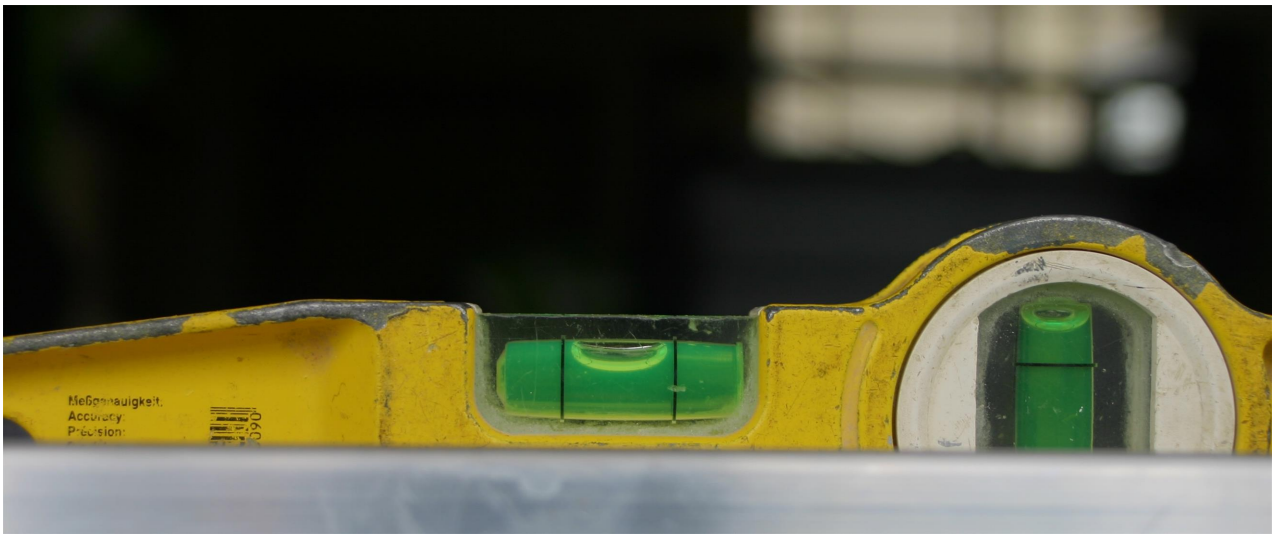
- Make sure running costs and energy efficiency are as close to design as possible.
- Increases the build quality of the home and reduces the likelihood of performance-related issues once the home is in use.
- Maintains customer satisfaction and the developer's reputation.

Context

Rigorous testing and commissioning at key development stages is important to make sure that the quality standards aimed for in design are met in practice.(139)

Although all controlled services that are covered the building regulations need to be commissioned (parts F, L and J), good- practice commissioning is often not carried out. Commissioning strategies are often over-optimistic and, if not effectively managed, can delay project completion, cause problems when the home is handed over to the occupier and result in poor performance.(140)

Testing a building's fabric helps to reveal any problems with home performance. If left too late, solutions are usually limited to temporary fixes, which can quickly fail over time, reducing the home's long-term performance. Pre-testing helps to make sure targeted fabric performance levels are met in practice when the main air barrier is still easily accessible, to make long-term repairs relatively easily, if needed. After construction is completed, further fabric testing helps to make sure targeted fabric performance is being met in practice, after the major work is finished and before the home is handed over to the occupier.



Credit Summary

Criterion number	Title	Credits
crit 1–crit 3	01 Commissioning building services and control systems	Minimum requirement
crit 4- crit 5	02 Fabric pre-testing	up to 4
crit 6–crit 7	03 Post-construction testing	up to 7
Total credits available		11

Criteria

01 Commissioning building services and control systems **Minimum requirement**

crit 1 Appropriate project team members have been appointed to conduct and manage commissioning activities.

crit 2 All building systems listed below that are present are commissioned in line with the manufacturer's guidance and appropriate commissioning best practice guidance by individuals who were not involved in the installation process:

- crit 2.a: Hot water.
- crit 2.b: Heating.
- crit 2.c: Ventilation.
- crit 2.d: Comfort cooling.
- crit 2.e: Low and zero carbon technologies.

crit 3 For buildings with complex building services and systems (for example, communal systems with a centralised plant), a specialist commissioning manager must be appointed to conduct and manage commissioning activities. They must be appointed during the design stage (by either the client or the principal contractor) to carry out the following responsibilities, in line with the Methodology:

- crit 3.a: Undertake design reviews and give advice on suitability for ease of commissioning.
- crit 3.b: Provide commissioning management input to construction programming and during installation stages.
- crit 3.c: Management of commissioning, performance testing, handover, post-handover stages.

02 Fabric pre-testing **up to 4 credits**

crit 4 A member of an appropriate body (referred to in the 'airtightness testing' part of Table 54) has been appointed to:

- crit 4.a: Determine the appropriate inspection and pre-testing methods for the site, using their professional discretion in line with the Methodology section and their professional body best practice guidance.
- crit 4.b: Provide quality assurance of the assessed home's fabric performance, including continuity of insulation, through inspection and air permeability testing, after the Primary air barrier is complete and while it is still accessible (see Methodology).
- crit 4.c: Outline recommendations to help meet the designed fabric performance standards at post-construction.
- crit 4.d: Broaden the sample size and carry out additional pre-testing of more homes if there is evidence of potential causes for the air test targets not being met for other dwelling types, which may affect other units not tested.

crit 5 The recommendations made as part of crit 4.c are carried out.

Table 52 Credits awarded depending on the proportion of homes that are inspected and tested (see Methodology)

Percentage of homes for each dwelling type (%)	Credits
25	1
50	2
75	3
100	4

03 Post-construction testing **up to 7 credits**

crit 6 Where post-construction testing and inspection of the integrity of the assessed home's building fabric is carried out, in accordance with an appropriate standard (see Table 54). Credits are awarded, depending on the aspects that are tested, in line with Table 53.

crit 7 Any remedial work is carried out before handover, to ensure the required performance characteristics of the home are met, where this is highlighted as needed from post-construction testing and inspection.

Table 53 Post-construction testing credits breakdown

Aspect	Credits
Air leakage paths (airtightness testing)	3
Continuity of insulation and thermal bridging (e.g. thermographic survey)	4
Air leakage paths, continuity of insulation and thermal bridging	7

Table 54 Appropriate testing standards

Testing method	Requirement
Airtightness testing	Carried out by professionals with membership of ATTMA (Air Tightness Testing and Measurement Association) or IATS (Independent Air Tightness Testing Scheme) attained at organisational level maintaining UKAS accreditation (as airtightness testing laboratories to ISO 17025). Airtightness testing is required by the Building Regulations but this may only happen on a sampling basis and would need to be performed on the specific home being assessed, for the purposes of meeting crit 6.
Thermographic survey	Carried out by a professional holding either: 1. A valid Level 2 certificate in thermography (as defined by the United Kingdom Thermography Authority (UKTA) website: www.ukta.org). Where a Level 2 thermographer is not available at the site, the survey may be undertaken by a Level 1 thermographer and then the images interpreted by a Level 2 thermographer OR 2. Awarding Body for the Built Environment (ABBE) Level 3 certificate in Domestic Infrared Thermography Class 1 Operators (as defined here www.abbeqa.co.uk) The thermographic survey must cover 100% of the treated spaces, unless it is a large complex building. The survey must ensure that all elements of the building fabric that enclose an internal heated or conditioned (treated) zone of the building will be tested. This includes internal walls separating treated and untreated zones.
Other methods	The criteria are focussed on airtightness testing and thermographic surveys because they are well established ways of assessing fabric performance. However, it is possible for alternative and innovative methods to be used as part of the testing approach for the purposes of these criteria if the same outcome is met, i.e. fabric performance has been evaluated and the sources of any issues are directly identified and are resolved through remedial works. For consideration of a specific testing approach, please send details to the HQM technical team, including: the procedures and standards being followed, the credentials of the individual carrying out the testing and how fabric performance is evaluated and quality assured.

Methodology

Seasonal commissioning

Any seasonal commissioning that is undertaken for complex services and systems should be carried out over the course of one year from the date of home completion, in accordance with commissioning best practice (see seasonal commissioning) and must include the following:

– Testing of all building services under full load conditions, i.e. heating equipment in mid-winter, cooling or ventilation equipment in mid-summer, and under part load conditions (spring, autumn).

– Re-commissioning of systems (following any work needed to serve revised loads), and incorporating any revisions in operating procedures into the operations and maintenance (O&M) manuals.

Where seasonal commissioning is conducted during occupancy, it is possible that this may contribute to meeting some of the criteria outlined in 9.3 Inspections and Completion issue regarding early and seasonal inspection visits.

Pre-testing

Inspection and pre-testing needs to be carried out after any works are finished that can risk undermining the primary air barrier (see definition). For example, after the principal penetrations have been made for: services, electrics, plumbing, drainage and extractions. It also needs to happen before the air barrier is covered up so it is still accessible for thorough inspection and any potential remedial works that are recommended by the appropriately qualified person. Leaving it later than this can lead to costly remedial works, a risk of poor performance, and non-compliance with regulatory requirements and fabric performance targets.

The appropriately qualified person needs to be satisfied that this is done in an adequate way to identify and resolve any problems that may affect the fabric performance standards, agreed in the commissioning and testing strategy, from being met in practice and maintained throughout occupation.

Pre-testing regime

Where pre-testing is not carried out on all homes, the AQP's testing regime needs to be appropriate for the type of project being assessed. Sampling must be carried out using a staggered approach, starting with a higher proportion of the first homes built being tested and reducing the number of homes tested as more are built, unless problems emerge (crit 4.d). Evidence needs to demonstrate how the AQP has determined the regime, including their justifications.

As an example, if 25% of homes are being tested on a site of 100 homes of the same dwelling type, it may be appropriate for the first 5 homes built to be tested, followed by 20 additional homes at decreasingly regular intervals (i.e. a higher proportion of homes at first).

Post-construction testing – temporary sealing

For the purposes of crit 6, short term remedial measures carried out, such as using mastic on the secondary air barrier, are only acceptable when used within the guidelines outlined in TIL001—Temporary Sealing Guidance (ATTMA, 2015).

The appropriately qualified person must be satisfied that any remedial measures will reasonably last the lifetime of the home and are in line with best practice.

Where temporary sealing is applied, documentary evidence needs to be provided showing where this is used (this should be included as part of the construction record in the 9.3 Inspections and Completion issue).

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes related to this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 1 - crit 3	01 Commissioning building services and control systems	A copy of the commissioning and testing strategy.	
crit 6	03 Post-construction testing	Refer to General evidence requirement above.	Thermographic survey and a level 2 thermography certificate (or equivalent, where a thermographic survey has been carried out).

Checklists, Tables & Illustrations

None.

Definitions

Commissioning best practice

For guidance on commissioning, refer to the sources below (where appropriate for systems installed):

BSRIA Commissioning Guides: Application Guide 1/91:

- Commissioning HVAC Systems: Guidance on the division of responsibilities (TM1/88.1).
- Commissioning of Air Systems (BG49/2013).
- Pre-Commission Cleaning of Pipework Systems (BG29/2012).
- Commissioning Water Systems (BG 2/2010).
- Commissioning Job Book – A framework for managing the commissioning process (BG 11/2010).
- Seasonal Commissioning (BG 44/2013).
- Domestic ventilation systems – a guide to measuring air flow rates (BG 46/2015).

CIBSE Commissioning Codes: Set of Seven Codes (2003):

- CIBSE Commissioning Code A: Air Distribution Systems (1996 confirmed 2006). ISBN: 9780900953736.
- CIBSE Commissioning Code B: Boilers. ISBN: 9781903287293.
- CIBSE Commissioning Code C: Automatic Controls. ISBN: 9781903287132.
- CIBSE Commissioning Code L: Lighting (SLL Commissioning Code L). ISBN: 9781903287323.
- CIBSE Commissioning Code M: Commissioning Management. ISBN: 9781903287330.
- CIBSE Commissioning Code R: Refrigerating Systems. ISBN: 9781903287286.
- CIBSE Commissioning Code W: Water Distribution Systems. ISBN: 9781906846152.

CIBSE / ADE CP1 Heat networks: Code of Practice for the UK (2020).

CSA:

- www.csa.org.uk.

The institute of engineering and technology:

- Photovoltaics (PV), IET code of practice.

Commissioning parts from Microgeneration certification scheme guidance:

- Solar Thermal (ST): MIS3001 and associated references.
- Small Wind: MIS3003 or BWEA standards (now Renewable UK).
- Biomass: MIS3004.
- Heat pumps: MIS3005.
- Micro-CHP: MIS3007.

BRE Trust:

- Wiltshire R, Williams J, & Woods P, (2014) A technical guide to district heating, BRE Trust.

Where other LZC technologies are present that are not mentioned above, please contact BRE for further guidance on how to proceed for the purposes of this issue.

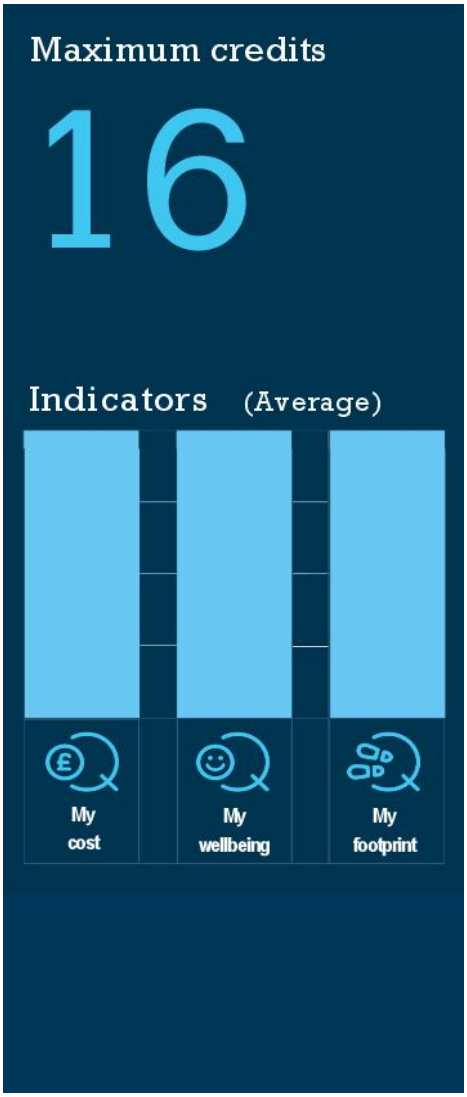
Primary air barrier

The construction product layer or layers that provide the majority of the envelope's resistance to the movement of air from wind, passive or mechanical sources. The barrier may be a combination of materials and components.

Remedial works

Where systems or services fail commissioning or are not performing as expected, remedial works are the measures taken to ensure systems and services pass commissioning. These measures may involve performing repairs and adjusting settings appropriate to the particular home being commissioned. These measures may also involve providing guidance or advice to occupants, where poor performance is partly due to how they are interacting with their systems or services (for example, where seasonal commissioning is carried out). The remedial works implemented must be in accordance with the recommendations made by the Commissioning strategy.

9.3 Inspections and Completion



Aim

To increase confidence that the home is capable of meeting its specified performance targets and a high level of build quality.

Benefit

- Helps to give unbiased assurance of quality during the design, throughout the construction and after the home is completed.
- Improves customer satisfaction by making sure homes are finished to a high standard before the occupants move in.
- Reduces risk of poor performance when a home is used, benefiting investors, warranty providers and other stakeholders.
- Reduces performance gaps to enhance the total value of the home.

Context

Building warranty and building-control processes are designed to provide inspections of homes at different stages of the development, to highlight and deal with any failures in meeting warranty standards or building regulations. Support from building warranties, developers and schemes like the Consumer Code for Home Builders help owners and occupants to deal with any faults within the early stages of the home, if these occur.

To deliver high-quality homes, project teams need to go beyond this by establishing well-thought-out plans during design(141) that are followed up with thorough, independent inspections of all homes, at key stages during construction(142) and when homes are completed(143), to make sure they are finished to a high standard. This, combined with a clear record of the quality measures taken, can encourage a culture of accountability, reassure occupants and help to deal with any faults or disputes(144). Delivering high-quality homes doesn't stop at completion. Visits from aftercare support teams help deal with any issues that are only noticed once occupants have moved in and when allowing for different seasons(145). This can increase occupants' satisfaction and reduce the gap between actual and expected performance.

Credit Summary

Criterion number	Title	Credits
crit 1–crit 2	01 Visual defects inspection	Minimum requirement
crit 3	02 Construction inspections	Minimum requirement
crit 4–crit 5	03 Construction record	Minimum requirement
crit 6–crit 9	04 Right to inspect	2
crit 10	05 Feedback dissemination	1
crit 11	06 Third party verification	5
crit 12	07 Early inspection visit	4
crit 13	08 Seasonal inspection visit	4
Total credits available		16

Criteria

01 Visual defects inspection **Minimum requirement**

crit 1 An appropriately qualified person, who is independent from site activities (i.e. not checking their own work) has done the following, before the occupant moves in:

- crit 1.a: Carried out a visual defects inspection of all the aspects in the visual defects inspection table (see Methodology), to check installation and finishes are in line with the specification.
- crit 1.b: Identified, monitored and reported on any remedial work that is needed, to the developer or client.
- crit 1.c: Ensured the home is finished and habitable, including the following:
  - crit 1.c.i: Access to the home is safe and clear (for example, unobstructed by construction works), including drives and pathways to the home.
  - crit 1.c.ii: There are no health and safety hazards inside the home.
  - crit 1.c.iii: Electrics and plumbing are all functioning.
  - crit 1.c.iv: All Active systems inside the home are installed, working and ready for occupant use.
  - crit 1.c.v: All fixtures and fittings are installed and finished.
  - crit 1.c.vi: Finishes and decoration are completed internally and externally.

crit 2 The results of the visual defects inspection and any outstanding remedial work are reported and given to occupants before they move in as part of their home information.

02 Construction inspections **Minimum requirement**

crit 3 Where an Appropriately qualified person is based on-site and has done the following, as a main part of their role:

- crit 3.a: Outlined and agreed the strategy, roles and responsibilities for meeting the 02 Construction inspections criteria, as part of the activities in the 'project delivery plan' criteria in the 9.1 Project Preparation issue.
- crit 3.b: Carried out systematic and scheduled inspections of build quality for all assessed homes at key stages throughout construction and ensured they comply with the home's required performance characteristics, including the following, as a minimum:
  - crit 3.b.i: Design specifications.
  - crit 3.b.ii: Warranty standards.
  - crit 3.b.iii: Building Regulations, planning permissions and other local authority and statutory requirements.
- crit 3.c: Ensured any design variations or materials substitutions are appropriately managed and approved by an appropriate member of the design team or the client.

03 Construction record **Minimum requirement**

crit 4 Where an Appropriately qualified person has been appointed to ensure a Construction record is kept throughout the construction stage that demonstrates the quality assurance measures taken to meet the home's required performance characteristics.

crit 5 The record is available to:

crit 5.a: Site operatives throughout the construction stage for them to directly contribute to, as appropriate.

crit 5.b: Occupants on request, as part of any visual defects inspections and when moving in. It needs to be available for the duration of the building warranty in place (see 11.1 Aftercare: crit 1 on page 217).

04 Right to inspect **2 credits**

crit 6 Potential owners of the home are given the right for them, or their own independent representative (not provided or recommended by the developer), to carry out their own, non-invasive, visual inspection or snagging check. This may be carried out up to one month before committing to buy the home, or up to one month before completion of the build and purchase if the home is not built at the time of committing to buy (for example, if buying off plan). The notification of this right is prominently given within the property sales materials.

crit 7 The home's specification and construction record is available to the potential owner or their representative carrying out the inspection.

crit 8 Any snagging issues, defects or inconsistencies with the home's specification that are identified by the visual defects inspection in crit 6 are resolved within 28 days after completion of the property purchase.

crit 9 Any activities referred to in the occupant's right to inspect do not impact the statutory rights owed by the developer to the purchaser in any way.

05 Feedback dissemination **1 credit**

crit 10 Where the Appropriately qualified person for the 02 Construction inspections criteria provides feedback on any lessons learnt and examples of good practice, regarding quality assurance from activities on the assessed site, to the developer, client, consultants and designers, to inform future projects via recorded meetings or an easily accessible platform.

06 Third party verification **5 credits**

crit 11 The appropriately qualified person appointed to carry out the role in the 02 Construction inspections criteria is an Independent third party.

07 Early inspection visit **4 credits**

crit 12 Where a contracted commitment is in place for a visit to be made, between four and six weeks after occupants have moved in, that includes the following:

crit 12.a: An inspection of the active systems referred to in 11.1 Aftercare: 02 Handover visit on page 217 to check they are functioning in line with their design intent and manufacturer's guidance. If needed, the following actions are taken to ensure the active systems are functioning as intended: repairs, remedial works, recommissioning, replacement or guidance given to occupants.

crit 12.b: Rectify any problems regarding the home (such as fixtures and fittings). For example, as a result of any snagging issues or defects not previously identified or resolved.

crit 12.c: Adapt any systems to reflect occupant usage patterns and individual preferences as appropriate.

