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BREEAM Pre- Assessment Report



EXECUTIVE SUMMARY

An updated BREEAM Pre-Assessment has been undertaken for the for the new-build office building, 39 Deansgate, to be constructed at the heart of Manchester City Centre following updates to the design in preparation for the submission of planning application.

The development is assessed under BREEAM 2018 New Construction scheme.

The Pre-Assessment concluded that the following scores are achievable for the building:

- Excellent: 73.76%
- Potential: 87.64%
- (Awarded: 23.49%)

The following scenarios are outlined with their associated scores:

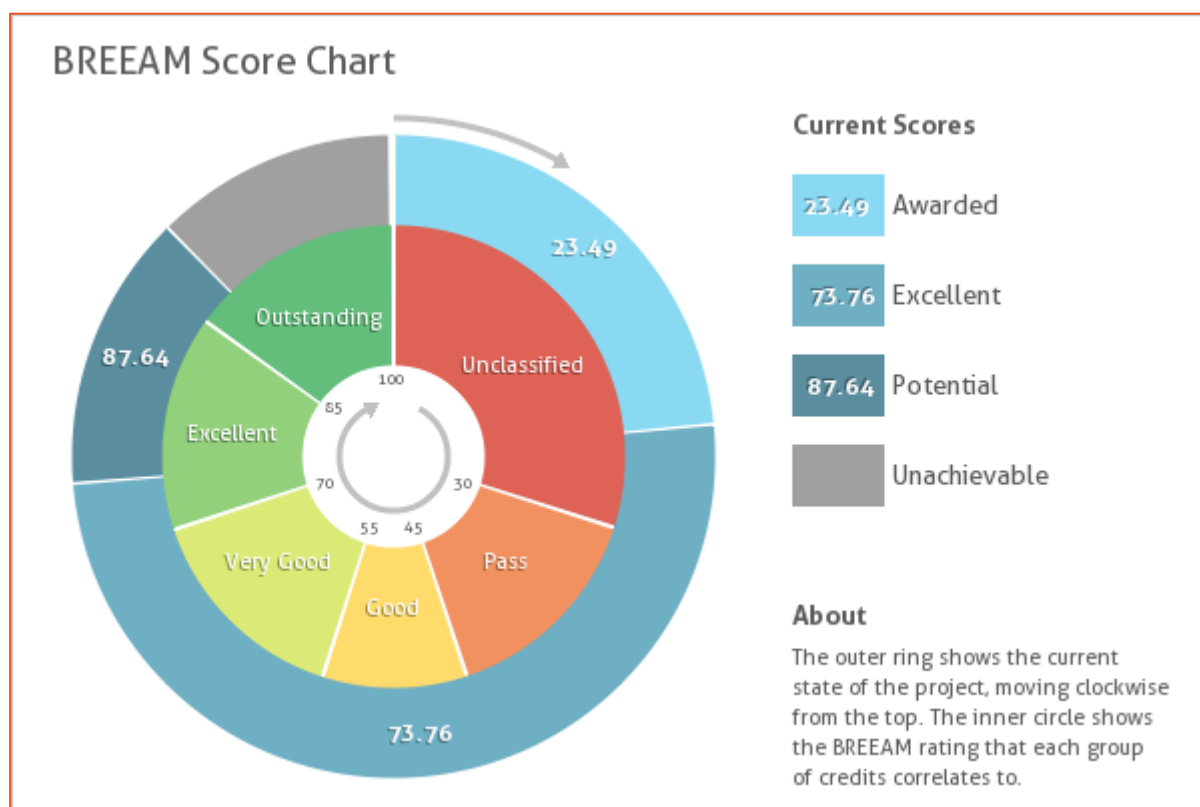


Image 1.0: BREEAM Rating Scenarios



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INTRODUCTION



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1.0 INTRODUCTION

Mainer Associates have been appointed to undertake a BREEAM Pre-assessment for the commercial office space for 39 Deansgate, Manchester.

Client Name: Kames Property Income Fund

Site Description: The Site is irregular in shape and comprises an area of around 0.11 ha (0.27 acres). It is bound by Deansgate to the West, St Mary's Gate to the North, the Grade II* listed Barton Arcade to the South and by 12-14 St Mary's Gate to the East. It is situated within the St Ann's Conservation Area.