08 Seasonal inspection visit **4 credits**

crit 13 Where a contracted commitment is in place for a visit to be made, between eight and twelve months after the occupant has moved in, to do the following:

crit 13.a: Carry out the same checks referred to in the 07 Early inspection visit criteria.

crit 13.b: Make any adjustments or provide occupants with guidance to ensure the home and its systems are performing as expected throughout the year, allowing for seasonal variation.

crit 13.c: Offer to check heating bills and take action to investigate and ensure homes are performing in line with their design intent. For example, this may include a combination of:

crit 13.c.i: Occupant guidance where occupant behaviour is a significant factor.

crit 13.c.ii: Remedial measures to address any sources of unexpected heat loss, where this is identified by testing such as thermal imaging at junctions and meeting points.

crit 13.c.iii: Systems adjustments or replacement where they are not running efficiently or are faulty.

crit 13.d: Offer to align any inspection visits with visits required for meeting criteria for the 11.4 Post Occupancy Evaluation issue, as appropriate.

Methodology

Visual defects inspection

The visual defects inspection should cover all aspects of the home that are possible to check visually including superstructure, finishes, building services and external works.

Visual defects inspection at completion (crit 1), provides a useful opportunity to address any problems, before occupants move in, to avoid the chance of early problems or complaints and therefore improve the handover process. However, checks made as part of the 'construction inspections' criteria are needed to ensure quality standards are being achieved, and any defects that are only visible at certain stages are revealed and resolved early on. Doing this will help homes pass visual defects inspections at completion, without delays and potentially costly remedial works, and improve the home's long-term performance.

Construction inspections scope

The appropriately qualified person needs to determine the scope of the construction record and scheduled inspections (where pursuing the construction inspections criteria), to ensure it is appropriate for the assessed project. This is likely to vary depending on the construction methods used, the project type and the quality assurance processes being considered. The table below outlines items that would be typically required for compliance with the construction inspections criteria and gives examples of the key stages of inspection that should be carried out, based on a traditional brick and block construction scenario.

However, please note that this list is not exhaustive, and has been provided to illustrate the scope of elements and stages that are expected to be quality assured as part of the criteria.

Table 55 Inspections scope

Building elements	Key stages of inspection
Substructure (e.g. foundations, excavations, service entries)	– Excavations and foundations in and before concrete is filled in – Throughout foundations
Damp proof course (e.g. below thresholds, upper or lower levels)	– DPC level installed – After blown cavity insulation
External and party walls (e.g. wall ties, cavity trays, cladding, tolerances, air/moisture barrier)	– During wall construction (e.g. while the cavity is still accessible) – At completion
Insulation (e.g. continuity, roofs, floors, services, at junctions, blown insulation drill points)	– Installation of: walls, roofs, lofts and lowest floors. – Before first fix – After services installed – At completion
External windows and doors (e.g. size tolerances), garage doors	– Window and door installation – During construction of blockwork (if applicable) – After blown cavity insulation

Building elements	Key stages of inspection
Floors	– Floor installation
Roofs (e.g. mortar mix, waterproofing, structure, covering and air/moisture barrier)	– When mortar mixed – During and after roof installation
Services (e.g. wiring, plumbing, ventilation, ducting, drilling, seals, insulation)	– First fix – Commissioning (including inspection of systems and services covered in the commissioning issue)
Drainage (e.g. drainage pipes, chambers, manhole covers)	– Completion or pre-handover
Hard and soft landscaping (e.g. fencing, top soil, planting)	– Completion or pre-handover
Protection of building materials during construction (e.g. against rainwater, frosts or hot weather)	– During all inspections for this issue, as applicable (such as insulation, roofs, drainage)

Frequency on-site

For the purposes of 02 Construction inspections, HQM has not attempted to define benchmarks for the frequency the AQP should be on-site because this will vary depending on the type of project and quality assurance processes in place.

The AQP needs to be on-site enough to adequately carry out the level of quality assurance required for all elements, at key stages, within the Construction inspections scope, for all assessed homes targeting these credits.

For example, on a site of hundreds of homes, the AQP will probably need to be based on the assessed site most of the time, in order to carry out the level of quality assurance required. On a smaller site, an AQP may only be needed to be on-site once a week or more frequently during stages that require more continuous presence on-site within a short period of time (such as foundations).

A level of remote quality assurance may also be appropriate in some scenarios. For example, using remote inspections via video may help to reduce the frequency an AQP is located on-site, if evidence is provided that demonstrates the same outcome is being achieved.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	

Checklists, Tables & Illustrations

None.

Definitions

Active systems

Any home systems that require active operation or maintenance. This includes common home systems such as:

- Heating and hot water systems.
- Ventilation systems.
- Low and zero carbon technologies.
- Comfort cooling systems.
- Appliances.
- Showers or baths, WCs.
- Lighting.
- Safety systems (e.g. smoke detectors, fire alarms and sprinklers).
- Security systems.
- Smart devices (e.g. as smart meters).

As well as any other systems, which may be less typical, such as:

- Electric car charging points.
- Living roof systems (e.g. green roofs).
- Flood resilience measures.
- Drainage systems or strategies (e.g. SuDS).
- Temperature control measures (e.g. active external shading).

Appropriately qualified person

A person is considered appropriate where they meet the following:

- Adequate experience required for carrying out inspections and quality assurance for all elements in the Construction inspections scope, in line with the home's required performance requirements. This may come from a mixture of qualifications or relevant site experience.
- Have at least 3 years' on-site experience working in the building industry (within the last 5 years).
- Is incentivised by quality rather than quick delivery, i.e. it is in their interest to identify defects and ensure they are resolved. For example, where this is confirmed in their contract and formally confirmed as part of their role.
- Keep up-to-date with changes in construction methods, statutory legislation and carry out continued professional development (CPD).
- Be a member of a relevant professional body and subject to their code of conduct such as the below (not an exhaustive list):
    - RICS Chartered surveyor (MRICS) www.rics.org.
    - CABE Chartered engineer (Member) www.cbuilde.com.
    - CIOB Chartered Construction Member or Chartered Builder (MCIOB) www.ciob.org.
    - Chartered RIBA Member www.architecture.com. Alternatively for Wales, Royal Society of Architects in Wales, for Northern Ireland, Royal Society of Ulster Architects. For Scotland, The Royal Incorporation of Architects in Scotland.
    - Architects Registration Board (Registered architect) www.arb.org.uk.
    - Federation of master builders at the Buildassure & FMB member or equivalent if also have met the FMB member criterion of a minimum of three years' trading history and provided one year's accounts: www.fmb.org.uk.
    - Approved Inspector on the CICAIR register (cic.org.uk).
    - The Institute of Clerks of Works and Construction Inspectorate of GB www.icwci.org.
- Alternatively, it is possible for an equivalent membership qualification to be accepted where the individual can demonstrate the following:
    - Subject to an ethical code of conduct and may be removed from the membership scheme if they are found to not comply.
    - Be an established professional, with experience of leading others on a building site.
    - Keep up-to-date with changes in construction methods, statutory legislation and carry out CPD.
    - Have good spoken and written communication skills.

It is possible for multiple people to carry out the construction inspections role where responsibilities can be demonstrated as being handed over.

Construction record

A clear and systematic record of the quality assurance measures taken, at key stages, to ensure the home's performance characteristics are being achieved. The format is flexible and should align with existing processes, where possible.

The appropriately qualified person is responsible for ensuring the record robustly reflects activities on-site. Examples of sources of evidence that may contribute to the record may include:

- Details of the installations and inspections carried out including methods (such as visual, thermographic), times, dates, individuals involved.
- Photographic or recorded evidence of installation.

- Delivery notes.
- Details of any substitutions or variations made.
- Details of any remedial work carried out.

The record can be contributed to by multiple people on-site, as long as the AQP oversees the record to ensure it accurately represents the work carried out.

Examples of how a construction record may be kept, include:

A written construction journal that multiple site operatives contribute to, potentially organised by a site secretary so the inspector can focus on build quality on-site, instead of filling out forms.

Using quality management software. Some software allows multiple site operatives to collect evidence and manage processes using a central platform, accessible via tablets or smart phones. They can often record and support: photographs taken on-site backed up by geo-location, site plans, task management, inspection reports and allocating tasks to different users.

Independent third party

An individual or group of individuals, who are not involved in any other aspects of the project (for example, design, construction or management of the assessed home), to ensure they are providing independent verification of the quality assurance processes. For example, this could be an organisation employed by the developer or main contractor, or they could be a client representative (such as a clerk of works) where the client is not also the developer.

Potential owner

This will vary depending on the type of project and nature of the home's ownership.

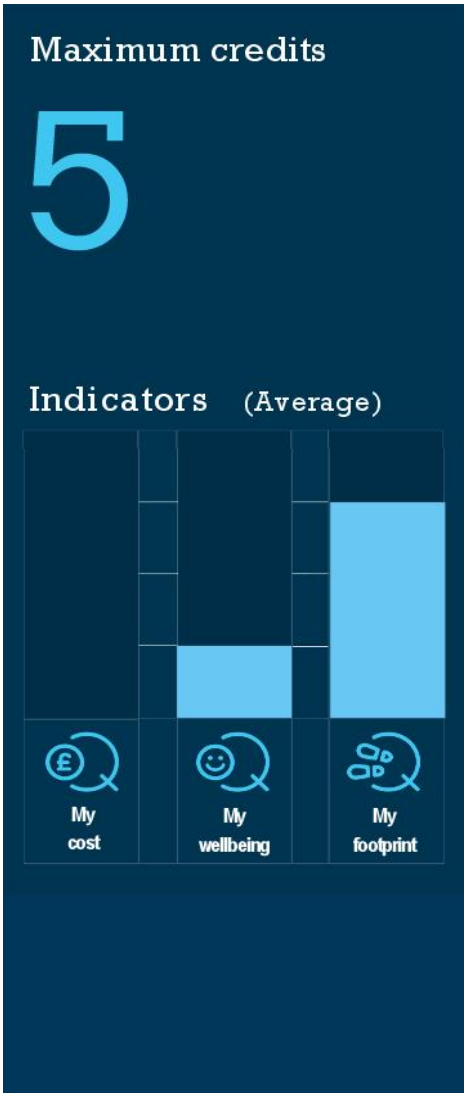
Essentially it refers to anyone who will own the home, once it is completed and handed over, including:

- Purchasers, including those who will own a proportion of the home as part of a shared ownership scheme (for example, part buy or part rent).
- The client who will own the home once it has been completed by the developer for occupation by others (such as a social housing provider).
- The developer if they are also the client, i.e. they will continue to own and manage the home during occupation, for example private rented sector provider. In this case, the criteria will essentially be met by default as part of the visual inspections criteria.

The purpose of this is to ensure that the homeowner is given the opportunity to ensure they are satisfied with the home that will be their responsibility after construction.

10 Construction Impacts

10.1 Responsible Construction Practices



Aim

To promote the environmentally and socially considerate, and accountable, management of construction sites.

Benefit

- Improves the reputation and acceptability of construction with neighbours, the general public, regulators and others.
- Helps encourage the community to accept the new development, before occupants have moved in.

Context

The construction industry has a huge impact on many people's lives, with a lot of construction work taking place where it can disturb existing communities.(146) Following more responsible construction practices can lead to a wide range of environmental, social and financial benefits.

Construction activities have many impacts on workers and the local area in terms of the environment, people's health and the economy. For example: local ground, water and air-quality pollution risks, which contractors and clients can be liable for, physical injury (43 workers fatally injured in the UK construction industry in 2015/2016 and 66,000 non-fatal workplace injuries reported), mental-health problems from stress (with absences from sickness costing British businesses £26 billion a year from lost productivity), and 19% of cyclists and 15% of pedestrians killed in road traffic accidents in the UK involving large goods vehicles over 3.5 tonnes, many of which are related to construction traffic.(147)

Responsible construction practices are important for dealing with these impacts and to achieve the best possible performance from a project. For example, by encouraging developers to care about their sites' appearance, respecting communities and protecting the environment and promoting safety for everyone involved or affected by the development.

Credit Summary

Criterion number	Title	Credits
crit 1–crit 5	01 Responsible construction management	up to 5
Total credits available		5

Criteria

01 Responsible construction management **2 credits**

crit 1 Achieve items required for two credits in Table 56.

Table 56 Responsible construction management items

Ref.	Criteria	Required for two credits
Risk evaluation and implementation		
The principal contractor evaluates the risks (on site and off site), plans and implements actions to minimise the identified risks, covering the following, where appropriate:		
Vehicle movement		
a	Manage the construction site entrance to minimise the impacts (e.g. safety, disruption) arising from vehicles approaching and leaving the development footprint. In particular this should consider the risks for vulnerable road users and local communities.	✓
b	Ensure the development footprint is accessible for delivery vehicles fitted with safety features (e.g. side under run protection) to remove or limit the need for on-street loading or unloading. Where on-street loading is unavoidable, this should be appropriately managed.	
c	Manage access routes to the development footprint, including for heavy vehicles to minimise traffic disruption and safety risks to others.	
Pollution management		
d	Minimise the risks of air, land and water pollution.	✓
e	Minimise the risks of nuisance from vibration, light and noise pollution.	
f	Implement practices to ensure the development footprint is safe, clean and organised at all times. This includes, but is not limited to, facilities, materials and waste storage.	✓
g	Ensure clear and safe access in and around the buildings at the point of handover.	✓
Health and wellbeing		
h	Provide processes and equipment required to respond to medical emergencies.	✓
i	The principal contractor identifies and implements initiatives to promote and maintain the health and wellbeing of all site operatives within the development footprint. This can be via site facilities, site management arrangements, etc.	
j	Establish management practices and facilities encouraging equality, fair treatment and respect of all site operatives.	✓
k	Provide secure, clean and organised facilities (e.g. changing and storage facilities) for site operatives within the development footprint.	
Security processes		
l	Minimise risks of the site becoming a focus for antisocial behaviour in the local community (e.g. robust perimeter fencing, CCTV, or avoid creating dark corners).	
Training, awareness and feedback		
The principal contractor is responsible for ensuring:		
m	Aspects of the construction process that might impact the community are communicated regularly, ensuring that nuisance and intrusion are minimised.	
n	Ongoing training is provided, and up to date, for personnel and visitors (covering items a to l, as appropriate.)	✓

Ref.	Criteria	Required for two credits
o	The principal contractor ensures that site operatives are trained for the tasks they are undertaking (including any site-specific considerations).	✓
p	The fleet operators (see Definitions) undertake driver training and awareness to promote safety within the development footprint and off site.	
Monitoring and reporting		
The principal contractor ensures:		
q	The fleet operators capture and investigate any road accidents, incidents and near misses, and reports them to the principal contractor. The principal contractor analyses these items.	
r	All visitor, workforce and community accidents, incidents and near misses are recorded and action is taken to reduce the likelihood of them reoccurring.	✓
s	Processes are in place to facilitate collecting and recording feedback from the community and to address any concerns related to the development footprint.	

2 credits

crit 2 crit 1 is achieved.

crit 3 Achieve any additional six items in Table 56.

1 credit

crit 4 crit 1 and crit 3 are achieved.

crit 5 All remaining items in Table 56 are achieved.

Methodology

Scope

This issue includes demolition and construction activities on site, from the beginning of demolition to the completion of construction. Where the site is taken over by the developer or owner following completion of demolition, the demolition phase can be excluded from the scope of this part of the issue.

Training

For the purposes of this HQM issue, training can be teaching, or developing in oneself or others, any skills and knowledge (for example manual handling, safe working practices, regulations, project management, vocational skills, site supervision) that relate to specific useful competencies.

Training includes, but is not limited to the following:

- Formal external training.
- On-site learning from trained or experienced people.
- Provision of training material or instructions for carrying out tasks.

Frequency of monitoring on-site

Site monitoring and visits shall occur at stages where significant health and safety risks or errors are likely to occur, where timing is critical for demonstrating compliance with the criteria, and where key evidence is required to be produced at specific times including, but not limited to photographic evidence, delivery notes and other documentary evidence.

Dedicated persons on-site

This can be a member of the project team or not. The person should ideally be based on-site or frequently be on site. Their role will be to monitor and report on activities described in Table 56 and especially those that are otherwise more difficult to evidence, such as the attitudes and conduct of the personnel on-site.

This does not have to be the same person throughout the process. However, they need to keep any records required for HQM evidence purposes and make sure these are handed over if a new person takes over.

There can be one or more dedicated persons on-site at the same time, responsible for different items that are part of crit 1–crit 5.

Phased or multiple home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 Responsible construction management	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	Scheme certificate and compliance report. OR One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.

Examples of evidence that satisfy criteria 1 to 5 include, but are not limited to the following:

- Company's policy and procedure documents (including environmental management, pollution prevention, security).
- Construction logistics plan.
- Responsibility matrix.
- Statement of confirmation by the 'dedicated person'.
- Training records.
- Photographic evidence.
- Records of communication with the neighbouring community.
- Contracts or formal agreements.
- Reporting documents and logs.
- Reporting procedures.
- Evidence produced by third party schemes (such as CCS monitor's report, FORS, CLOCS, Yellow Jacket documentation).

Checklists, Tables & Illustrations

None.

Definitions

Development footprint

The development footprint includes any land used for buildings, hardstanding, landscaping, site access or where construction work is carried out (or land is being disturbed in any other way), plus a 3 m boundary in every direction around these areas. It also includes any areas used for temporary site storage and buildings. If it is not known exactly where buildings, hardstanding, site access, temporary storage and buildings will be located, it must be assumed that the development footprint is the entire development site.

Fleet operator

A fleet operator is responsible for groups of motor vehicles owned or leased by a business, Government agency or other organisation rather than by an individual or family.

Transportation to the project is likely to be by several fleet operators many of which will not be under the control of the constructor. The criteria relate to all fleet operators nonetheless.

HQM Recognised responsible construction management schemes

These are third party schemes evaluated by BRE Global for recognition under BREEAM. Refer to Guidance Note 33 for further guidance on recognised schemes and the way in which they support compliance with these HQM criteria. This is a list of existing schemes that we are currently aware of that may support the achievement of the responsible construction management criteria:

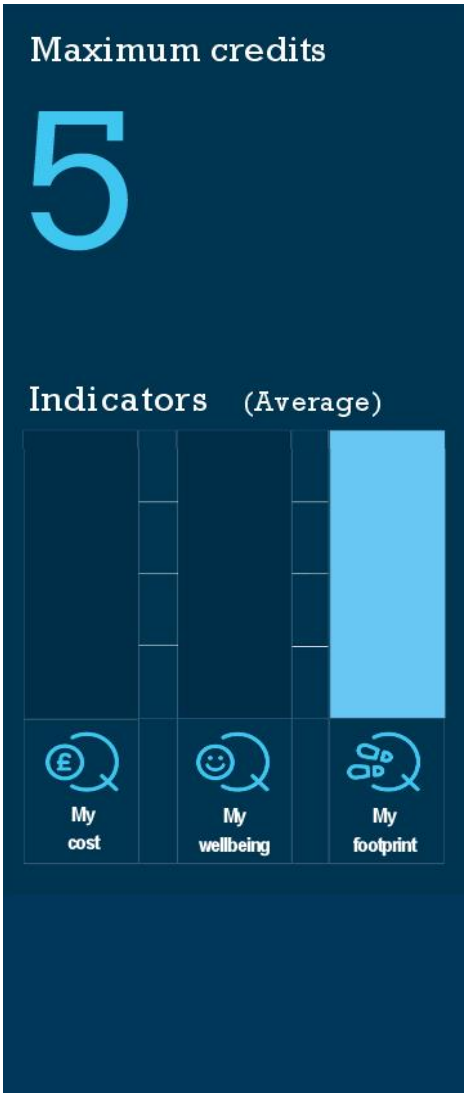
Considerate Constructors Scheme

The Considerate Constructors Scheme (CCS) is a national initiative set up by the UK construction industry to improve its image. The scheme is a self-financing, independent organisation owned by the Construction Umbrella Bodies (Holdings) Ltd (made up of the Construction Products Association and the Construction Industry Council). Sites and companies that register with the scheme sign up and are monitored against a Code of Considerate Practice, designed to encourage best practice beyond statutory requirements.

Fleet Operator Recognition Scheme

The Fleet Operator Recognition Scheme (FORS) is a voluntary accreditation scheme that promotes best practice for commercial vehicle operators. FORS encompasses all aspects of safety, efficiency, and environmental protection by encouraging and training fleet operators to measure, monitor and improve performance. FORS provides accreditation pathways for operators of any type, and for those organisations that award contracts and specify transport requirements.

10.2 Construction Energy Use



Aim

To avoid wasting energy on site and reduce as far as possible the amount of energy used, and associated carbon emissions, during the construction process.

Benefit

- Manages the effect of construction on the environment by making sure energy is used responsibly during construction.
- Helps control construction costs.

Context

Carbon emissions from on-site activities are responsible for a third of the constructor's total emissions. By monitoring energy use, through methods such as metering, developers can identify inefficiencies in their processes. [148] This issue recognises where developers take measures to use less energy for on-site activities.

There are factors, such as the ability to connect to the national grid, weather considerations and the type of work needed on-site, which may be outside the project's control. This can lead to a wide difference in energy use across the housing construction sector. Due to this wide difference, it is not possible to set benchmarks at present.

Credit Summary

Criterion number	Title	Credits
crit 1	01 Contractor's energy efficiency checklist	2
crit 2	02 Energy monitoring and reporting	2
crit 3	03 Weekly detailed monitoring and reporting of metered energy use	1
Total credits available		5

Criteria

01 Contractor's energy efficiency checklist **2 credits**

crit 1 The contractor's energy efficiency checklist[149] (see Table 57) has been completed with a full record of decisions actions or justifications for all points. In cases where the contractor has not been appointed at the time of design stage assessment, see Contractor not yet appointed.

02 Energy monitoring and reporting **2 credits**

crit 2 Target, monitor and report data on the principal contractor's and subcontractors' metered energy consumption as a result of the use of construction plant, equipment (mobile and fixed) and site accommodation.

03 Weekly detailed monitoring and reporting of metered energy use **1 credit**

crit 3 Conduct the monitoring and reporting of data in crit 2 on a weekly basis.

Methodology

Contractor's energy efficiency checklist

The contractor's energy efficiency checklist (see Table 57) should be completed at both pre-construction and construction stage.

Step 1 The HQM Assessor is to distribute the contractor's energy efficiency checklist to the individual responsible, and also raise awareness of the potential for pursuing the requirements outlined in crit 2–crit 3 to monitor and report energy consumption on site. The consideration process on the checklist must be commenced during the mobilisation stage or earlier where possible.

Step 2 In order to be eligible for the credits available in crit 1, the contractor is to consider and justify their chosen actions regarding the points listed on the checklist. When assessing the checklist, the HQM Assessor should assume that all points are possible until they are discounted by a justification from the contractor before awarding this credit. The answer 'Not Applicable' by itself would not be sufficient without an accompanying reason.

Contractor not yet appointed

At the design stage, where a contractor has not been appointed and there is no suitable individual to undertake the completion of the checklist, the client should appoint an individual to assume responsibility for ensuring inclusion of the requirements of this criterion before the credit can be awarded. Once a constructor is appointed, the responsibility is handed over. This compliance note does not apply at the post construction stage. In order to award this credit at the post construction stage, the requirement must be followed up as soon as it becomes available and included in Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254, and must be completed before site construction activity commences.

Detailed monitoring and reporting

In instances where there are no sources of energy being metered on the site, then the credits cannot be awarded.

Energy monitoring and reporting

Step 1 Where energy monitoring is being carried out and reported, a method is established for how this will be reported back.

- Establish whether the contractor has procedures in place which allows them to capture the required information.
- Establish the designated individual who will be responsible for overseeing monitoring and reporting and how this will be communicated during the build.
- Establish if any intermediate measurements will be taken, e.g., whether metered energy data will be measured weekly in order to achieve crit 3.
- Establish the targets for each fuel type.
- Establish if any intermediate measurements will be taken. Where detailed monitoring and reporting is possible (see Detailed monitoring and reporting) then the project may be eligible for the credits available in crit 3.
- Establish the method of scoping that the readings will relate to. This could be as simple as a total reading for a whole project for each fuel type or, where practical, it could be a reading per sub-meter, per project phase, per block, per storey, per plot, per trade or any other grouping that the contractor can effectively manage. This detail does not influence the credits; it only declares the scope to the assessor so evidence can also be organised accordingly.
- Collate the information that demonstrates the energy monitoring and reporting has been carried out.

Principal contractor's and subcontractors' energy consumption should be reported in kWh (and where relevant, litres of fuel used).

Phased or multiple home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 1	02 Energy efficiency checklist	Energy efficiency checklist (pre-construction stage). Submit the completed checklist before activities start on site. OR Where a contractor hasn't been appointed, a letter from the client or their representative containing: – Confirmation that the Energy efficient measures listed on the checklist will be undertaken. AND – Submit the completed checklist before activities start on site to continue eligibility to post construction.	Energy efficiency checklist (construction stage items) – Submit the completed pre-construction stage checklist before activities start on-site – Submit additional construction stage items.

Criterion Reference	Title	Design Stage	Post Construction Stage
crit 2	03 Site monitoring	A copy of the specification or procedure confirming: – Procedures are in place to monitor and report energy consumption – Name and job title of the designated individuals. OR A letter from the client or their representative containing: – Confirmation that the specification will contain a clause on monitoring energy consumption – An outline of the detailed requirements that will be included in that specification clause.	Monitoring records or report confirming: – Type of energy sources utilised on-site (i.e. electricity, fuel) – Recorded energy consumption for each energy source.
crit 3	04 Detailed monitoring and reporting	Where a contractor has not been appointed at the time of the design stage assessment, a contractually binding document, such as the Employers Requirements, may be used as evidence to demonstrate that the criteria will be met. Ultimately, the assessor should satisfy themselves that the evidence provided at design stage ensures that the criteria will be met later on in the project.	To demonstrate compliance, the following must be provided: – Each meter reading that has been taken, clearly displaying the units of measurement – The date on which the reading was taken – Photographic evidence of meter readings or the data report from the Automatic meter reading (AMR) system (where applicable) for the duration of the project – The scope of each reading.

Checklists, Tables & Illustrations

Table 57 Contractor's energy efficiency checklist

Stage	Energy efficiency action (see Definitions for further details on where to find more information about what each title entails)	Record of decisions and actions taken
Pre-construction phase	Plan the energy requirements of the project	To be completed by the contractor or the appointed individual. For example, at design stage monitoring was established on a weekly basis. For example, at post-construction monitoring was carried out on the first working day of the week throughout the project. Not applicable is not valid for this point.
	Procure low CO_2 site accommodation	To be completed by the contractor or the appointed individual. For example, obtain EPC rating of C or higher for site accommodation.
	Specify energy efficient plant	To be completed by the contractor or the appointed individual.
	Secure early, high capacity, electricity grid connection	To be completed by the contractor or the appointed individual.
	Co-ordinate monitoring with phasing programme of work and set the intervals at which the reporting will be taken at.	To be completed by the contractor or the appointed individual. The action against this point will determine eligibility for crit 3.
	*Other energy efficiency actions can be added to this checklist	
Construction phase	Deploy the right size generators (if generators are needed)	To be completed by the contractor.
	Manage energy in a site office efficiently	To be completed by the contractor.
	Consider energy saving measures	To be completed by the contractor.
	Consider installing intelligent and efficient temporary electrics	To be completed by the contractor.
	Consider techniques which avoid forced drying of wet trades	To be completed by the contractor.
	Monitor and manage energy use	To be completed by the contractor. The action against this point will determine eligibility for crit 2–crit 3.
	*Other energy efficiency actions can be added to this checklist	

Definitions

Automatic meter reading (AMR)

Automatic meter reading (AMR) ensures bills are based on actual rather than estimated, consumption, and avoids the need for manual readings, which can be impractical and unreliable(150).

Constructing Excellence and reporting of construction site impacts

Constructing Excellence publishes the construction industry key performance indicators (KPIs)(151) based on data collected by the Department for Business, Innovation and Skills via a voluntary quarterly survey returned by contractors throughout the UK. The Office of National Statistics also reports the annual results in the Construction Statistics Annual. One of the key performance indicators is the 'amount of CO_2 emissions caused by the energy used during the construction process per £100,000 of project value ($kgCO_2$/£100k)'.

Information collated by contractors as part of their voluntary submissions to Constructing Excellence may also serve to help demonstrate compliance with this HQM issue.

Energy consumption

This is the energy that is used by the construction plant, equipment (mobile and fixed) and site accommodation for the development as a whole from start on site up until practical completion.

Energy efficiency action

A list of actions that a contractor is to consider, and justify their chosen actions against in order to complete the checklist. For further information on the items included in the checklist see the Green Construction Board - How to reduce CO_2 on construction sites crib sheet. For further general information, see www.greenconstructionboard.org.

Mobilisation

The project stage which occurs after the appointment of the main contractor and preparatory work is undertaken prior to activities starting on site.

Practical completion

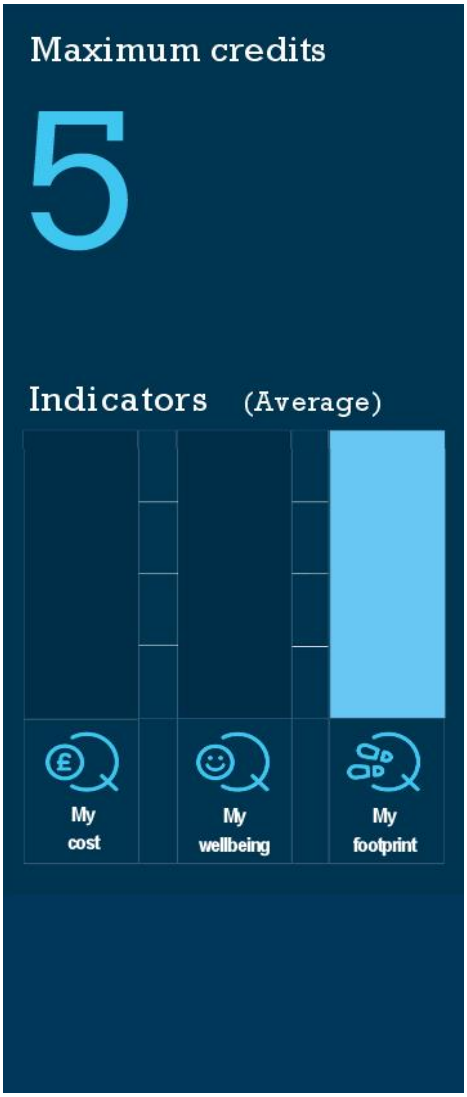
For the purposes of this issue, this is to broadly align with the term that is generally understood within the industry and used in many standard forms of contract. For clarification it should satisfy the following point:

- The building has received a completion certificate from the contract administrator.
- All works will have finished on the home and it is practical for occupation. This also includes the external works within the deeds boundary of the home.

Tools for monitoring and targeting construction site impacts

BRE's online environmental reporting tool, SMARTWaste, enables users to capture, monitor and target a project's on-site energy consumption and produce a CO_2 footprint, water consumption and responsible sourcing of timber. Transport and CCS data can also be collected. The system can be used as a tool to help meet the criteria of this issue and as a source of evidence for demonstrating compliance. It is available through the SMARTWaste Membership scheme by developing tailor-made versions of SMARTWaste. More details on the tool and membership are available at www.smartwaste.co.uk.

10.3 Construction Water Use



Aim

To avoid wasting water on site, by using it efficiently and reducing usage as far as possible.

Benefit

- Helps manage construction costs.
- Makes sure resources are used responsibly.

Context

Water resources are under severe stress throughout much of the UK. Reducing the amount of water used on construction sites can help resolve this problem.(152) This is also cost-effective as it reduces the costs associated with disposing of and treating wastewater (for example, removing wastewater by tanker and releasing it to the sewer).(153) This issue can help to reduce the risk of potential water shortages during periods of drought and help to reduce energy use where water is heated or cooled.

There are factors, such as weather considerations and the type of work needed on site, which may be outside the project's control. This can lead to a wide difference in water use across the housing construction sector. Due to this wide difference, it is not possible to set benchmarks at present.

Credit Summary

Criterion number	Title	Credits
crit 1	01 Contractor's water efficiency checklist	2
crit 2	02 Water monitoring and reporting	2
crit 3	03 Weekly detailed monitoring and reporting of metered water use	1
Total credits available		5

Criteria

01 Contractor's water efficiency checklist **2 credits**

crit 1 The contractor's water efficiency checklist(154) (see Table 58) has been completed with a full record of decisions actions or justifications for all points. In cases where the contractor has not been appointed at the time of design stage assessment, see Contractor not yet appointed.

02 Water monitoring and reporting **2 credits**

crit 2 Target, monitor and report data on the principal contractor's and subcontractors' potable water consumption (m^3) arising from the use of construction plant, equipment (mobile and fixed) and site accommodation.

03 Weekly detailed monitoring and reporting of metered water use **1 credit**

crit 3 Conduct the monitoring and reporting of data in crit 2, on a weekly basis.

Methodology

Contractor's water efficiency checklist

The contractor's water efficiency checklist should be completed at both the pre-construction and construction stages (see Table 58).

Step 1 The HQM Assessor is to distribute the contractor's water efficiency checklist to the individual responsible, and also raise awareness of the requirements outlined in crit 2–crit 3 to monitor and report water consumption on site. The consideration process on the checklist must be commenced during the mobilisation stage or earlier, where possible.

Step 2 In order to be eligible for the credits available in crit 1, the contractor is to consider and justify their chosen actions regarding the points listed on the checklist. When assessing the checklist, the HQM Assessor should assume that all points are possible until they are discounted by a justification from the contractor before awarding this credit. The answer 'Not Applicable' by itself would not be sufficient without an accompanying reason.

Contractor not yet appointed

At the design stage, where a contractor has not been appointed and there is no suitable individual to undertake the completion of the checklist, the client should appoint an individual to assume responsibility for ensuring inclusion of the requirements of this criterion before the credit can be awarded. Once a constructor is appointed, the responsibility is handed over. This compliance note does not apply at the post construction stage. In order to award this credit at the post construction stage, the requirement must be followed up as soon as it becomes available and included in the Post Construction Evidence, and must be completed before site construction activity commences.

Detailed monitoring and reporting

In instances where water is not being metered on the site, then the credit cannot be awarded.

Water monitoring and reporting

Step 1 Where water monitoring is being carried out and reported, a method is established for how this will be reported back.

- Establish whether the contractor has procedures in place which allows them to capture the required information.
- Establish the designated individual who will be responsible for overseeing monitoring and reporting, and how this will be communicated during the build.
- Establish if any intermediate measurements will be taken, e.g., whether metered water data will be measured weekly in order to achieve crit 3.

- Establish the targets for water consumption.
- Establish if any intermediate measurements will be taken. Where detailed monitoring and reporting is possible (see Detailed monitoring and reporting), then the project may be eligible for the credits available in crit 3.
- Establish the method of scoping that the readings will relate to. This could be as simple as a total reading for a whole project or, where practical, it could be a reading per sub-meter, per project phase, per block, per storey, per plot, per trade or any other grouping that the contractor can effectively manage. This detail does not influence the credits; it only declares the scope to the assessor so evidence can also be organised accordingly.
- Collate the information that demonstrates that water monitoring and reporting has been carried out.

Phased or multiple home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 1	02 Water efficiency checklist	Water efficiency checklist. Submit the completed checklist before activities start on site. OR Where a contractor hasn't been appointed, a letter from the client or their representative containing: – Confirmation that the water efficient measures listed on the checklist will be undertaken. AND – Submit the completed checklist before activities start on-site to continue eligibility to post construction.	Water efficiency checklist (construction stage items) – Submit the completed checklist before activities start on site.

Criterion Reference	Title	Design Stage	Post Construction Stage
crit 2	03 Site monitoring	A copy of the specification or procedure confirming: – Procedures are in place to monitor and report water consumption – Name and job title of the designated individuals. OR A letter from the client or their representative containing: – Confirmation that the specification will contain a clause on monitoring water consumption – An outline of the detailed requirements that will be included in that specification clause.	Monitoring records or report confirming: – Recorded water consumption.
crit 3	04 Detailed monitoring and reporting	Where a contractor has not been appointed at the time of the design stage assessment, a contractually binding document, such as the Employers Requirements, may be used as evidence to demonstrate that the criteria will be met. Ultimately, the assessor should satisfy themselves that the evidence provided at design stage ensures that the criteria will be met later on in the project.	To demonstrate compliance the following must be provided: – Each meter reading that has been taken, clearly displaying the units of measurement – The date on which the reading was taken – Photographic evidence of meter readings or the data report from the Automatic meter reading (AMR) system (where applicable) for the duration of the project – The scope of each reading.

Checklists, Tables & Illustrations

Table 58 Contractor's water efficiency checklist

Water efficiency action	Record of decisions or actions taken
Consider installing trigger guns to hoses.	To be completed by the contractor or the appointed individual.
Consider the use of efficient dust suppression techniques (general and road) such as fan misting systems.	To be completed by the contractor or the appointed individual.
Consider waste efficient wheel washing, e.g. drive on systems.	To be completed by the contractor or the appointed individual.
For washing out and cleaning – consider efficient systems such as high pressure (low flow) washers.	To be completed by the contractor or the appointed individual.
For site accommodation, consider the use of water efficient fittings for urinals, toilets and taps.	To be completed by the contractor or the appointed individual.
Consider installing a rainwater harvesting system.	To be completed by the contractor or the appointed individual.
*Other water efficiency actions can be added to this checklist.	To be completed by the contractor or the appointed individual.

Definitions

Automatic meter reading (AMR)

Automatic meter reading (AMR) ensures bills are based on actual rather than estimated consumption and avoids the need for manual readings, which can be impractical and unreliable(155).

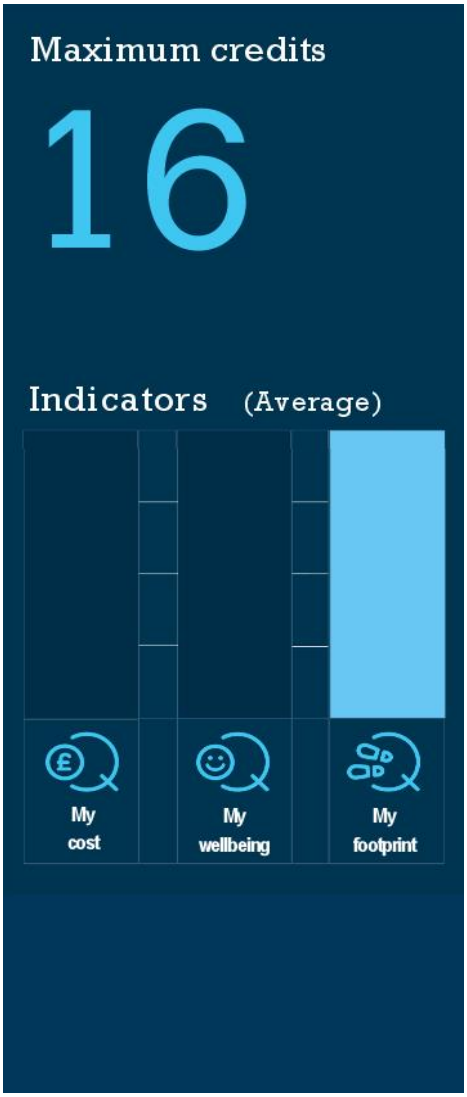
Mobilisation

The project stage which occurs after the appointment of the main contractor and preparatory work is undertaken, prior to activities starting on-site.

Tools for monitoring and targeting construction site impacts

BRE's online environmental reporting tool, SMARTWaste, enables users to capture, monitor and target a project's on-site energy consumption and produce a CO_2 footprint, water consumption and responsible sourcing of timber. Transport and CCS data can also be collected. The system can be used as a tool to help meet the criteria of this issue and as a source of evidence for demonstrating compliance. It is available through the SMARTWaste Membership scheme by developing tailor-made versions of SMARTWaste. More details on the tool and membership are available at www.smartwaste.co.uk.

10.4 Site Waste Management



Aim

To promote resource efficiency and reduce as far as possible the effect of construction on the environment by managing construction waste effectively to reduce the total amount of waste produced, and by looking at alternatives to landfill for disposing waste.

Benefit

- Reduces environmental impact by making sure resources are used responsibly and waste is disposed of responsibly during construction.
- Reduces construction costs.

Context

Reducing the amount of waste produced lowers the environmental impact and the cost of the construction process. The true cost of waste includes the cost of the product or material that is wasted as well as the cost of handling and managing the waste. Although there may be income associated with recycling certain materials, construction sites usually have to pay to have waste collected or processed .

Legislation in this area has changed over time. However the benefits to the developer and the environment remain the same.

Credit Summary

Criterion number	Title	Credits
crit 1–crit 3	01 Product procurement policy	1
crit 4–crit 6	02 Construction resource efficiency	up to 8
crit 7–crit 8	03 Diversion of construction waste from landfill	up to 4
crit 9–crit 10	04 Diversion of excavation waste from landfill	3
Total credits available		16

Criteria

01 Product procurement policy **1 credit**

crit 1 The client or developer has a documented policy and procedure in place by the end of RIBA stage 2 (or equivalent). The documented policy and procedure sets out procurement requirements relating to opportunities for minimising construction waste on-site for all suppliers and trades (see Documented product procurement policy).

crit 2 The documented policy and procedure must be disseminated to all relevant internal and external personnel. It should also be included within the construction contract to ensure that they are enforceable on the assessed project.

crit 3 The documented policy and procedure must encourage the specification of products which can help to minimise waste arisings (for example, considers materials that can be reused once the home has been deconstructed, considers recycling or take-back arrangements and packaging recycling or minimisation).(156)

02 Construction resource efficiency **up to 8 credits**

crit 4 Complete a pre-demolition audit of any existing buildings, structures or hard surfaces to be demolished, if feasible.

crit 5 A Resource Management Plan (RMP) has been developed covering the non-hazardous waste related to on-site construction and where applicable, dedicated off-site manufacture or fabrication (including demolition and excavation waste) generated by the building's design and construction.

crit 6 Associated credits can be awarded where construction waste related to on-site construction and dedicated off-site manufacture or fabrication (excluding demolition and excavation waste) meets, or is lower than, the benchmarks identified in Table 59.