39 Deansgate is currently occupied by a 9-storey mixed use building known as 'Speakers' House', built in 1963 and designed by the architectural practice of Douglas Stephen & Partners. It has been refurbished numerous times over the years most recently in 2013 when new cladding was added to the main shop front façades. The existing building has a Net area of 3,754 sq. m (40,408 sq.ft) with accommodation arranged over ground, mezzanine, and eight upper floors. Car Parking provision with 13 spaces is provided to the rear. The ground floor, circa 1116 sq.m (12,013 sq.ft) is occupied by retail tenants including the Flight Centre, Spar and Gregg's. The upper floors are currently used as offices, with an area in excess of 2,638 sq. m (28,395 sq.ft). The offices are partially occupied and generally characterised by short term leases.

The Site is currently serviced by an alley leading to a yard accessed via the pedestrianised Exchange Street/ St. Ann's Square to the East.

Description of development:

"Erection of a 17 storey building comprising office use (Use Class E(g)(i)) and flexible ground floor commercial units (Use Classes E(a),(b),(c) and sui generis 'drinking establishment'), new electricity sub-station, basement cycle parking and rooftop plant enclosure, together with access, servicing and associated works following demolition of the existing"

Key features include:

- No basement car parking is proposed. Cycle store/ Showers/ drying rooms etc. in basement accessed via a dedicated ramp;
- Blue/ Green Roof



This Pre-Assessment has been undertaken using the BREEAM 2018 New Construction scheme. We understand the project team will target a BREEAM Excellent rating.



This report has therefore reevaluated the set of credits that will be required for an Excellent rating. We also provided a separate set of credits that may be required if other credits are lost during the process. The early consideration of these are therefore imperative. These more onerous credits are detailed in Section 3.1.

Image 2.0: 39 Deansgate Basement Layout



CREDIT SUMMARY



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2.0 CREDIT SUMMARY

Other than assumptions, Mainer Associates have identified areas where credits are likely to be achieved, or lost, based on information already available to us.

Tra 01: Travel Plan

The client has established a Travel Plan compliant with criteria under Tra 01 for 2 credits. The site-specific travel assessment or statement covers a range of issues. These include existing infrastructure and travel patterns, current cyclist facilities and walkability, site accessibility by public transport, disabled access, and access to local amenities. Critically, the plan also identifies avenues to improve sustainable modes of transport available to building occupants during the office's operating hours.

Due to the central location of 39 Deansgate within Manchester City Centre, the development is within proximity to major transport links. Mainer Associates have assumed the development will be able to implement the Travel Plan that is established by RIBA stage 2.

Tra 02: Sustainable Transport Measures

Tra 02 Sustainable Transport Measures awards credits based on improvements made to sustainable transport options in relation to the site's existing Accessibility Index. Points are allocated to different sustainable transport measures, that are implemented in addition to existing infrastructure. The project will accumulate points and corresponding credits in relation to the type and number of measures developed.

Mainer Associates have conducted an initial study into the site's accessibility and have established an Accessibility Index score of 33.34 for 39 Deansgate. On this basis the BREEAM guidance confirms that 4 points are required to achieve 6 credits, and 6 points to achieve 8 credits. The table below provides a set of potential sustainable transport measures, which, when implemented, will achieve the required number of points/credits.

Table 1.0: Sustainable Transport Measures

Assessment Option	Public Transport Measures	Points
1	1. The existing AI calculated in Tra 01 achieves the following: ≥ 4 for prison or MOD sites, rural location sensitive buildings, and other building group 3 ≥ 8 for all other building types	1
2	2. Demonstrate an increase over the existing Accessibility Index through negotiation with local bus, train or tram companies to increase the frequency of the local service provision for the development.	2
	OR	

**Table 1.0: Sustainable Transport Measures**

	3. Demonstrate an increase over the existing Accessibility Index. This could be through provision of a diverted bus route, a new or enhanced bus stop, or other similar solutions.	3
	OR	
	4. Provide a public transport information system in a publicly accessible area.	3
3	5. Provide a public transport information system in a publicly accessible area, to allow building users access to up-to-date information on the available public transport and transport infrastructure. This may include signposting to public transport, cycling, walking infrastructure or local amenities.	1
Assessment Option	Private Transport Measures	Points
4	6. Provide electric recharging stations of a minimum of 3kW for at least 10% of the total car parking capacity for the development.	1
5	7. Set up a car sharing group or facility to facilitate and encourage building users to car share. 8. Raise awareness of the sharing scheme with marketing and communication materials. 9. Provide priority spaces for car sharers for at least 5% of the total car parking capacity for the development. 10. Locate priority parking spaces nearest the development entrance used by the sharing scheme participants.	1
Assessment Option	Active Travel Measures	Points
6	11. During preparation of the brief, the design team consults with the local authority (LA) on the state of the local cycling network and public accessible pedestrian routes, to focus on whichever the LA deems most relevant to the project, and how to improve it. 12. Agree and implement one proposition chosen with the local authority. The proposition supported by the development is additional to existing local plans and has a significant impact on the local cycling network or on pedestrian routes open to the public.	2
7	13. Install compliant cycle storage spaces to meet the minimum levels set out on the basis of anticipated building occupancy.	1
8	14. Option 7 must be achieved. 15. Provide at least two compliant cyclists' facilities for the building users, (including pupils where appropriate to the building type): • Showers • Changing facilities • Lockers • Drying spaces	1
9	Existing Amenities: 16. At least three existing accessible amenities are present. These may be appropriate food outlets, access to cash, access to an outdoor open space access to recreation or sports facility, pharmacy, GP or postal service.	1