Table 59 Site Waste Reduction Performance credit allocation

Waste generated per 100m² (project wide gross internal floor area, GIFA) for new build residential projects		
m^3 per 100m²	Tonnes per 100m²	Credits
≤ 13.9	≤ 8.5	2
≤ 8.1	≤ 4.9	4
≤ 4.8	≤ 2.9	6
≤ 3.5	≤ 1.9	8

Volume (m^3) is actual volume of waste (not bulk volume).

03 Diversion of construction waste from landfill **up to 4 credits**

crit 7 Waste materials will be sorted into separate key waste groups (according to the waste streams generated by the scope of the works) as per Table 61. Further subdivision of the key groups to reflect the most appropriate recovery route for materials, such as recycling of key groups or energy from waste, is encouraged. This can be either on-site, or through a licensed contractor for recovery.

crit 8 Credits are awarded for the project's performance concerning the diversion of non-hazardous construction and demolition (where applicable) waste from landfill. The associated benchmarks are outlined in Table 60.

Table 60 Diversion from landfill credit allocation

Type of waste	Percentage diverted from landfill (by Volume)	Percentage diverted from landfill (by Tonnage)	Credits
Construction	70%	80%	2
Demolition	80%	90%	
Construction	85%	90%	4
Demolition	85%	95%	

04 Diversion of excavation waste from landfill **3 credits**

crit 9 Maximum credits have been achieved from crit 8.

crit 10 At least 95% (either by volume or tonnage) of excavation waste is diverted from landfill.

Methodology

Documented product procurement policy

This may be prepared and adopted at an organisational level or be site or project specific. It is recommended (but not a requirement) that the documented policy follows the principles of BS 8900-1:2013(157) *Managing sustainable development of organisations – Guide*, BS ISO 20400:2017 *Sustainable procurement – Guidance*(158), or BS 8895 *Designing for material efficiency in building projects* (Parts 1 and 2). This policy may form a part of a broader Sustainable Procurement Plan or be in the form of a standalone document.

Limited site space for segregation and storage

Where space on site is too limited to allow materials to be segregated, a waste contractor may be used to separate and process recyclable materials off site. Similarly manufacturers' take-back schemes could also be used. Where this is the case, evidence must be produced which demonstrates that segregation of materials is carried out to the agreed levels and that materials are reused or recycled as appropriate. Such evidence could be Environment Agency or Scottish Environment Protection Agency or Environment Agency Wales or Northern Ireland Environment Agency Waste Return Forms.

Resource Management Plan records

The project waste arisings should be recorded and include construction, demolition and excavation waste.

Note that the performance benchmarks for awarding of credits do not include demolition and excavation waste.

Phased or multiple home development

See Appendix D – Post-Construction Stage Assessment Issue Exceptions on page 254.

Waste collation from multiple satellite sites

In cases where the constructor has adopted a strategy that includes multiple sites, which collates the waste in a centralised location, the assessment is based on the combined sites as if they are one development site. Sites that are not undertaking a HQM assessment which are collated in this manner are to be included in the assessment.

Waste from temporary support structures

Any waste generated on-site for the purposes of the development (excluding demolition and excavation waste) must be taken account of in the assessment of this issue. If temporary support structures, or any other materials or systems brought in to facilitate the construction of the building, enter the waste stream (albeit for recycling), then they will need to be classified as construction waste, and therefore contribute to the construction waste, and be assessed against the benchmark for this issue. If the support structure, system or material is reused by the contractor (or any other contractor) on other sites and therefore has not entered the waste stream, then such items can be excluded from calculations. The same principle would apply to timber formwork where used.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 1–crit 3	02 Documented product procurement policy	– A copy of the documented product procurement policy. – Evidence that the policy is disseminated, or a written commitment to do so. – Evidence that the policy is included in the construction contract, or a written commitment to do so. – Evidence that there is a policy on waste minimisation.	– Evidence that the policy was disseminated. – Evidence that the policy was included in the construction contract.
crit 4 and crit 5	03 Resource Management Plan and pre-demolition audit	A copy of the Resource Management Plan and where relevant, pre-demolition audit. Waste data obtained from licensed external waste contractors is reliable and verifiable, by using data from EA/SEPA/EA Wales/NIEA Waste Return Forms or from a PAS 402:2013 certified company can be used as method of compliance	
crit 6	04 Construction resource efficiency	A projected waste benchmark AND A copy of the specification or procedure confirming: – Procedures are in place to monitor and minimise construction waste – Name and job title of the designated individuals. OR A letter from the client or their representative containing: – Confirmation that the specification will contain a clause on reporting and minimising construction waste – An outline of the detailed requirements that will be included in that specification clause.	Monitoring records or a report confirming: – Monitoring actions carried out by the designated individual – The total waste arising for the development – Comparison of the total waste arising against the benchmark.

Criterion Reference	Title	Design Stage	Post Construction Stage
crit 7–crit 10	05 Diversion of construction waste and excavation waste from landfill	Projected waste diversion figures. A copy of the specification or procedure confirming: – Procedures are in place to divert wastes from landfill – Targets that will be set and reviewed regularly – Name and job title of the designated individual. OR A letter from the client or their representative containing: – Confirmation that the specification will contain a clause on diverting wastes from landfill – An outline of the detailed requirements that will be included in that specification clause.	A copy of the main contract programme showing: – Actions taken to divert waste from landfill. Monitoring records or report confirming: – Monitoring actions carried out by the designated individual – The total waste arising for the development (broken down by demolition, excavation and construction) and the amount that has been diverted from landfill – Evidence of waste transfer stations recycling rates – A comparison of the estimated figures in the pre-demolition audit with the actual figures.

Checklists, Tables & Illustrations

Table 61 Waste groups

European Waste Catalogue	Key group	Examples
170102	Bricks	Bricks
170101	Concrete	Pipes, kerb stones, paving slabs, concrete rubble, precast and in situ
170604	Insulation	Glass fibre, mineral wool, foamed plastic
1501	Packaging	Paint pots, pallets, cardboard, cable drums, wrapping bands, polythene sheets
170201	Timber	Softwood, hardwood, board products such as plywood, chipboard, medium density fibreboard (MDF)
1602	Electrical and electronic equipment	Electrical and electronic TVs, fridges, air-conditioning units, lamps equipment
200301	Canteen or office	Office waste, canteen waste, vegetation
1301	Oils	Hydraulic oil, engine oil, lubricating oil
1703	Asphalt and tar	Bitumen, coal tars, asphalt
170103	Tiles and ceramics	Ceramic tiles, clay roof tiles, ceramic, sanitary ware
1701	Inert	Mixed rubble or excavation material, glass
1704	Metals	Radiators, cables, wires, bars, sheet
170802	Gypsum	Plasterboard, plaster, fibre cement sheets
170101	Binders	Render, cement, mortar
170203	Plastics	Pipes, cladding, frames, non-packaging sheet
200307	Furniture	Tables, chairs, desks, sofas
1705	Soils	Soils, clays, sand, gravel, natural stone
Most relevant EWC	Liquids	Non-hazardous paints, thinners, timber treatments
Most relevant EWC	Hazardous	Defined in the Hazardous Waste List (HWL) of the European Waste Catalogue (EWC)
Most relevant EWC	Floor coverings (soft)	Carpets, vinyl flooring
Most relevant EWC	Architectural features	Roof tiles, reclaimed bricks, fireplaces
170904 (Mixed)	Mixed or other	Efforts should be made to categorise waste into the above categories wherever possible.

Definitions

Best practice construction waste management plan

Best practice is a combination of commitments to:

1. Design out waste (materials optimisation).
2. Reduce waste generated on site.
3. Develop and implement procedures to sort and reuse or recycle construction and demolition waste on site and off site (as applicable).
4. Follow guidance from:
    a. Defra (Department of Environment, Food and Rural Affairs).
    b. BRE (Building Research Establishment Ltd).
    c. Welsh Government.
    d. SEPA (Scottish Environment Protection Agency).

Diversion from landfill

Actions to avoid waste being disposed of in landfill include:

1. Reusing the material on-site (in situ or for new applications).
2. Reusing the material on other sites.
3. Community reuse and recycling.
4. Salvaging or reclaiming the material for reuse.
5. Returning material to the supplier via a 'take-back' scheme.
6. Recovery of the material from site by an approved waste management contractor and recycled or sent for energy recovery.

PAS 402:2013

PAS 402:2013 is a specification for performance reporting that can be adopted by waste management organisations. It is applicable to waste management organisations that process waste, for example a waste treatment facility and not those operating solely as carriers or brokers. The specification provides the framework for the demonstration of performance against key areas of delivery, including how waste management activities are conducted, landfill diversion and materials recovery, assuring potential and existing customers of the service they are procuring. It can provide clients such as Government and local authorities with a framework for good practice which they can specify.

Pre-demolition audit

The pre-demolition audit is undertaken to determine if, in the case of demolition, refurbishment or reuse is feasible and, if not, to maximise the recovery of material from demolition for subsequent high-grade or high-value applications. The audit must be referenced in the RMP and cover:

1. Identification of the key refurbishment or demolition materials.
2. Potential applications and any related issues for the reuse and recycling of the key refurbishment and demolition materials in accordance with the waste hierarchy.

Resource Management Plan (RMP)

The aim of the RMP is to promote resource efficiency and to prevent illegal waste activities. Resource efficiency includes minimising waste at source and ensuring that clients, designers and principal contractors assess the use, reuse and recycling of materials and products on and off the site. A compliant RMP should be written in line with best practice (see Definitions above) and defines:

1. A target benchmark for resource efficiency, i.e. m^3 of waste per 100m^2 or tonnes of waste per 100m^2.
2. Procedures and commitments for minimising non-hazardous waste in line with the target benchmark.
3. Procedures for minimising hazardous waste.
4. A waste minimisation target and details of waste minimisation actions to be undertaken (consider those actions listed within the waste minimisation definition).

5. Procedures for estimating, monitoring, measuring and reporting hazardous and non-hazardous site waste. If waste data are obtained from licensed external waste contractors, the data need to be reliable and verifiable, for example by using data from EA/SEPA/EA Wales/NIEA Waste Return Forms or from a PAS 402:2013 certified company.
6. Procedures for sorting, reusing and recycling construction waste into defined waste groups (see additional guidance section), either on-site or through a licensed external contractor.
7. Procedures for reviewing and updating the plan.
8. The name or job title of the individual responsible for implementing the above.
9. Adequate protection and storage of material on-site.

A Site Waste Management Plan is a form of Resource Management Plan and for HQM should be written in line with best practice (see Best practice construction waste management plan on the previous page).

Waste hierarchy

The order of priority for the management of waste where waste generation could or does occur. This is listed in descending order of environmental preference in The Waste (England and Wales) Regulation 2011[(159)] as:

- Prevention.
- Reuse.
- Recycle.
- Recover.

Waste minimisation

This term encompasses two elements of the waste hierarchy:

Waste reduction or prevention = using less material in design, manufacture and installation, keeping products for longer, using no hazardous materials.

Reuse = using products again for the same purpose for which they were conceived, which may require checking, cleaning or repairing (preparing for reuse).

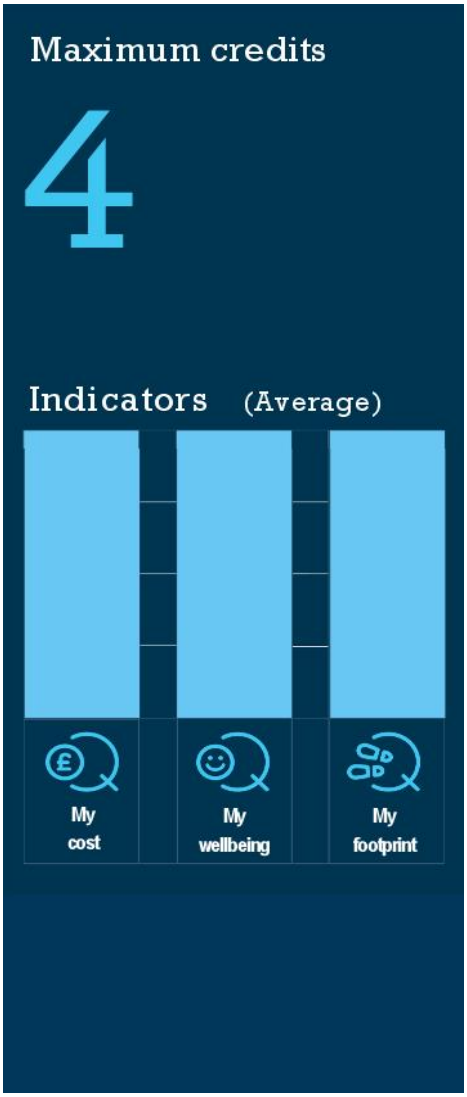
Types of waste minimisation actions include:

1. Consider implementing BS 8895:2013 Designing for material efficiency in building projects, Parts 1 and 2.
2. Set and report against waste reduction targets.
3. Design for standardisation of components.
4. Avoid waste from excavation or groundworks and consider opportunities for zero cut and fill.
5. Return packaging for reuse.
6. Consider community reuse of surplus or offcuts.
7. Include waste minimisation initiatives and targets in tenders or contracts and engage with the supply chain.
8. Consider use of BIM (building information modelling).
9. Design for off-site or modular build.
10. Design for flexibility, adaptability and future deconstruction.
11. Design to use fewer materials.
12. Use of reusable temporary elements such as shuttering and protection.

This list is not exhaustive and other waste minimisation actions can be taken.

11 Customer Experience

11.1 Aftercare



Aim

To support occupants when they first move into their home, to help them manage their home efficiently, live comfortably and deal with any early problems as soon as possible.

Benefit

- Helps occupants feel happy, comfortable and confident in their new home.
- Reduces costs and disruptions by helping to make sure that home systems are working efficiently and identifies and deals with any problems as soon as possible.
- Allows the developer to have a closer relationship with their customers, improving relationships and reputation.

Context

For many people, moving home is considered to be one of the most stressful events they will go through, and in many cases it will be by far the biggest financial investment of their lives. A smooth and well-supported handover to the occupier can have a huge effect on their satisfaction and experience of settling into their new home, and on the developer's reputation.

This issue supports the building industry's and Government's efforts to produce better buildings. It builds on the principles of BSRIA's soft landings framework(160) and recognises the growing emphasis on giving consumers more protection in relation to homes, which is included in publications such as the Each Home Counts report(161) and the All Party Parliamentary Group's 'More homes, fewer complaints'(162). A well-delivered handover helps occupants use their home in an efficient and effective way (163), while also giving developers feedback to improve customer satisfaction on future projects, making this an important part of HQM's approach as a consumer-centred standard for sustainability and quality.

Credit Summary

This issue contains two criteria (crit 1 and crit 2) that are minimum requirements and need to be met in order for a home to become certified under the Home Quality Mark.

Criterion number	Title	Credits
crit 1	01 Building warranty	Minimum requirement
crit 2	02 Handover visit	Minimum requirement
crit 3	03 On-call support	up to 4
Total credits available		4

Criteria

01 Building warranty **Minimum requirement**

crit 1 The home is covered by a building warranty, from a warranty provider who is a member of and fully complies with 'The Consumer Code for Home Builders' (consumercodeforhomebuilders.com) or is recognised by the Trading Standards Institute.

02 Handover visit **Minimum requirement**

crit 2 Where a contracted commitment is in place for the following to be met, as agreed with the first occupants before or after they move in (within 4 weeks):

crit 2.a: Introduction to the home information available, including its purpose and communication of the content for the below topics as a minimum (see 11.2 Home Information):

crit 2.a.i: Introduction, including the quick start guide and HQM certificate.

crit 2.a.ii: Health and safety.

crit 2.a.iii: Operation and maintenance.

crit 2.a.iv: Support.

crit 2.b: Demonstrations of how to operate and maintain any installed active systems (see definition) and passive design features, with reference to the home information available, including the following as a minimum:

crit 2.b.i: Ventilation systems, including how to use installed systems to maintain a comfortable and energy efficient home.

crit 2.b.ii: Heating and hot water systems, including how to conserve energy and carry out or identify when maintenance or repair is needed.

crit 2.b.iii: Low and zero carbon technologies (LZC), including: how to check their performance, the support available if needed and how to maximise energy saving benefits (such as using appliances at peak supply and electric vehicle charging).

crit 2.b.iv: Smart devices and any monitors and controls, including any installed as part of the 11.3 Smart Homes issue).

crit 2.c: Provisionally agree dates for the 4–6 week and 8–12 month aftercare visits, where these criteria are met in the 9.3 Inspections and Completion issue.

crit 2.d: Where post occupancy evaluations (POEs) have been committed to (see 11.4 Post Occupancy Evaluation), details regarding what a POE is, how the occupants can get involved and the benefits of being involved must be communicated to the occupants during aftercare visits. Provisional dates are arranged for POE visits as appropriate.

03 On-call support **up to 4 credits**

crit 3 Where a contracted commitment has been made to provide on-call support, to the occupants of the home being assessed, which meets the following:

crit 3.a: Covers all parts of the home (i.e. all building fabric, systems and services).

crit 3.b: Is available for the whole duration of time specified in the criteria.

crit 3.c: Is free for occupants to use. Credits are not available where aftercare support is offered as an optional feature of the home at an additional cost to occupants.

crit 3.d: Is available to whoever occupies the home, during the time the support is specified as being available for. This means that in the event that a home changes occupancy before the arranged aftercare support is due to finish, the support must still be available to any new occupants for the time originally agreed to.

Credits are awarded depending on how long the support is available for:

- 3 credits for two years.
- 4 credits for three years.

Methodology

Handover visit timing

There is flexibility regarding when the handover visit is carried out, as long as the occupant is in agreement and all of the criteria will be able to be met at the time that the visit is taking place. Note, where the handover visit is carried out after the occupants have moved in, the early inspection week visit (in the Inspections and Completion issue) must be carried out 4 to 6 weeks after the handover visit date.

Build to rent projects

For build to rent projects, latent defects insurance can be used to meet crit 1.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	

BRE will contact developers to ensure any aftercare or POE commitments made to achieve these credits have been undertaken. In the event that aftercare or POE commitments are not undertaken or completed, BRE may suspend or withdraw the assessment's HQM certificate and its Green Book Live listing. Alternatively, BRE may re-issue the HQM certificate with an updated rating and score based on the withdrawal of the affected credits (at the client's own expense).

Checklists, Tables & Illustrations

None.

Definitions

Active systems

Any home systems that require active operation or maintenance. This includes common home systems such as:

- Heating and hot water systems.
- Ventilation systems.
- Low and zero carbon technologies.
- Comfort cooling systems.
- Appliances.
- Showers or baths.
- Lighting.
- Security systems.
- Smart devices (e.g. smart meters).

As well as any other systems, which may be less typical, such as:

- Electric car charging points.
- Living roof systems (e.g. green roofs).
- Flood resilience measures.
- Drainage systems or strategies (e.g. SuDS).
- Temperature control measures (e.g. active external shading).

On-call support

Support that is available to occupants on demand. For example:

- Call-out service.
- Ongoing maintenance and management arrangements.
- Resident on-site attendance.

Near-site LZC

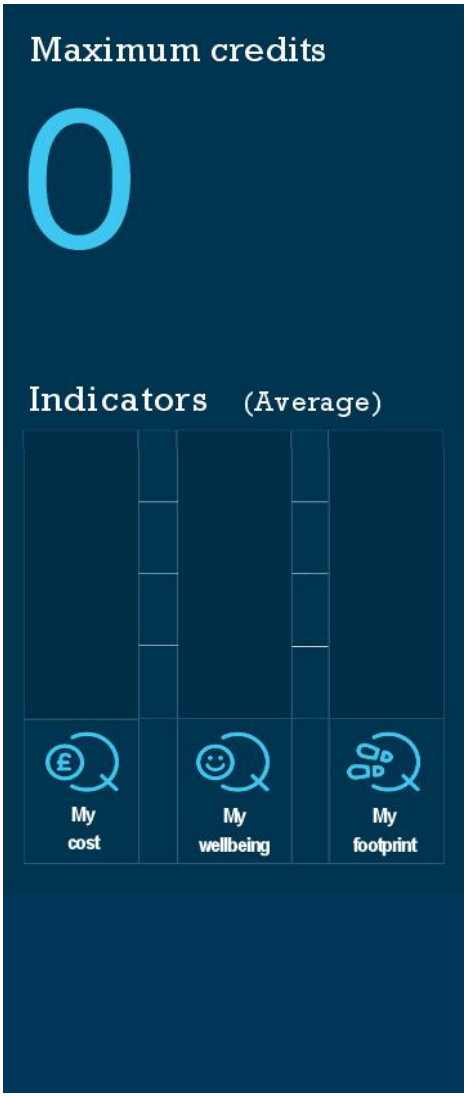
A low or zero carbon source of energy generation located near to the site of the assessed building. The source is or will be providing energy for all or part of a local community of buildings, including the assessed home, e.g. decentralised energy generation linked to a community heat network or renewable electricity sources connected via private wire.

On-site LZC

A low or zero-carbon source of energy generation which is located on the same site as the assessed home.
This is support that is available to occupants on demand. For example:

- Call-out service.
- Ongoing maintenance and management arrangements.
- Periodic walkabouts.
- Resident on-site attendance.

11.2 Home Information



Aim

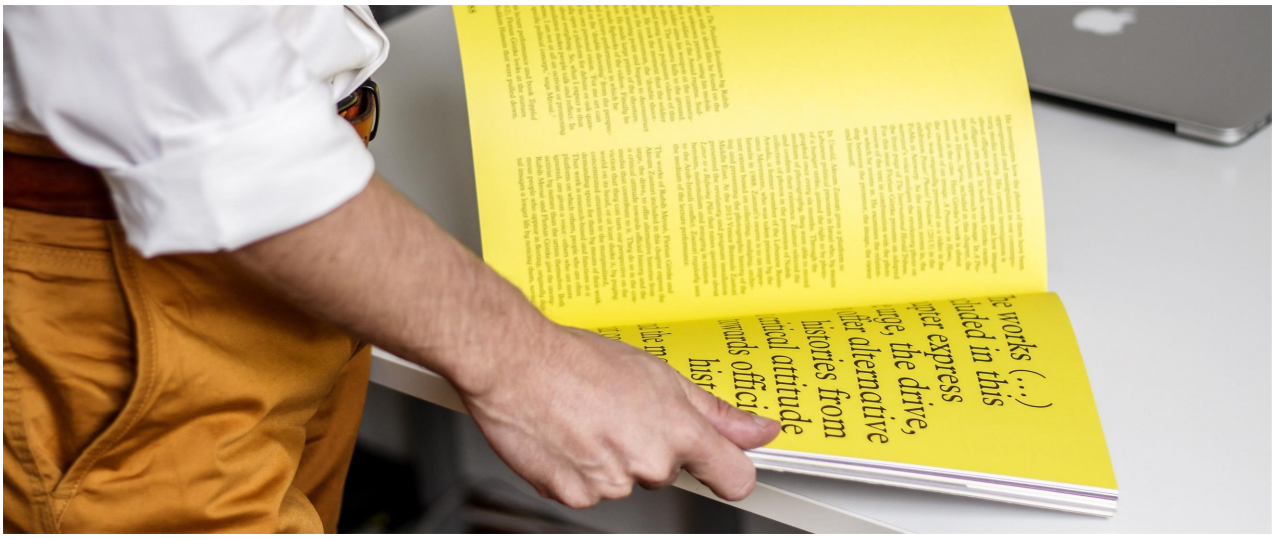
To provide occupants with useful and accessible information that helps them get the most from their home, work with their local community and reduce their costs and environmental footprint.

Benefit

- Helps occupants manage their home in a cost-effective way and use it in an efficient way that takes account of the design intent.
- Informs occupants how to use their home in a way that supports their health and wellbeing.
- Allows occupants to understand and make the most of their community and its amenities.

Context

Providing occupants with relevant, clear, accessible and user-friendly information about using and maintaining their home is an important part of helping people to live well and be satisfied with their new home.(164) Good-quality and accessible information is of growing importance given the increasingly airtight, serviced and complex buildings which are required under building regulations and people's expectations. Providing clear information also helps consumers to make sure they get the most from their home by informing them what support is available and giving them access to information they should have a right to see. This is one of the recommendations from the All Party Parliamentary Group's report 'More homes, fewer complaints'.(165) This issue recognises where this type of information is provided in written guides, videos, websites, or other media, in order to help translate the design benefits of homes direct to the people living in them.



Credit Summary

This issue contains a criterion (crit 1) that is a minimum requirement and needs to be met in order for a home to become certified under the Home Quality Mark.

Criterion number	Title	Credits
crit 1	01 Home information	Minimum requirement
Total credits available		0

Criteria

01 Home information **Minimum requirement**

crit 1 Where it is demonstrated that all applicable home information will be provided to occupants of all homes from the first day of moving in and the home information meets the following:

crit 1.a: Available in an accessible format (see Methodology).

crit 1.b: Available in both a hard and soft copy.

For England, Scotland, and Northern Ireland:

crit 1.c: Written in Plain English (to meet the guidelines of the Plain English Campaign), which is jargon free and uses simple illustrations as appropriate. For example, this may include diagrams, flow charts or interactive graphics to show where items referred to are located.

For Wales:

crit 1.d: Provided in Plain English (to meet the guidelines of the Plain English Campaign) and in Welsh, which is jargon free and uses simple illustrations as appropriate. For example, this may include diagrams, flow charts or interactive graphics to show where items referred to are located.

For England, Scotland, Wales, and Northern Ireland:

crit 1.e: Clearly communicates the following:

crit 1.e.i: All the content outlined in Table 62 and any information required as part of meeting criteria listed in Table 63, to all parties, for transparency.

crit 1.e.ii: The person or organisation responsible for anything referred to in the home information, and their contact details (for example, who is responsible for maintenance of active systems).

crit 1.e.iii: Who the information is relevant to (such as the leaseholder, freeholder or trades person).

crit 1.e.iv: Contact details for the person or company responsible for any queries regarding the home (for example, this may include landlords, warranty providers, management companies or housing associations).

Table 62 Information as part of HQM minimum requirement

Topic	Information required
Introduction	A quick start guide where all home information is briefly summarised and can be used to direct readers to the relevant section of home information where further information is needed (such as a simple index or 'crib' sheet). The assessed home's HQM post-construction certificate issued by BRE Global.
Operation and maintenance	Operational and maintenance information for all active systems (see definition) within the home or building (where present).
Health and safety	Key health and safety information and emergency procedures specific to the home. For example, the location and use of the fuse box, stopcock, smoke alarms or emergency exits. Contact details for: – Local emergency services (for example, the local police station, hospitals, or the fire brigade).
Support	A summary of all types of aftercare support available to the occupants, including the duration and how to use it. This includes details for the following, as a minimum: – Guarantees, insurance policies or warranties – Support from organisations such as the Consumer Code for Home Builders and the Trading Standards Institute, depending on the warranty in place – How to deal with defects or snagging issues – Visits available, including any available as part of the Aftercare issue – Details of the commissioning or testing that has taken place, including who by and what was done.
Public transport	Information for local transport networks or nodes, including the following, where available: – Public transport options available (such as buses or trains) – Locations, including distance – Routes available – Timetables (for example, from the transport provider). This information could be provided in different formats such as a phone application, for accuracy and real time updates.
Local amenities	Details of the key and beneficial local amenities that are within walking distance to the home and their locations.
Temperature	The results from the thermal analysis carried out for the Temperature issue's minimum requirement and guidance on how occupants can avoid excessive indoor temperatures caused by hot weather. This guidance should cover the appropriate use of any specific features that are present within the home to help with this, including: external shutters, windows that open, window coverings, trickle vents and purge ventilation (including mechanical and natural).

In addition to the information outlined in Table 62, the information in Table 63 also needs to be provided if the corresponding issue and criteria have been met.

For example, if any of the credits in the Energy issue are being pursued, then the information outlined in the 'information required' column must also be provided in line with the home information criteria (i.e. crit 1). In contrast, if credits in the Energy issue have not been met, the corresponding information would not need to be provided.

Table 63 Information required as part of meeting criteria in various technical issues

Issue	Technical criteria	Information required
1.2 Sustainable Transport Options	04 Electric vehicle charging points 05 Car clubs	The location of any sustainable transport access, including electric charging points, car clubs, electric bicycles, bike hire, or other. Contact details for those responsible for any sustainable transport schemes (including car clubs). An overview of the reasons for using sustainable transport options (such as environmental and economic savings).
2.4 Long Term Ecological Management and Maintenance	Any	– Details of the ecological value within the property boundary (for example, public and private gardens, green roofs), common areas (such as communal gardens), and the surrounding area (such as public recreational space). – The benefits of the ecological value to the occupants and the broader community. – Guidance on how the occupants can make the most of the local ecology and contribute to its management, for example planting ecologically appropriate species in their property, as well as things they should avoid doing (such as disrupting wildlife corridors). – Highlight relevant actions that can be taken to enhance value within the property (that is owned or occupied) to help ensure its ongoing management and maintenance. – Contact details for those responsible for the management and maintenance of the local ecology and sources of local information on biodiversity and ecological management, including management companies and local wildlife trusts.
2.5 Recreational Space	05 Growing space	Maintenance requirements relating to any plant or food growing space provided. Access restrictions to outdoor space (for example, allotments closed after daylight hours). Types of produce that have been planted and advice of what would grow well in the soil conditions.
3.1 Flood Risk	02B Medium or high risk	Information regarding the flood resilience measures in place within the site boundary.
3.2 Managing Rainfall Impacts	Any	An overview of the reasons for any installed drainage systems use (such as environmental and economic savings) and restrictions on making alterations. Emergency contacts for those responsible for managing any drainage systems or strategies installed.
3.3 Security	01 Home information 02 Approved Document Q compliance 03 Security needs assessment	A summary of the Security Needs Assessment (SNA) and the recommendations implemented.

Issue	Technical criteria	Information required
4.1 Indoor Pollutants	03 Minimising the effects of cooking - Homes with mechanical ventilation heat recovery (MVHR)	A statement from the developer that they are either meeting regulatory requirements in terms of indoor air quality or where credits are sought in the issue, a statement about how they are meeting HQM requirements for the credits achieved. Attention drawn to occupants that fitout or finishing choices may affect indoor air quality. Where recirculating hoods are specified, regular maintenance guidance, according to manufacturer's instructions (for example, charcoal filter replacement, grease filter cleaning or replacement).
4.5 Temperature	Minimum requirement	The results from the thermal analysis carried out for the Temperature issue's minimum requirement and guidance of how occupants can avoid excessive indoor temperatures caused by hot weather. This guidance should cover the appropriate use of any specific features that are present within the home to help with this, including: external shutters, openable windows, window coverings, trickle vents and purge ventilation (including mechanical and natural).
5.1 Energy and Carbon Performance	Any	Details of all parts of the energy strategy for the home. Details of any energy performance targets or levels incorporated into the home's design. Guidance for the occupant on how to operate their home efficiently. General information for the EU energy labelling scheme.
5.2 Decentralised Energy	Any	Simple guidance of how to check LZC technologies are performing correctly and what to do when they are not. The design intent of each LZC technology installed. How systems can be expanded, adapted or installed in the future (where options are available). Advice on ways that occupants can adjust their patterns of energy use to optimise the use of energy from LZC technologies.
6.3 Life Cycle Costing	Any	A simple outline of the cost appraisal showing the specific maintenance and living costs associated with the building fabric. Any specific manufacturer advice that can help the homeowner understand how to care for and get the most out of the products. An outline of what may be required if maintenance will be needed on a product that has been specified. A year-on- year projected expenditure in a graphic form or the raw data that could feed into a graphic form. The format of this data should at least include the year, the element or component and the expected cost. A copy of the final version of the homeowner's report (in accordance with 6.3 Life Cycle Costing: crit 3 on page 151).

Issue	Technical criteria	Information required
7.2 Access and Space	02 Nationally described space standards 03 Accessible and adaptable design 04 Accredited access consultant confirmation	Details of any adaptable functionality that has been designed into the home in relation to access and inclusive design.
7.3 Recyclable Waste	02 Consultation with the waste collection authority 03 Internal waste storage 04 Composting facilities and management	Details of the waste collection patterns, recyclable waste facilities and composting waste facilities provided in the home, including what bins are used for what. Information provided by the service provider or local authority is sufficient, where available.
11.3 Smart Homes	Any	Information regarding the options for retrofit available (such as smart meters or heat meters). How to interpret information from devices that have been installed. Contact details to help if devices malfunction, where available (examples include: warranty provider, manufacturers, or maintenance management plan providers). Guidance on cyber-security relating to smart devices and internet access, including: – Changing default router passwords – Keeping software of devices up-to-date – Complete the setup of smart devices – Appropriate positioning of voice activated devices – Smart lock features.

It is good practice for specific information required for other purposes to be provided as part of the home information supplied for complying with HQM. For example, home reports or quick start guides are sometimes required for regulatory purposes. Where possible, information should be provided in a consistent format and information should not be duplicated.

Methodology

Accessible and flexible format

Written information provided to occupants must be communicated using clear and appropriate language (in plain English avoiding the use of jargon). This information must also be provided in an appropriate format for users where particular needs are known (such as foreign languages, Braille, or audio) or must be available on request where this is not known.

Home information must also be user friendly and have a layout that is easy to navigate so that the occupants can find the information they need (for example, by using a simple index or 'crib' sheet).

The format the home information shall be provided in is flexible, as long as the requirements in the criteria are met. For example, the guidance relating to ventilation, temperature, energy efficiency and indoor air quality could be communicated together as part of a section giving guidance on maintaining a comfortable and efficient home, rather than having to rigidly structure home information into sections listed in Table 62.

Likewise, the format that the soft copy of the home information should take is flexible, in order to recognise the different ways this information can be provided (such as an online portal, interactive website, or mobile app).

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
crit 1	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
crit 1	02 Home information	Refer to the general evidence requirements.	A copy of the home information content that will be provided to all homes.
	03 Confirmation supplied	Refer to the general evidence requirements.	Confirmation that the home information has been provided to all homes.

Checklists, Tables & Illustrations

None.

Definitions

Active systems

Any home systems that require active operation or maintenance. This includes common home systems such as:

- Heating and hot water systems.
- Ventilation systems.
- Low and zero carbon technologies.
- Comfort cooling systems.
- Appliances.
- Showers or baths.
- Lighting.
- Security systems.
- Smart devices (e.g. smart meters).

As well as any other systems, which may be less typical, such as:

- Electric car charging points.
- Living roof systems (e.g. green roofs).
- Flood resilience measures.
- Drainage systems or strategies (e.g. SuDS).
- Temperature control measures (e.g. active external shading).

11.3 Smart Homes

Aim

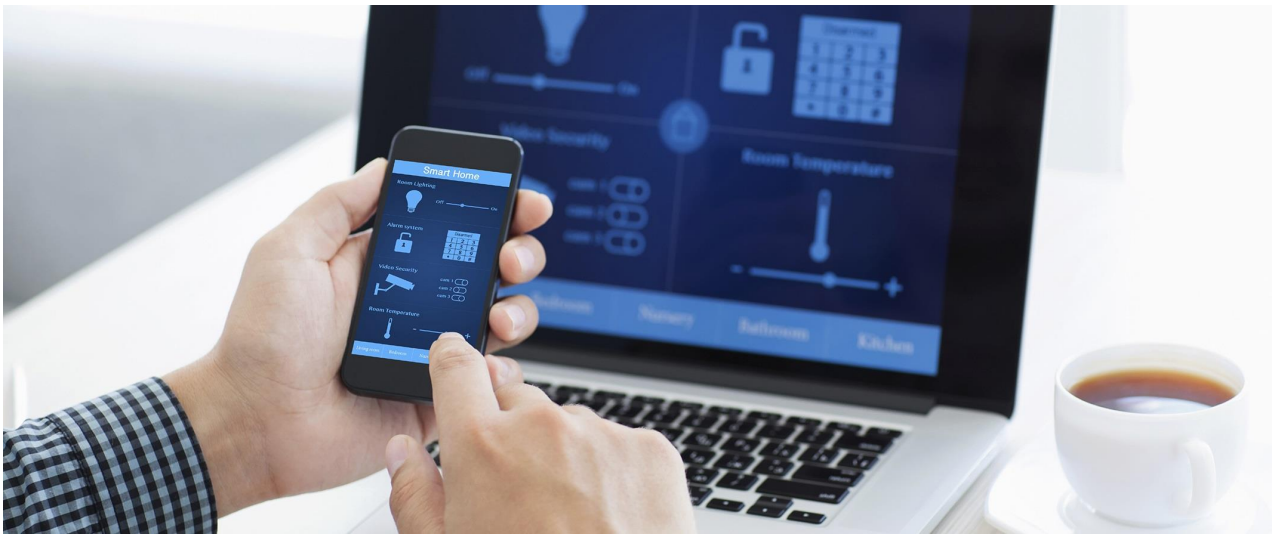
To make sure that the home is able to adapt to increasingly digital lifestyles, take account of developing technologies, and respond to the growing demand for digital connectivity and smart systems throughout the home.

Benefit

- Helps occupants have access to high-speed digital entertainment and gives them flexibility to work from home.
- Improves health and wellbeing and reduces running costs by using smart devices, including monitors, meters, and controls based on changes in the home such as motion, temperature, and light.
- Gives occupants more control in their home to allow it to adapt to their needs.

Context

Dependency on digital connectivity is growing across all age groups and cultures, with approximately 70% of adults using a smartphone in the UK in 2016.(166) Tablets, TVs, heating controls, security systems and white goods with smart technology can now help people live more comfortably and efficiently. Occupants can choose to use their smart home to use appliances when energy costs less during off-peak periods or to manage a comfortable internal temperature based on the time they usually get home from work. Digital connectivity is essential to help occupants get the most from smart technology (167) in their home and it is increasingly important to consumers looking for new homes, particularly for digital entertainment(168). In December 2016, Ofcom reported that almost 89% of UK homes can get superfast broadband and this continues to rise.(169) Home broadband connection is partly covered by Approved Document R and reliable connections throughout the home are also essential for realising the value of smart devices in practice.(170) Energy suppliers are rolling out smart meters to every home and small business as part of a government-driven target and HQM goes beyond this by recognising devices that help improve how homes are managed.



Credit Summary

Criterion number	Title	Credits
crit 1	01 Home information	Prerequisite
crit 2–crit 3	02 Connectivity to the home	up to 2
crit 4–crit 9	03 Connectivity within the home	1
crit 10–crit 11	04 Basic smart heating	1
crit 12–crit 14	05 Advanced smart heating	1
crit 15–crit 16	06 Basic smart lighting	1
crit 17–crit 18	07 Smart energy management	1
crit 19–crit 20	08 Additional smart solutions	1
Total credits available		8

Criteria

01 Home information **Prerequisite**

crit 1 Home information needs to be provided as part of or all of the criteria in this issue. Please see 11.2 Home Information.

02 Connectivity to the home **up to 2 credits**

crit 2 A network infrastructure provider is contacted during the planning stage (see Methodology) and the following is achieved:

crit 2.a: Connections from the street for broadband, telecommunications and cable TV are installed in duct work provided by the service provider, overhead from the street or via direct burial cable, to support future changes, as defined in PAS 35491 2017 Section 5.2.2.

crit 2.b: Any other appropriate infrastructure is implemented on-site during construction, in line with the network infrastructure provider's guidance (for example, in terms of layout, installation of inspection chambers, joint boxes, or distribution units).

crit 2.c: Connection to the broader network via network terminating equipment (such as a master socket for copper or an optical network termination unit for fibre) by post-construction stage.

crit 2.d: Cabled connection is available to occupants when they move in (for example, cabling installed during construction or pulled through before occupancy).

crit 3 Credits are awarded depending on the download speed of the broadband available to the home:

- 1 credit for superfast broadband (24Mbit/s).
- 2 credits for ultra-fast broadband (100Mbit/s).

03 Connectivity within the home **1 credit**

crit 4 There is a primary home distribution space (PHDS) containing a patching panel which together provides a central location for all wiring to be run, including connections from incoming services and distribution of cabling around the home, in accordance with BS EN 50174 series.

crit 5 Ethernet (Cat 5e) is routed to all principal rooms (see definition) in the home, within routing ducts, and with the provision for pulling through new cables in the future.

crit 6 Cable ducting is provided in secondary rooms (see definition) in the home for future upgrades or to resolve poor wireless broadband in any secondary rooms.

crit 7 Cable ducting must either have curved inside and outer corners if they have 90 degree angles, or must be greater than 90 degrees.

crit 8 Both installation and commissioning are done in accordance with BS EN 50174 series.

Where any of the subsequent credits in this issue are met, the following is also met:

crit 9 Installed devices relating to this issue (such as visual display units, sensors, transmitters, signal repeaters, or hubs) must not:

- crit 9.a: Reduce the minimum number of electrical sockets available to occupants that are required legally or by the design.
- crit 9.b: Impede the access or functioning of any other switches or control devices.

04 Basic smart heating **1 credit**

crit 10 crit 2 to crit 9 have been achieved.

crit 11 Accessible (see Definitions) smart home devices or systems have been installed at no additional cost to the occupant (for example, subscription fees) that:

- crit 11.a: Provide a smart heating functionality by monitoring internal temperature levels in the main living room, as a minimum, and keep it within a fixed range for energy savings and comfort, and
- crit 11.b: Has a 12-month warranty on the smart heating devices. This includes smart thermostat, temperature sensors, boiler transceiver unit and any communications hub provided specifically with the smart heating system.
- crit 11.c: Use a smartphone application interface for the smart devices that:
  - crit 11.c.i: Displays internal temperature levels over a weekly, monthly and yearly basis.
  - crit 11.c.ii: Provides remote control of heating with the ability to change schedules.
  - crit 11.c.iii: Provides instant on/off override.
- crit 11.d: Homes over 150m² must have temperature sensors in a main bedroom, in addition to the main living room.

05 Advanced smart heating **1 credit**

crit 12 crit 10 to crit 11 have been achieved.

crit 13 Provide additional smart heating functionality that:

- crit 13.a: Uses multi-zone heating; the ability to independently measure and control the internal temperature of multiple zones for all principal rooms within the home.
- crit 13.b: Uses external temperature sensing.
- crit 13.c: Allows 'away from home' or geo-location control.
- crit 13.d: Allows active frost protection.
- crit 13.e: Uses stored environmental and behavioural data to tailor experience.

crit 14 Occupancy sensing that can be used to trigger heating schedules (such as 'away from home' modes).

06 Basic smart lighting **1 credit**

crit 15 crit 2 to crit 9 have been achieved.

crit 16 Accessible (see Definitions) smart home devices or systems have been installed at no additional cost to the occupant (such as subscription fees) that:

- crit 16.a: Monitor and control the internal lighting in principal rooms, using pre-set lighting controls for energy savings and comfort, and have the ability to be controlled remotely via a smart phone app.
- crit 16.b: Allow for remote dimming control of individual lights in principal rooms.
- crit 16.c: Occupancy sensing that is used to trigger lighting schedules (for example 'away from home' modes).

07 Smart energy management **1 credit**

crit 17 crit 15 and crit 16 are met.

crit 18 Accessible (see Definitions) smart home devices or systems have been installed at no additional cost to the occupant (such as subscription fees) that:

crit 18.a: Monitor, control and report energy use of individual devices via a smartphone app in at least the principal rooms, using smart plugs or sufficient energy disaggregation methods.

crit 18.b: Provide additional lighting functionality that automatically senses ambient light levels and adjusts light levels to meet pre-set requirements (for example, by altering brightness or temperature of the light).

crit 18.c: Monitor and display the operational status and availability of LZC technologies where these are installed (such as where solar PVs are installed).

08 Additional smart solutions **1 credit**

crit 19 crit 10 to crit 11 and crit 15 to crit 16 have been achieved.

crit 20 Accessible (see definition) smart home devices or systems have been installed at no additional cost to the occupant (for example, subscription fees) for at least three of the following:

crit 20.a: Monitor air quality in all principal rooms and either report information to a smart phone app or to an in-home display.

crit 20.b: Enable voice control of the smart heating and smart lighting devices, independent from a smartphone.

crit 20.c: Monitor and report humidity in the kitchen, bathroom and a main bedroom.

crit 20.d: Smart ventilation or filtering, linked with an air quality sensor that measures at least three of the following: Carbon monoxide, Carbon dioxide, humidity, particulates, volatile organic compounds (VOCs).

crit 20.e: Gesture control for smart devices.

crit 20.f: Geofencing; ability to control devices based on the location of the user (for example, where they are within a set radius of the home).

crit 20.g: Other controls (see Compliance Notes).

Methodology

Apartment ducting

Apartments with two bedrooms or less do not have to meet crit 6 for the purpose of complying with the 'connectivity within the home' criteria. All other criteria are still relevant to ensure adequate, whole-home connectivity, which is needed to realise the benefits of a smart home, including for future improvements made to the home.

Network infrastructure guidance

The references below provide guidance on how to provide new homes with a connection. The earlier this is considered, the easier it is to implement on site and provide occupants with connection on moving in, which helps to assure customer satisfaction and reduce the need for often expensive or time-consuming remedial works.

- Openreach (2022) 'How to build a fibre network - developer guide'
- Virgin New Build Developers Guide
- Department for Business Innovation & Skills (2016) 'PAS 2016:2010. Next generation access for new build homes guide'
- HM Government (2014) 'Better connected: A practical guide to utilities for home builders'

For more details, including their time frames before starting on site, please contact a network infrastructure provider during the early design stage (typically RIBA stage 3 or equivalent).

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.
crit 3	02 Broadband speed test	Confirmation from a network provider of the download speeds available at the development or data bit speed measurement using apps or web services to verify speeds.

Checklists, Tables & Illustrations

None.

Definitions

Accessible device

For the purposes of the Smart Homes issue, devices are accessible if they link with a web or mobile interface that meet the WCAG2.0 (ISO/IEC 40500) accessibility standards (www.w3.org; www.iso.org).

Where the above is not met, (e.g. only a visual display unit is installed), a device must have been installed that meets an equivalent level of accessibility to ensure it is usable by people with disabilities.

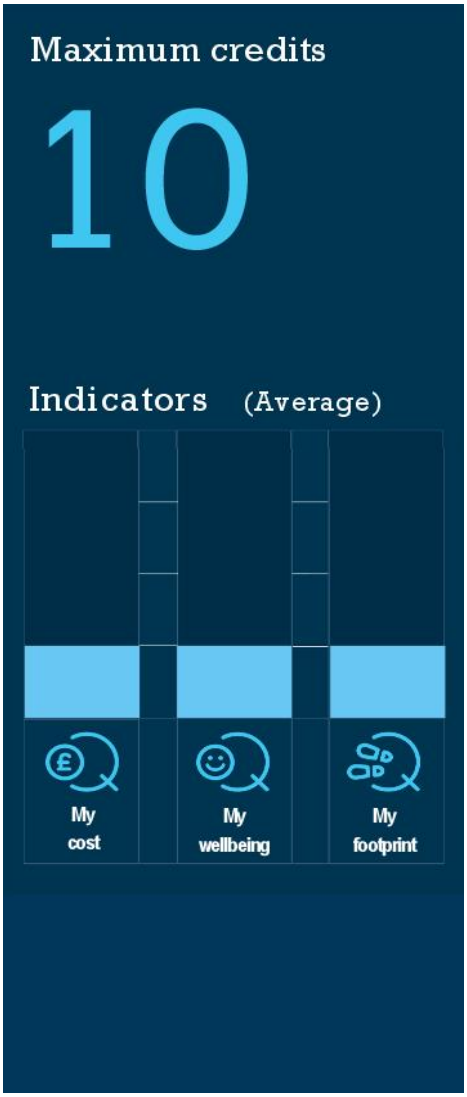
Principal rooms

Main lounge or living room, study or home office, main bedroom and TV room (PAS 35491, 2017).

Secondary rooms

Second and third bedrooms, kitchens, dining rooms and playrooms (PAS 35491, 2017).

11.4 Post Occupancy Evaluation



Aim

To provide improved feedback on the performance and the occupants' experience of the home, to inform stakeholders in the future and to help reduce performance gaps in homes.

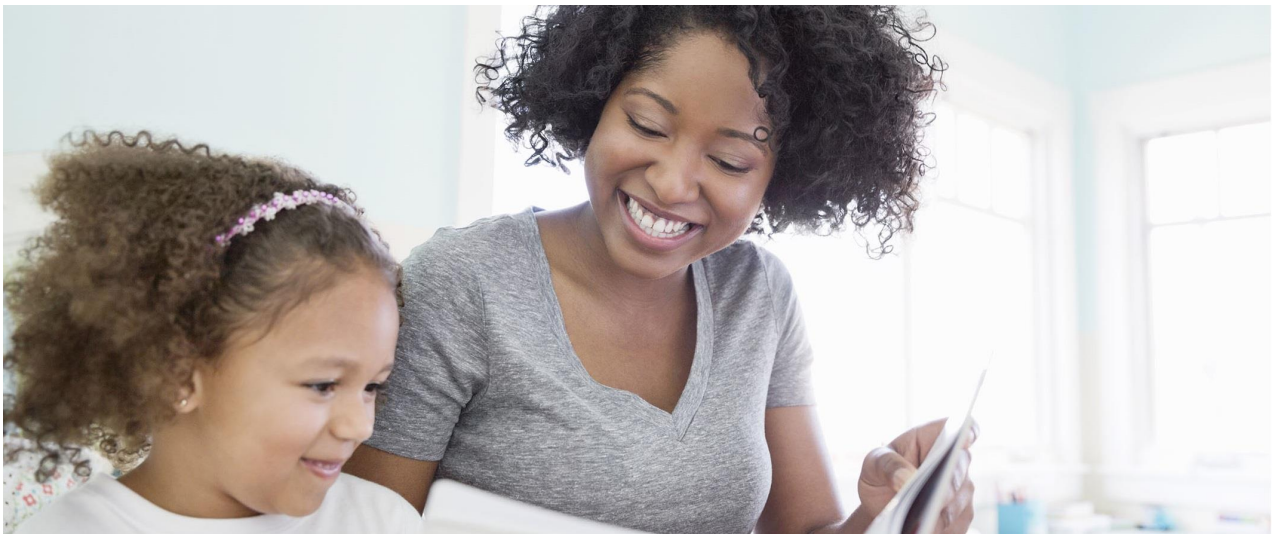
Benefit

- Helps collect 'real life' data to help demonstrate the value of high-performing homes to the financial sector.
- Better guides future design and construction.
- Provides valuable information about consumers, by understanding how people use their home.
- Improves future performance of homes and helps guide policy, tools and industry standards.

Context

Many new homes do not perform in practice as their design intent suggests that they should. This can result in increased operating and maintenance costs, poor occupant satisfaction, damaged industry reputation and many other performance issues over the whole life of the home. Post occupancy evaluations (POEs) are increasingly recognised by building experts and the Government as an effective way of getting the best possible performance out of a home and better informing the construction industry as a whole.(171)(172)(173)(174)

POEs involve systematically collecting information about a building's performance. This can be done in a number of ways, including collecting feedback from residents (for example, occupant-satisfaction questionnaires, interviews and focus groups), monitoring environmental conditions (for example, thermal comfort, noise levels and air quality), audits of energy and water use, and to assess how homes are performing (for example, checking that heating systems are working properly).(175)



Credit Summary

Criterion number	Title	Credits
crit 1–crit 2	01 Occupant satisfaction feedback and bill data	2
crit 3–crit 4	02 Energy and temperature monitoring	3
crit 5–crit 6	03 Advanced POE	2
crit 7–crit 8	04 Independent third party	3
Total credits available		10

Criteria

01 Occupant satisfaction feedback and bill data **2 credits**

Where a commitment has been made for an appropriately qualified professional to carry out the following:

crit 1 Within 6 weeks of occupation:

- crit 1.a: Occupants are formally offered to be involved with the POE, in an accessible format (see Methodology) or in person (for example, as part of any appropriate Aftercare visits).
- crit 1.b: The formal offer must include the following, as appropriate:
  - crit 1.b.i: Details of the actions to be carried out with the occupant's permission.
  - crit 1.b.ii: Benefits of the POE to the occupants, including any services available to them as part of the POE (for example, incentives or if the Aftercare issue has been pursued), to encourage occupant involvement.
  - crit 1.b.iii: Broader reasons for POEs to be carried out and the importance for house building.
  - crit 1.b.iv: Approximate timescales for any home visits or opportunities for occupant feedback (such as questionnaires, interviews or focus groups).
  - crit 1.b.v: Contact details for the company and persons responsible for carrying out POEs.
  - crit 1.b.vi: Details of how occupant feedback and any performance data will be used (see Methodology).
- crit 1.c: Request occupant contact details including an up-to-date phone number and e-mail address, to help encourage their involvement.
- crit 1.d: Contact occupants after the 6-week period, prior to when the POE is scheduled to be carried out, where the first offer has not been accepted or declined.

crit 2 Between 12 and 18 months after occupation:

- crit 2.a: Collect occupant feedback (POE 1- see Methodology).
- crit 2.b: Request the annual energy and water bills for the first year of occupation.
- crit 2.c: Analyse occupant feedback, and energy and water bills to evaluate the performance of the home in practice, compared to its design intent, to improve future projects.
- crit 2.d: Disseminate the POE results and lessons learnt to key stakeholders (see Methodology), in order to share good practice.
- crit 2.e: Send POE data to BRE in the format outlined in the Methodology section for each POE method.

02 Energy and temperature monitoring **3 credits**

crit 3 crit 1 to crit 2 have been achieved.

crit 4 Where an appropriately qualified professional has also been appointed to do the following:

crit 4.a: Collect and monitor the following data for at least one year, recorded hourly:

crit 4.a.i: Energy consumption data in kWh/person or kWh/m².

crit 4.a.ii: Internal temperature in °C, recorded in the main bedroom and living room as a minimum.

crit 4.b: Compare actual and predicted energy costs using the home's Energy Performance Certificate (EPC).

crit 4.c: Analyse results and outline future lessons, as part of crit 2, to improve the performance of future projects.

03 Advanced POE **2 credits**

crit 5 Where crit 1 to crit 4 have been met.

crit 6 Where the appropriately qualified professional will also undertake at least one other POE method (see Methodology) as part of the data being collected and analysed for crit 1 to crit 4.

04 Independent third party **3 credits**

crit 7 Where crit 1 and crit 2 have been achieved.

crit 8 Where an independent third party (see definitions) has been appointed as the appropriately qualified professional and is contractually obliged to fulfil any POE commitments referred to in crit 1 to crit 6.

Methodology

Table 64 Methods that may be used to conduct a post occupancy evaluation

Method	Requirements
POE 1. Occupant feedback	The exact format of occupant satisfaction feedback is flexible (e.g. questionnaires, focus groups, or interviews) as long as occupant satisfaction feedback is gathered for the following aspects of their home, as a minimum: 1. Public transport. 2. Alternative sustainable transport options (if present). 3. Local amenities. 4. Local community overall. 5. Outdoor space. 6. Security. 7. Indoor air quality. 8. Indoor daylight levels. 9. Noise. 10. Thermal comfort. 11. Comfort overall. 12. Energy and water bills. 13. Running costs overall. 14. Indoor space (e.g. size, accessibility, etc.). 15. Active systems (see Aftercare definition). 16. Quality of build, fixtures and fittings. 17. Maintenance and operation of the home. 18. Aftercare support. 19. Home information. 20. Digital connectivity (e.g. broadband) and smart features.
POE 2. Energy audit	Energy data need to be sent to BRE using the HQM template, available on BREEAM Projects.
POE 3. Water audit	Monitoring of water consumption data for at least one year and recording of the number of occupants. Predicted consumption would be based on the modelled water consumption calculated for the purposes of the HQM water efficiency issue.

Method	Requirements
POE 4. Forensic walk-through	A thorough inspection undertaken to check the home's operation, identify problems with the home itself as well as any operational practices (e.g. occupant behaviour). This is conducted between 12 and 18 months of occupation. A summary of the observations made during the walk-through and any actions carried out to rectify identified problems.
POE 5. LZC technology performance monitoring	Technical review of installed LZC technologies to determine if performance (e.g. energy generated) is in line with design intent, as specified by the installer and relevant guidance from the manufacturer. The following data need to be collected and disseminated appropriately as a minimum: – Predicted and actual energy generation or savings (e.g. kWp for PV).
POE 6. Humidity monitoring	Relative humidity must be measured in a living room and at least one bedroom, over the course of at least one year and readings must be recorded at least every hour.

While monitoring humidity and temperature is less common as part of a POE compared to monitoring energy and water usage for instance, monitoring these aspects of the home can be useful where occupants have expressed problems with poor ventilation or overheating, for example. As these types of problems can have significant health implications, they have been included as types of data that may be useful to collect as part of a POE. Monitoring humidity and temperature may therefore be most appropriate as part of a whole house research project or case study or where occupant feedback identifies particular problems associated with these aspects in their home.

Accessible format

Where formal offers are made in writing, they must be communicated using clear and appropriate language (in plain English avoiding the use of jargon). This information must also be provided in an appropriate format for users where particular needs are known (such as foreign languages, Braille, or audio) or must be available on request where this is not known.

Data format

All data must be anonymous to protect occupant privacy. However, the data must still be able to be cross-referenced with the HQM registration number and individual dwelling ID, to allow for comparison with inputs made for the assessment. This is required to help contribute to HQM's ongoing technical development and will be subject to use across the BRE Group.

Appropriately disseminated

The HQM assessment reference and dwelling ID used in the HQM assessment tool needs to be clearly recorded as part of any POE results that are disseminated.

Dissemination will vary depending on the type of data or information collected as part of the POE, but may be in the form of a written summary, follow up meetings, case study or report of POE results and analysis, which is disseminated to key stakeholders including (where appropriate):

- Occupants.
- BRE.
- Developer.
- Designers (such as architects and structural engineers).
- Principal contractor.
- Management companies.
- Landlords.

Examples of the types of acceptable content for dissemination include:

- Occupants: A user-friendly written summary or follow up interview, meeting or focus group may be appropriate ways to disseminate useful findings to occupants and advice to help occupants get the most from their home. For example, simple ways they can reduce energy consumption and how to prevent overheating.

- BRE: POE results (excluding confidential information) as part of the evidence to confirm compliance and help to shape HQM in the future so that technical requirements more closely reflect performance in-use.
- Developers, designers and principal contractor: A report or analysis of the POE findings, in order to help inform future energy strategies and better quality design and construction. This report may also help stakeholders support their claims of quality in-use.
- Management companies: Occupant feedback on building services and control systems, to help inform future maintenance.

Compliance Notes

Please visit the BREEAM Knowledge Base to access the compliance notes associated with this issue.

Evidence

Criterion Reference	Title	Design Stage	Post Construction Stage
All	01 General evidence	One or more of the appropriate evidence types listed in Appendix C – HQM Evidence Requirements on page 248 can be used to demonstrate compliance with these criteria.	
All	02 Confirmation of POE offer to all occupants	Refer to general evidence requirement above.	A copy of the correspondence and the POE offer that will be provided to occupants.
crit 8	03 Contract	A letter of commitment from the relevant party confirming the intent to appoint an appropriately qualified professional who is contractually obliged to fulfil any POE commitments referred to in crit 1 to crit 6.	The contractual agreement between the developer and the independent party, confirming: – What will be carried out as part of the POE – How the occupant will be contacted to ask for their permission – Timescales for carrying out the POE – The independent party responsible for carrying out the POE.

BRE will contact developers to ensure any aftercare or POE commitments made to achieve these credits have been undertaken. In the event that aftercare or POE commitments are not undertaken or completed, BRE may suspend or withdraw the assessment's HQM certificate and its Green Book Live listing. Alternatively, BRE may re-issue the HQM certificate with an updated rating and score based on the withdrawal of the affected credits (at the client's own expense).

Checklists, Tables & Illustrations

None.

Definitions

Active systems

Any home systems that require active operation or maintenance. This includes common home systems such as:

- Heating and hot water systems.
- Ventilation systems.
- Low and zero carbon technologies.
- Comfort cooling systems.
- Appliances.
- Showers or baths.
- Lighting.
- Security systems.
- Smart devices (e.g. smart meters).

As well as any other systems, which may be less typical, such as:

- Electric car charging points.
- Living roof systems (e.g. green roofs).
- Flood resilience measures.
- Drainage systems or strategies (e.g. SuDS).
- Temperature control measures (e.g. active external shading).

Appropriately qualified professional

For the purposes of the POE issue, an AQP is an individual or multiple individuals with the relevant skills and experience to carry out the specific POE methods being used.

Their organisation may be involved with the project, but the AQP specifically carrying out the POE has to be independent from the project's design and construction.

Please note that the appropriately qualified professional must meet the independent third-party definition, to meet the 'independent third party' credits. If they do not, they can still be used to pursue the other credits in this issue.

Independent third party

An individual or group of individuals, independent from the parties involved with the assessed home.

For the purposes of the POE issue, this could be a consultancy specifically employed to carry out a POE, where they have had no involvement in the assessed home other than POE.

Post occupancy evaluation

Post occupancy evaluation (POE) is the umbrella term for the process of obtaining feedback on the performance of a recently completed new building or refurbishment, while in-use. Over time, the value of POE has been recognised not only as a one-off evaluation of a recently completed project, but as an ongoing assessment process for any building in-use that should be conducted at regular intervals over the building’s life cycle.

Appendices

Appendix A – HQM Scoring and Rating

HQM scoring and rating methodology

There are two elements to the scoring approach taken within HQM. There is a single overarching Star Rating and a set of three occupant focused Indicators which represent the degree to which the home meets the requirements set out in each of the 39 distinct issues within HQM.

How the Star Rating is calculated

The Star Rating provides a simple comparative measure of the overall quality and performance of a new build home. This is based on a total HQM score which is calculated out of a maximum available 500 credits. The relative importance of different issues and criteria (and therefore the number of credits available within them) is based on the scoring methodology that underpins all BREEAM schemes, albeit tailored to the needs of the new build housing sector.

To achieve a HQM Star Rating, a minimum total number of credits must be achieved as highlighted in Table 65. In HQM, all credits are equal (i.e. one credit is equal to one credit throughout the scheme).

Table 65 Minimum credits required for each Star Rating

	1 Star	1.5 Star	2 Star	2.5 Star	3 Star	3.5 Star	4 Star	4.5 Star	5 Star
Minimum total credits	Minimum requirements only	90	100	120	150	190	240	300	400
Percentage		18	20	24	30	38	48	60	80
Rating					Good		Very Good	Excellent	Outstanding

There are a number of minimum requirements within key issues which apply for all Star Ratings (see Table 71 for more details). If these minimum requirements are not achieved, a HQM certificate cannot be issued.

How the Indicators are calculated

The second element of scoring in HQM are the Indicators which reflect key areas of concern to the householder. The respective scores for each of these Indicators are generated in parallel with the HQM Star Rating. The indicator band rating achieved (1-5) is independent of the star rating achieved (1-5) for a home. The relative contribution of each assessment issue to the indicator scores is confirmed in the information box at the top of each issue, alongside the total number of credits available.

The Indicators are scored out of 5 and are awarded on the basis of the total minimum number of points as highlighted in Table 66.

Table 66 Minimum number of points required for each indicator band

	Indicator	Indicator band				
		1	2	3	4	5
	My Cost	47.25	52.5	78.75	126	210
	My Wellbeing	51.25	56.75	85.25	136.25	227
	My Footprint	72.25	80.25	120.25	192.5	320.75
	Percentage	**18**	**20**	**30**	**48**	**80**

Each criterion was rated in terms of the likelihood that it will impact householders living costs (My Cost), health and wellbeing (My Wellbeing) and environmental footprint (My Footprint). The ratings are classed as "No, Low, Medium, High or Very High Impact" (calculated using a decimal as shown in Table 67), this was tested through a series of consultations during the development of HQM. These accumulate to contribute to the overall indicator points achieved, and the resulting indicator score (as shown in Table 66).

Table 67 Issue impact decimals

No	Low	Medium	High	Very High
0	0.25	0.5	0.75	1

There are a number of backstops set to achieve certain levels within each indicator. These represent the minimum performance criteria that must be met by the home in key areas relevant to that particular Indicator.

To achieve an indicator score, the minimum number of points (as highlighted in Table 66) must be achieved, and the indicator backstops for the level required (as highlighted in Table 68, Table 69, and Table 70), must be complied with.

Table 68 'My Cost' Indicator backstops

Issue	Level 1	Level 2	Level 3	Level 4	Level 5
3.1 Flood Risk			17 credits		
3.3 Security				4 credits	9 credits
4.5 Temperature				6 credits (Foundation route) OR 11 credits (Comprehensive route)	
4.6 Ventilation				4 credits (Maintenance & controls)	
5.1 Energy and Carbon Performance				26 credits (Energy performance)	41 credits (Energy performance)
8.1 Water Efficiency			8 credits		11 credits

Table 69 'My Wellbeing' Indicator backstops

Issue	Level 1	Level 2	Level 3	Level 4	Level 5
2.5 Recreational Space			3 credits	5 credits	7 credits
3.3 Security					9 credits
4.1 Indoor Pollutants			1 credit	2 credits	4 credits
4.2 Daylight			3 credits	5 credits	8 credits
4.3 Noise Sources					2 credits
4.4 Sound Insulation			1 credit (Sound insulation between homes)	3 credits (Sound insulation between homes)	5 credits (Sound insulation between homes)
4.5 Temperature			6 credits (Foundation route) OR 11 credits (Comprehensive route)		
4.6 Ventilation			5 credits (Ventilation rates)	5 credits (Ventilation rates) + 4 credits (Ventilation air intakes)	
7.2 Access and Space			5 credits (Nationally described space standards)		11 credits

Table 70 'My Footprint' Indicator backstops

Issue	Level 1	Level 2	Level 3	Level 4	Level 5
2.2 Managing Impacts on Ecology			6 credits		
2.3 Ecological Change and Enhancement				2 credits (Foundation route) OR 4 credits (Comprehensive route)	6 credits (Comprehensive route)
2.4 Long Term Ecological Management and Maintenance			4 credits (Landscape and ecology management plan)		
5.1 Energy and Carbon Performance			12 credits (Energy performance)	37 credits (Energy performance)	52 credits (Energy performance)

Issue	Level 1	Level 2	Level 3	Level 4	Level 5
6.1 Responsible Sourcing			2 credits (Product procurement policy) + 5 credits (Responsible sourcing of construction products assessment)	2 credits (Product procurement policy) + 7 credits (Responsible sourcing of construction products assessment)	2 credits (Product procurement policy) + 9 credits (Responsible sourcing of construction products assessment)
6.2 Environmental Impact of Materials			2 credits (Product procurement policy) + 2 credits (Product environmental information)	2 credits (Product procurement policy) + 2 credits (Product environmental information) + 3 credits (Building life cycle assessment)	2 credits (Product procurement policy) + 2 credits (Product environmental information) + 10 credits (Building life cycle assessment)
8.1 Water Efficiency			8 credits		11 credits
10.4 Site Waste Management			5 credits	7 credits	11 credits

Detail

Table 71 Detail of the scoring

Issue	Criteria	Total criteria credits	Total issue credits	Indicators My Cost	My Wellbeing	My Footprint
Our Surroundings (153 credits)						
1 Transport and Movement						
1.1 Public Transport Availability	Accessibility index	12	15	0.5	0.5	0.5
	Improved local service	3		0.5	0.5	0.5
1.2 Sustainable Transport Options	Home information	Prerequisite	17	N/A	N/A	N/A
	Cycle storage	6		0.5	0.75	0.5
	Cycle networks	4		0.5	0.75	0.5
	Electric vehicle charging points	4		0.5	0.25	0.5
	Car clubs	3		0.5	0.25	0.5
1.3 Local Amenities	Key local amenities	11	16	0.75	0.5	0.5
	Beneficial local amenities	5		0.75	0.5	0.5
2 Outdoors						
2.1 Identifying Ecological Risks and Opportunities	Assessment route selection	Prerequisite	7	N/A	N/A	N/A
	Survey and evaluation*	3		0	0.5	1
	Determining ecological outcomes*	3		0	0.5	1
	Wider site sustainability	1		0	0.5	1
2.2 Managing Impacts on Ecology	Ecological risks and opportunities for the project	Prerequisite	9	N/A	N/A	N/A
	Liaison, implementation and data	3		0	0.5	1
	Managing negative impacts*	6		0	0.5	1

Issue	Criteria	Total criteria credits	Total issue credits	Indicators My Cost	My Wellbeing	My Footprint
2.3 Ecological Change and Enhancement	Ecological risks and opportunities for the project	Prerequisite	12	N/A	N/A	N/A
	Previously occupied land	2		0	0	1
	Liaison, implementation, and data*	2		0	0.5	1
	Measuring the change in ecological value*	8		0	0.5	1
2.4 Long Term Ecological Management and Maintenance	Roles and responsibilities, implementation, statutory obligations	Prerequisite	8	N/A	N/A	N/A
	Home information	Prerequisite		N/A	N/A	N/A
	Liaison, review, and management	Prerequisite		N/A	N/A	N/A
	Landscape and ecology management plan	4		0	0.5	1
	Monitoring and update	4		0	0.5	1
2.5 Recreational Space	Home information	Prerequisite	22	N/A	N/A	N/A
	Accessible recreational spaces	4		0.5	0.75	0.5
	Private space	6		0.5	0.75	0.5
	Communal space	7		0.5	0.75	0.5
	Growing space	3		0.5	0.75	0.5
	Expert input	2		0.5	0.75	0.5
3 Safety and Resilience						
3.1 Flood Risk	Home information	Prerequisite	19	N/A	N/A	N/A
	For England, Scotland, and Northern Ireland: Flood risk assessment For Wales: Flood consequence assessment	Minimum requirement		N/A	N/A	N/A
	Flood risk	19		1	0.75	1
3.2 Managing Rainfall Impacts	Home information	Prerequisite	19	N/A	N/A	N/A
	Managing the rate and volume of run-off*	14		0.25	0.25	1
	Water quality	3		0.25	0.25	1
	Designing for maintenance and operation	2		0.25	0.25	1
3.3 Security	Home information	Prerequisite	9	N/A	N/A	N/A
	For Wales: Approved Document Q compliance	Minimum requirement		N/A	N/A	N/A
	Security needs assessment	Prerequisite		N/A	N/A	N/A
	Security features	9		1	1	0.25
My Home (261 credits)						
4 Comfort						

Issue	Criteria	Total criteria credits	Total issue credits	Indicators My Cost	My Wellbeing	My Footprint
4.1 Indoor Pollutants	Home information	Prerequisite	12	N/A	N/A	N/A
	Minimising emissions from space and water heating	Prerequisite		N/A	N/A	N/A
	Minimising the effects of cooking	2		0.25	1	0
	Minimising emissions from building product types	4		0.25	1	0
	Minimising airborne formaldehyde from all sources	3		0.25	1	0
	Minimising airborne TVOCs (total volatile organic compounds) from all sources	3		0.25	1	0
4.2 Daylight	Average daylight factor (kitchens)	5	13	0.75	1	0.75
	Average daylight factor (living spaces)	5		0.75	1	0.75
	View of sky	3		0	1	0
4.3 Noise sources	Internal noise levels	2	4	0	1	0
	External noise levels	2		0	1	0
4.4 Sound Insulation	Sound insulation between homes	5	9	0	1	0
	Sound insulation levels for internal walls and floors	4		0	1	0
4.5 Temperature	Home information	Prerequisite	17	N/A	N/A	N/A
	Temperature analysis*	Minimum requirement		N/A	N/A	N/A
		17		1	1	1
4.6 Ventilation	Information sign	Prerequisite	13	N/A	N/A	N/A
	Ventilation air intakes	4		0.25	1	0
	Ventilation rates	Minimum requirement		N/A	N/A	N/A
		5		0.5	1	0.5
	Maintenance and controls	Minimum requirement		N/A	N/A	N/A
		4		0.75	1	0.75
5 Energy						
5.1 Energy and Carbon Performance	Home information	Prerequisite	60	N/A	N/A	N/A
	Energy performance	52		1	0.75	1
	Beyond zero net regulated carbon	8		1	0.75	1
5.2 Decentralised Energy	Home information	Prerequisite	8	N/A	N/A	N/A
	Feasibility study	Prerequisite		N/A	N/A	N/A
	Implementation of feasibility study findings	8		1	0.25	1
5.3 Impact on Local Air Quality	Impact on local air quality	15	15	0	1	1
6 Materials						
6.1 Responsible Sourcing	Legally harvested and traded timber	Prerequisite	25	N/A	N/A	N/A
	Product procurement policy	2		0	0	1
	Responsible sourcing of construction products assessment*	23		0	0	1

Issue	Criteria	Total criteria credits	Total issue credits	Indicators My Cost	My Wellbeing	My Footprint
6.2 Environmental Impact of Materials	Product procurement policy	2	25	0	0	1
	Product environmental information	4		0	0	1
	Building life cycle assessment*	19		0	0	1
6.3 Life Cycle Costing	Occupant's life cycle cost report	6	12	1	0.25	1
	Component level life cycle cost optimisation	6		1	0.25	1
6.4 Durability	Integral elements	5	7	1	0.25	1
	Finishing elements	2		1	0.25	1
7 Space						
7.1 Drying Space	External drying	1	3	0.75	0.5	0.75
	Internal drying	2		0.75	0.75	0.75
7.2 Access and Space	Home information	Prerequisite	11	N/A	N/A	N/A
	Nationally described space standards	5		0	1	0
	Accessible and adaptable design	3		0.5	1	0.5
	Accredited access consultant confirmation	3		0.5	1	0.5
7.3 Recyclable Waste	Home information	Prerequisite	10	N/A	N/A	N/A
	Consultation with the waste collection authority	2		0	0	1
	Internal waste storage	5		0	0	1
	Composting facilities and management	3		0	0	1
8 Water						
8.1 Water Efficiency	Water efficient fittings	11	17	1	0.25	1
	Water recycling	6		1	0	1
Delivery (86 credits)						
9 Quality Assurance						
9.1 Project Preparation	Feedback from previous projects	4	6	1	1	1
	Project delivery plan	Minimum requirement		N/A	N/A	N/A
	Product procurement and substitution policy	Minimum requirement		N/A	N/A	N/A
	Dissemination of information	Minimum requirement		N/A	N/A	N/A
	Site worker feedback	2		1	1	1
9.2 Commissioning and Testing	Commissioning building services and control systems	Minimum requirement	11	N/A	N/A	N/A
	Fabric pre-testing	4		1	1	1
	Post-construction testing	7		1	1	1

Issue	Criteria	Total criteria credits	Total issue credits	Indicators My Cost	My Wellbeing	My Footprint
9.3 Inspection and Completion	Visual defects inspection	Minimum requirement	16	N/A	N/A	N/A
	Construction inspections	Minimum requirement		N/A	N/A	N/A
	Construction record	Minimum requirement		N/A	N/A	N/A
	Right to inspect	2		1	1	1
	Feedback dissemination	1		1	1	1
	Third party verification	5		1	1	1
	Early inspection visit	4		1	1	1
	Seasonal inspection visit	4		1	1	1
10 Construction Impacts						
10.1 Responsible Construction Practices	Responsible construction management	5	5	0	0.25	0.75
10.2 Construction Energy Use	Contractor's energy efficiency checklist	2	5	0	0	1
	Energy monitoring and reporting	2		0	0	1
	Weekly detailed monitoring and reporting of metered energy use	1		0	0	1
10.3 Construction Water Use	Contractor's water efficiency checklist	2	5	0	0	1
	Water monitoring and reporting	2		0	0	1
	Weekly detailed monitoring and reporting of metered water use	1		0	0	1
10.4 Site Waste Management	Product procurement policy	1	16	0	0	1
	Construction resource efficiency	8		0	0	1
	Diversion of construction waste from landfill	4		0	0	1
	Diversion of excavation waste from landfill	3		0	0	1
11 Customer Experience						
11.1 Aftercare	Building warranty	Minimum requirement	4	N/A	N/A	N/A
	Handover visit	Minimum requirement		N/A	N/A	N/A
	On-call support	4		1	1	1
11.2 Home Information	Home information	Minimum requirement	0	N/A	N/A	N/A
11.3 Smart Homes	Home information	Prerequisite	8	N/A	N/A	N/A
	Connectivity to the home	2		1	0.75	0.75
	Connectivity within the home	1		1	0.75	0.75
	Basic smart heating	1		1	0.75	0.75
	Advanced smart heating	1		1	0.75	0.75
	Basic smart lighting	1		1	0.75	0.75
	Smart energy management	1		1	0.75	0.75
	Additional smart solutions	1		1	0.75	0.75

Issue	Criteria	Total criteria credits	Total issue credits	Indicators My Cost	My Wellbeing	My Footprint
11.4 Post Occupancy Evaluation	Occupant satisfaction feedback and bill data	2	10	0.25	0.25	0.25
	Energy and temperature monitoring	3		0.25	0.25	0.25
	Advanced POE	2		0.25	0.25	0.25
	Independent third party	3		0.25	0.25	0.25
	Total credits available		**500**			
	Total indicator scores available			**262.50**	**283.50**	**400.75**

*These criteria contain routes of rigour. The route selected may affect the total criteria credits that can be achieved.

Appendix B – HQM Application: Supporting Guidance

How many homes can be included in a single HQM assessment?

In the first instance clients are advised to consult a licensed HQM assessor on how best to categorise and classify their project for assessment, registration and certification purposes (BRE Global can assist HQM assessors where required).

At least one HQM assessment must be undertaken for each project or site seeking to apply the scheme, regardless of the proposed number of homes on the site.

The number and type of homes and phases of the project are important factors in deciding how to apply the scheme on a single site. For example, separate assessments can be undertaken for each phase of a project, with HQM certification sought to coincide with completion and sale or handover of each phase.

Homes can also be grouped within input sets, on the online assessment tool, to share inputs and evidence for issues selected by the assessor, to prevent the same inputs having to be entered repeatedly.

Input sets may be useful for issue inputs that are identical for a set of homes, which might include: site-wide (e.g. in Our Surroundings), issues that can be assessed according to house type where the dwellings are identical (e.g. for Environmental Impact from Construction Products), or issues that refer to organisational processes (e.g. Aftercare).

Pre-approval of HQM assessment issues and criteria

Home-building in the UK can achieve efficiencies through the use of either design solutions or whole building models being repeated. The HQM scheme allows design solutions and processes to be repeated across individual homes on a project (an individual site). The Pre-Approval process allows design solutions and processes to be 'deemed to satisfy' parts (criteria), and then used on multiple projects (sites). The performance of any Pre-Approved solution or procurement process is combined with the assessment of site-specific issues to produce the overall HQM rating and scorecard for each project. The approach therefore reduces repetition in the application of the scheme for all stakeholders involved in a home building project, whether it be across multiple sites, or multiple homes or house types on a single larger project.

This type of approval provides clients and designers with greater confidence in achieving their sustainability goals and increased efficiencies of design and assessment, while maintaining the robustness of the HQM process and its outcome.

There are a number of ways in which Pre-Approvals can be applied:

- Pre-Approval within My Home for common elements of house design and where elements of the home are manufactured off-site.
- Pre-Approval of company processes, quality control and customer support systems for issues within the Delivery section.
- Site outline scoring within the Our Surroundings, linking with BREEAM Communities for larger scale developments.

For further information on HQM Pre-Approvals contact the HQM team at BRE.

Post-construction review assessments

Where an assessment of a project has been certified at the 'interim' design stage, a post-construction review assessment of the same project can be completed to verify its design performance 'as-built' (for final certification). Where certification of a design stage assessment has not been sought, a full 'post-construction' assessment can be undertaken, with verification based on the project's 'as-built' performance (for final certification).

A post-construction review or assessment is based predominantly on evidence collated during one or more visits to a site during or after completion (and typically before handover). HQM assessors can refer to the scheme Operations Manual (SD5070) for guidance on site visits.

Appendix C – HQM Evidence Requirements

This section provides guidance to assessors and project teams on the types of evidence required to demonstrate compliance with HQM issues.

Why does HQM require evidence?

HQM is a third-party assessment and certification scheme operated in accordance with international standards. Operating to international standards ensures that certification schemes such as HQM are run in a consistent and reliable manner. The HQM assessor's assessment report and the BRE Global quality assurance process are the fundamental tenets of HQM, ensuring consistency of, and confidence in, the HQM rating awarded by the assessor.

To maintain this consistency and credibility all certification decisions must be based on verified and credible project information that is traceable, i.e. evidence based. This is not only important for ensuring compliance with the international standards to which HQM operates, but also in terms of managing risk to clients and HQM assessors in the event that a certification outcome is challenged.

The assessment report and the HQM assessor role

It is the HQM assessor who determines the HQM rating, and the assessment report is the formal record of an assessor's audit against the criteria defined in the technical manual for the HQM scheme. The HQM certificate issued by BRE Global provides assurance that the service provided by the assessor (that is, the process of producing the assessment report) has been conducted in accordance with the requirements of the scheme. The purpose of the certificate is therefore to give confidence to the client in the assessor's performance and processes in determining a HQM rating.

It is the role of the assessor to gather project information and use it to assess performance against the HQM scheme in a competent and impartial manner. To award a HQM credit, the assessor must be satisfied beyond reasonable doubt that the evidence gathered demonstrates unambiguous compliance with all relevant criteria defined in the HQM scheme. All evidence must be appropriately referenced in the formal report produced by the assessor and made available on request from BRE Global for quality assurance checks.

Clear, ordered and well-referenced evidence for each HQM issue and criterion facilitates efficient quality assurance and certification.

Evidence types

Evidence should not necessarily need to be prepared specifically for the purpose of the HQM assessment. In many instances, the assessor should be able to source readily available and prepared project information for the purpose of demonstrating compliance. For this reason, HQM aims to avoid being prescriptive on the type of evidence required, although some issues do require specific documents to be provided.

The assessor and project team will find that many assessment issues will require more than one piece or type of information to demonstrate compliance with one criterion, or alternatively, one piece of information may be sufficient to demonstrate compliance with multiple criteria or assessment issues.

To assist project teams and the HQM assessor in their collation of evidence at each stage of assessment, the different types of documentation that can be used as evidence of compliance are listed below.

These evidence types fall broadly in to three categories:

1. General evidence type.
2. Specific evidence type.
3. Other evidence type.

For some assessment issues, the assessor is likely to require a mixture of general and specific evidence types.

1. General evidence

General evidence includes a broad list of defined information commonly produced for a building project. One or a mix of these types of information can be used to demonstrate compliance for one or more of the HQM issues and criteria, as deemed appropriate by the HQM assessor for the stage of assessment.

General HQM evidence types are listed in Table 73 and are not specifically listed in the 'Evidence' section found within each HQM issue. Note, not all general evidence types will be appropriate for all issues and it is the responsibility of the assessor to ensure that the evidence provided specifically demonstrates compliance and is fully referenced in the assessment reporting tool.

2. Specific evidence

Specific evidence is defined as information that must be provided to verify compliance with the relevant criteria for the HQM credit sought. In all cases it will be the only type of evidence that will be accepted by BRE Global for that particular issue or criterion. Where specific evidence is not provided and appropriately referenced in the assessment report, the quality assurance checks will identify a non-conformity and certification will be delayed. An example of specific evidence would be a copy of the relevant SAP output documents from the approved SAP software for the 'Energy' issue in HQM.

Where required, specific evidence is defined and listed for each HQM issue in the 'Evidence' section for both design and post-construction stages of assessment. Although the 'Evidence' section lists the specific evidence required to demonstrate compliance with particular criteria, simply submitting this evidence may not be sufficient to demonstrate full compliance. Additional 'general evidence types' may also be required. For example, to demonstrate compliance with criteria 1-3 of the Water Efficiency issue at design stage, a copy of the Water Efficiency Calculator for New Dwellings and documentary evidence supporting the data used to complete the calculator tool is required. However, in addition to this, further evidence is required, i.e. general evidence types such as letters of commitments, specifications, or drawings must be provided confirming the water fittings and systems entered into the tool are to be installed. Note, not all HQM issues will have specific evidence requirements.

3. Other evidence types

Other types of evidence can still be used to demonstrate compliance where an information type provided by a client or design team is not listed in Table 73 or the 'Evidence' table for each issue. To avoid non-conformities and delays in certification, undefined alternative types of evidence must demonstrate credible, robust and traceable assurance to the same level as, or better than, specified or general evidence types. If in doubt, please contact the HQM technical team prior to accepting such evidence.

Written commitments at design stage

At the design stage of assessment, it is permissible to use letters or emails to demonstrate intent to comply with particular HQM criteria (provided they meet the requirements for communication records below). Such evidence must also make clear the actions and evidence (or an understanding thereof) that will be undertaken and provided to ensure the project's on-going compliance, particularly at the final stage of assessment, i.e. post-construction. This is to ensure that the party who makes the commitment is clearly aware of the actions and evidence that needs to be supplied to demonstrate compliance with HQM at the post-construction stage of assessment. For example, in many circumstances it would not be acceptable for the design team to copy and paste the HQM criteria into a formal commitment. The commitment should specifically detail how criteria are to be achieved in the context of the assessment, and often copying and pasting the HQM criteria will not provide this level of detail.

While letters of commitment can play a role in demonstrating compliance, they are not a replacement for more formal and established types of project information. The assessor must not award credits where they have a reason to doubt the validity or intent of written commitments, or where it is reasonable to expect formal design or specification information to be available to confirm compliance.

Post-construction stage evidence

There are two types of assessment that can be carried out at the post-construction stage:

1. A post-construction review of a design stage assessment, or
2. A post-construction assessment (where no design stage assessment has been carried out).

The 'post-construction stage' evidence section in each issue assumes that a design stage assessment has been completed. Where a design stage assessment has not been completed, the assessor will need to review both the 'design stage' and 'post-construction stage' evidence listed in the evidence section and ensure sufficient evidence is submitted with the assessment to demonstrate compliance with the criteria.

Evidence supplied at the post-construction stage must be reflective of the completed building and must therefore demonstrate what has actually been implemented or constructed. For example, if flood resilience measures have been specified at design stage, evidence at the post-construction stage would need to demonstrate that these have actually been installed. Appropriate evidence may be a site inspection report with supporting photographs or as-built drawings showing the location of the flood resilience measures.

For a large or phased development, there are some issues that will not be complete when a post-construction stage assessment for the first homes is completed. For example, these could include some ecology credits or community-based facilities. It is possible to certify the first homes without certain issues being complete based on written commitments. The details of these exceptions are highlighted in Appendix D – Post-Construction Stage Assessment Issue Exceptions: Table 74 on page 254. This is not intended to be a comprehensive list; its purpose is to provide guidance to assessors on the type of exceptions that are acceptable.

Written commitments at post-construction stage

Written commitments cannot be used to demonstrate compliance at the post-construction stage of assessment. The only exception to this is where the criteria require an additional action to take place post-construction, i.e. after handover and possibly during the building operation. An example could be a written commitment from the building owner or occupier making a commitment to conduct a post occupancy evaluation. As with letters of commitment at the design stage, the HQM assessor must not award HQM credits where they have a reason to doubt the validity or intent of written commitments or where it is reasonable to expect a formal documentation, such as a schedule of services or professional services contract.

Written confirmation at post-construction stage

Where a post-construction review of a design stage assessment is carried out, written confirmation validating that nothing has changed since the design stage assessment can be provided as evidence within the post-construction review. Where anything has changed since the design stage assessment, or where the design stage assessment evidence was in the form of a written commitment, or where full detailed documentary evidence was not provided, written confirmation is not acceptable.

Where a post-construction stage assessment is carried out without an associated design stage assessment, written confirmation is not an option to demonstrate compliance.

Evidence principles

HQM assessors and the BRE Global Quality Assurance team work to the evidence principles in Table 72.

As described above, where specific evidence is stated in the 'evidence' section within each assessment issue, this must be sourced and verified by the HQM assessor.

Where no specific evidence has been listed for an issue or specific criterion, this means that there are potentially a number of different types of 'general' project information, as per Table 73 that can be sourced by the HQM assessor and used to demonstrate compliance. It is the HQM assessor's responsibility to source and verify the evidence for each relevant criterion, where compliance and credits are being claimed by the project team.

In determining the appropriateness of any evidence type for each issue, the principles outlined in Table 72 must be considered by HQM assessors. Where the evidence meets the principles outlined in Table 72 and, where appropriate, the guidance provided in Robustness of evidence, such evidence is admissible for the purpose of the assessment and the BRE Global Quality Assurance checks.

These principles are not listed in a hierarchical order and are all equally important when considering which evidence type to submit to demonstrate compliance for each issue or criterion.

Table 72 HQM evidence principles

	Principle	Objective		A question to ask to check
1	Evidence provided for all criteria for all credits sought	Evidence must demonstrate that ALL relevant* criteria and sub-criteria for each credit sought are achieved and where relevant, is provided to support compliance notes, definitions, etc.	Completeness	Are all criteria and sub-criteria covered? Have all relevant compliance notes and definitions been addressed?
2	Unambiguous assessment	The assessment must demonstrate unambiguous compliance and the evidence must support this assessment. Evidence (and supporting notes) must clearly demonstrate to a third-party reviewer that the criteria have been met.	Independent review compatibility	If a third party (e.g. BRE Global) reviewed my report with the submitted evidence, would they be able to confirm compliance and award the same credits I have?

	Principle	Objective		A question to ask to check
3	Robust	a. When selecting the Evidence type, always ensure it is robust and is relevant to the stage of assessment. b. The selected Evidence contains all the relevant basic information, with the necessary constituent parts to be deemed robust. (See Robustness of evidence section for further details on both of the above.)	Proof that evidence is robust and from a reliable source	Is this the most robust form of evidence available to demonstrate compliance with this criterion? Does the evidence contain all the relevant basic information? Is it fully auditable? Is it the latest revision?
4	Use existing evidence	Use existing project information to demonstrate compliance. In most cases evidence shouldn't need to be 'created' for HQM compliance purposes.	Minimises evidence and reduces time and cost of compliance	Does robust evidence meeting the above principles already exist that I can use? If I need to ask for more evidence, is the project seeking credits where compliance is not adequately demonstrated?

*Where the assessor or design team deem specific criteria 'not relevant' to the assessment, a full justification should be collated and then submitted as a technical query for review by BRE Global.

Robustness of evidence

Robust evidence provides confirmation that the assessment has been carried out correctly and the building complies with the criteria for the HQM credits sought. The assessor should consider the following when gathering project information and evaluating whether the evidence provided is as 'robust' as possible:

- Is there more than one piece of evidence that could be used to demonstrate compliance?
- Where there is more than one piece of evidence, is the chosen evidence the most robust and appropriate piece of evidence to demonstrate that a particular criterion has been achieved?

Minimum Level of Information

Any evidence submitted for a HQM assessment must be robust in terms of its source and its traceability. Below is a list of the minimum Level of Information (LOI) the assessor must expect to see when certain types of evidence are submitted:

Communication records:

Any communication records used as evidence must provide clear confirmation of the site name, author's identity and role, the date and recipient's identity.

Formal letters of correspondence:

Must be on company or organisation headed notepaper with a signature (electronic signatures are acceptable) and must provide clear confirmation of the site name. Ideally letters should be a secured document.

Meeting minutes:

Must provide clear confirmation of the site name and include date, location and attendee information (names, organisations and roles), along with a record of the meeting and agreed actions.

Drawings:

All drawings must have the building or site name, phase (if applicable), title of drawing, date, revision number and a scale.

Specification:

It must be clear that the specification relates to the project under assessment, and it must have a date and revision number. Where sections of a specification are provided the assessor should reference the extract and, as a minimum, submit the front page of the specification detailing the project name, revision number and date.

Site inspection report:

A site inspection report must include the building or site name, date, author, and summary text to detail what was witnessed and confirm compliance. The report must include sufficient information to create an audit trail that justifies the conclusions reached, particularly where the site report is the only evidence supplied at post-construction stage. A simple statement confirming compliance will not be sufficient. Photographs may be useful as supporting evidence in a report, though it is unlikely that a photograph on its own will demonstrate compliance.

Please note that for some issues a visual inspection cannot be undertaken to verify whether compliance has been achieved with the criteria, for example Water Efficiency, or Responsible Sourcing.

For other types of evidence not listed, the assessor should use the above as a guide for the sort of evidence that is suitable. As a minimum, in most cases the evidence used to assess compliance should always contain key information such as the project name, the author, date, revision numbers.

Table 73 General evidence types

Ref.	Document or evidence type	Description or notes
E1	As constructed information	Information produced at the end of a project to represent what has been constructed. This will comprise a mixture of 'as-built' information or drawings and surveys from specialist subcontractors and the 'final construction issue' from design team members.
E2	Building Information Model (BIM)	The BIM (or BIM files) used for the project containing relevant information or evidence of compliance. This could include outputs in a neutral format such as IFC or COBie and native format (e.g. BIM authoring software). Note: The assessor should be able to intelligibly view any native software formats and, upon request by BRE Global, provide neutral formats.
E4	HQM assessor's site inspection report	A formal report based on the HQM assessor's own survey of the site or building to confirm compliance with HQM criteria. During the site inspection an attempt should be made to check as many issues as possible. However it is unlikely that all issues could be checked during one site visit. Different specifications of the home will be completed at different times. Therefore the site inspection will need to be planned in discussion with the client to identify when would be most appropriate. At least one site visit must be carried out for every assessment. An assessor's site inspection report will be distinct from their formal HQM assessment report, serving as a form of evidence of compliance in its own right, and it may include photographs taken by the assessor as part of the survey. Assessors may ask others to complete the site inspection on their behalf. If so, it is the responsibility of the assessor to ensure that their representative is: – Competent – Able to carry out the task – Impartial.
E5	Building contracts	The building contract or excerpts and clauses from it. In some instances, the building contract may contain design duties for specialist subcontractors or design team members.
E6	Certificates of compliance (third party)	Examples include ISO14001, BES6001, FSC (Forest Stewardship Council), other BREEAM recognised RSCS (Responsible Sourcing Certification Scheme) certificates, Environmental Profile Certificate, EPD (Environmental Product Declaration), Considerate Constructors certificate, Passivhaus, DOP (Declarations of Performance Certificates).
E7	Communication records	Formal communication records between or from relevant project stakeholders or other third parties confirming an appointment, action or outcome. This may be in the form of a letter, meeting minutes, email correspondence, publication or other form of media (see also additional guidance on the following pages).

Ref.	Document or evidence type	Description or notes
E8	Communication strategy	The strategy that sets out when the project team will meet, how they will communicate effectively and the protocols for issuing information between the various parties, both informally and at information exchanges. This may be covered by the employer information requirements.
E9	Computer aided modelling results or outputs	Examples include thermal modelling, flooding, life cycle assessment, life cycle costing, ventilation modelling, daylighting.
E10	Construction specification	The specification for the project or building(176).
E11	Construction stage data and information	For example, purchase orders, metering data, logbooks, commissioning records or reports.
E12	Contractual tree	A diagram that clarifies the contractual relationship between the client and the parties undertaking the roles required on a project.
E13	Cost information	Project costs, including the cost estimate and life cycle costs.
E14	Design drawings(177)	Developed and technical Design, including the coordinated architectural, structural and building services design. Site plans, drainage designs.
E15	Design programme	A programme setting out the strategic dates in relation to the design process. It is aligned with the project programme but is strategic in its nature, due to the iterative nature of the design process, particularly in the early stages.
E16	Design responsibility matrix	A matrix that sets out who is responsible for designing each aspect of the project and when. This document sets out the extent of any performance specified design.
E17	Feasibility study	Studies undertaken to test the feasibility of the initial project brief of the site or in a specific context, and to consider how site-wide issues will be addressed.
E18	Final project brief	The initial project brief amended so that it is aligned with the concept design and any briefing decisions made during this stage.
E19	Other third-party information	For example, maps, public transport timetables, product data or details, manufacturers' literature, PDS (Product Data Sheets), Government /EU standards or codes, EU labelling, CE Marking Labels, Curriculum Vitae (CV).
E20	Professional services contract	An agreement to provide professional or consulting services such as, designing, feasibility studies, or legal or technical advice.
E21	Professional specialist reports	Professional reports resulting from specialist surveys, studies or test results, e.g. contaminated land, ecology, flood risk assessment, surface water run-off report, site investigation, acoustics, indoor air quality plan, low and zero carbon technologies study, transport analysis, commissioning reports, passive design analysis report, life cycle assessment, landscape and habitat management plan etc.
E22	Project execution or quality plan	The project execution plan is produced in collaboration between the project lead and lead designer, with contributions from other designers and members of the project team. The project execution plan sets out the processes and protocols to be used to develop the design.
E23	Project programme	The overall period for the briefing, design, construction and post completion activities of a project.
E24	Project roles table	A table that sets out the roles required on a project as well as defining the stages during which those roles are required and the parties responsible for carrying out the roles.
E25	Project strategy	The strategies developed in parallel with the concept design to support the design and, in certain instances, to respond to the final project brief as it is concluded. Examples include, strategies for sustainability, acoustics, handover, maintenance and operational, fire engineering, building control, technology, health and safety, construction, travel plan, sustainable procurement plan.
E26	Risk Assessment	The risk assessment considers the various designs and other risks on a project and how each risk will be managed and the party responsible for managing each risk.
E27	Schedule of services	A list of specific services and tasks to be undertaken by a party involved in the project, which is incorporated into their professional services contract.
E28	Strategic or initial project brief	The brief prepared following discussions with the client to ascertain the project objectives, the client's business case and, in certain instances, in response to site feasibility studies.

Appendix D – Post-Construction Stage Assessment Issue Exceptions

For developments that are either phased, or contain multiple homes, there are some issues that will not be complete when a post-construction stage assessment for the first homes is completed. For example, these could include some ecology credits or community-based facilities. It is possible to certify the first homes without certain issues being complete based on written commitments. The details of these exceptions are highlighted in Table 74. This is not intended to be a comprehensive list; its purpose is to provide guidance to assessors on the type of exceptions that are acceptable.

Table 74 Post-construction stage exceptions

Categories	Issues	Exception
1 Transport and Movement	1.1 Public Transport Availability	Where new transport facilities will be provided, but at a later stage than the home being assessed, the assessment can consider such facilities, provided that a commitment has been made to provide these transport facilities. This can be demonstrated either within the general contract specification or in the form of a Section 106 agreement. This must outline that the transport facilities will be available for use by the time 60% of the development (either within a phase or over all phases) has been completed and is ready for occupation.
	1.2 Sustainable Transport Options	Where communal facilities will be provided, but at a later stage than the home being assessed, communal facilities must be provided prior to 60% of the development being completed. However, in instances where it is deemed that the occupants of the development require these facilities at an earlier time, then they must be provided as such. When the facilities are being provided at a later stage than the home being assessed, then written confirmation from the developer demonstrating that these facilities will be completed is required to demonstrate compliance with the relevant criteria.
	1.3 Local Amenities	Where local amenities will be provided, but at a later stage than the home being assessed, these must be provided prior to 60% of the development being completed. However, in instances where it is deemed that the occupants of the development require these facilities at an earlier time, then they must be provided as such. When the facilities are being provided at a later stage than the home being assessed, then written confirmation from the developer demonstrating that these facilities will be completed is required to illustrate compliance with the relevant criteria.
2 Outdoors	2.2 Managing Impacts on Ecology	All protection measures from the ecological survey must be implemented prior to any work being undertaken on-site. However, any selected solutions, actions and measures related to enhancing ecology, must be undertaken prior to 60% of the development being completed.
	2.3 Ecological Change and Enhancement	When this enhancement is being undertaken at a later stage than the home being assessed, written confirmation from the developer demonstrating that these recommendations will be undertaken is required to demonstrate compliance with the relevant criteria.
	2.5 Recreational Space	Communal space must be provided prior to 60% of the development being completed. When the facilities are being provided at a later stage than the home being assessed, then written confirmation from the developer demonstrating that these facilities will be completed is required to demonstrate compliance with the relevant criteria.

Categories	Issues	Exception
3 Safety and Resilience	3.1 Flood Risk	All site-wide flood resilience measures should be planned and a programme for their construction finalised which indicates that they will be operational before more than 60% of the homes on a development site are completed or certified.
	3.2 Managing Rainfall Impacts	Site-wide SuDS may not be fully installed when initial phases are released, but evidence of the devices to be used and any relevant calculations need to be available. They need to be operational before more than 60% of the homes are completed or certified.
	3.3 Security	Security recommendations or solutions to external areas within the boundary of the site may not be implemented when initial phases are released, but evidence of the features to be used needs to be available. They need to be operational before more than 60% of the homes are completed or certified.
5 Energy	5.1 Energy and Carbon Performance	Centralised energy supply infrastructure on multi-phase developments must be operational before more than 60% of the homes are completed or certified. This requirement is variable where there is an alternative statutory requirement in place for the system to be operational at a different stage. For centralised energy supply infrastructure: the infrastructure to allow a future connection must be provided to each home for credits to be awarded, regardless of the percentage of total homes completed. For security reasons, it is acceptable for white goods to not be fitted until just before handover to new residents, as long as orders are in place.
	5.2 Decentralised Energy	Centralised energy supply infrastructure on multi-phase developments must be operational before more than 60% of the homes are completed or certified. This requirement is variable where there is an alternative statutory requirement in place for the system to be operational at a different stage. For centralised energy supply infrastructure: the infrastructure to allow a future connection must be provided to each home for credits to be awarded, regardless of the percentage of total homes completed.
	5.3 Impact on Local Air Quality	Centralised energy supply infrastructure on multi-phase developments must be operational before more than 60% of the homes are completed or certified. This requirement is variable where there is an alternative statutory requirement in place for the system to be operational at a different stage. For centralised energy supply infrastructure: the infrastructure to allow a future connection must be provided to each home for credits to be awarded, regardless of the percentage of total homes completed.
7 Space	7.1 Drying Space	For security reasons, it is acceptable for white goods to not be fitted until just before handover to new residents, as long as orders are in place.
	7.3 Recyclable Waste	Where communal composting facilities will be provided, but at a later stage than the home being assessed, these must be provided prior to 60% of the development being completed. When the facilities are being provided at a later stage than the home being assessed, then written confirmation from the developer demonstrating that these facilities will be completed is required to demonstrate compliance with the relevant criteria.
8 Water	8.1 Water Efficiency	Communal grey water or rainwater systems may not be installed, but should be operational before more than 60% of the homes the systems are serving have been completed or certified. For security reasons, it is acceptable for white goods to not be fitted until just before handover to new residents, as long as orders are in place.

Categories	Issues	Exception
9 Quality Assurance	9.2 Commissioning and Testing	Centralised energy supply infrastructure or other centralised systems that fall under the scope of the commissioning part of this issue, which are on multi-phase developments, may not be commissioned in the first phase, but should be operational before more than 60% of the homes are completed or certified. This requirement is variable where there is an alternative statutory requirement in place requiring the system to be operational at a different stage. For community heating systems: the infrastructure to allow a future connection must be provided to each home for credits to be awarded, regardless of the percentage of total homes completed.
	10.1 Responsible Construction Practices	The Considerate Constructors Scheme (CCS) makes provision for phased developments within their registration process, allowing each phase to be registered separately. They make this provision to allow for very large developments that may go on over several years. The situation with HQM phasing is different, in that it is possible that HQM homes will be released for sale (and therefore require HQM certificates) gradually, perhaps only a few at a time. We recognise that it would be unreasonable to expect final CCS certificates to be issued for all of these releases (which would require each of these groups of a few homes to be registered separately with CCS). Where CCS is used to demonstrate compliance, credits for phased developments can be based on the latest site monitor's report from CCS and a firm commitment from the developer. Where homes are to be released before the first site monitor's visit, credits can be awarded based on a firm commitment from the contractor or developer. When the final homes being assessed using HQM and CCS are submitted for Post-Construction Stage Assessment, the CCS site monitor's report AND the final CCS certificate must be included in the evidence. Please note this means that where HQM assessed homes form part of a larger phased development and construction will not be completed on the site before the final HQM home is assessed, the development will need to be registered with CCS as more than one phase, with HQM homes forming a separate phase. If on submission of the final CCS certificate with the final HQM assessed homes, the CCS certificate does not meet the level stated in the commitment, BRE reserves the right to withdraw HQM certificates or reduce the level achieved.
	10.2 Construction Energy Use	For phased developments, evidence should be provided to demonstrate that the proposed monitoring strategy has been implemented up to the completion date for the phase being certified. Where there is no sub-metering of individual phases, then as a minimum, a reading for the site as a whole on the date that the respective phase is completed should be submitted.
	10.3 Construction Water Use	For phased developments, evidence should be provided to demonstrate that the proposed monitoring strategy has been implemented up to the completion date for the phase being certified. Where there is no sub-metering of individual phases, then as a minimum, a reading for the site as a whole on the date that the respective phase is completed should be submitted.

Categories	Issues	Exception
	10.4 Site Waste Management	It is recommended that where work is phased, contractors should look to monitor and record waste arisings for each respective phase individually. However, where this is not possible and earlier phases are finalising their Post-Construction Stage report, the waste that has been generated up until that point can be divided by the site-wide GIFA of the buildings that have been handed over. Additional appropriate supporting evidence must support the timing of the measurement and handover. Subsequent phases should include all phases that precede it in the calculation methodology, especially when phases have overlapped.

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176 For the purpose of HQM the specific clause of the specification must be referenced within the report.
177 Evidence in the form of design drawings must be presented in a clear, professional working format with clearly identified legends indicating revision number, date, title, owner, etc. (where appropriate).