**Table 1.0: Sustainable Transport Measures**

10	Enhanced Amenities: 17. Ensure a minimum of one new accessible amenity is provided.	2
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LE01-LE05: Site Selection – Land Use and Ecology

This credit requires at least 75% of a proposed development's footprint to be on an area of land which has been previously occupied/developed. As the whole site is hardstanding (and there is a building currently occupying the site), the credit for LE01 has been achieved.

It is assumed a Suitably Qualified Ecologist will be appointed to guide the landscaping on the site to protect, enhance and maintain ecological value (if present). Eight credits across Land Use and Ecology issues have been identified as attainable under a BREEAM Excellent scenario.

Pol 03: Surface Water Run-Off

While the development is positioned next to the River Irwell, it is our current understanding that the site is in an area of low flood risk (Flood Zone 1). This is demonstrated via the Gov.uk's Flood Risk map below. The development could therefore achieve 2 credits where a site-specific Flood Risk Assessment confirms this.

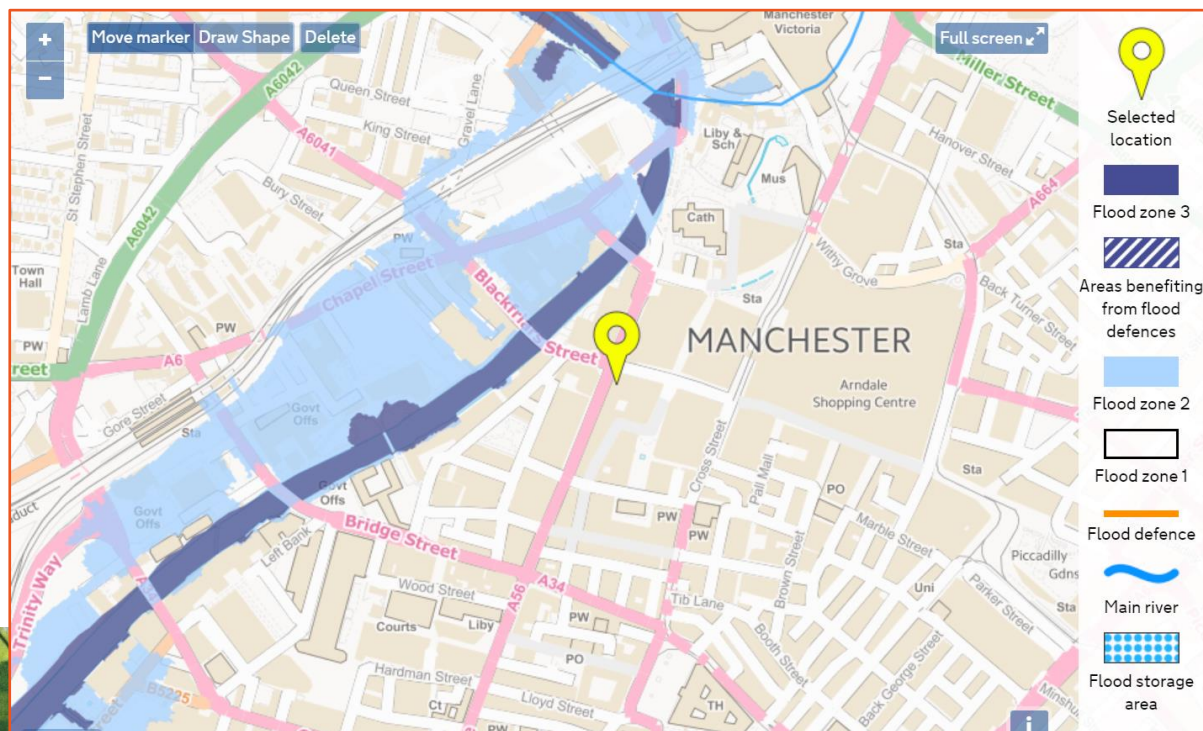


Image 3.0: Gov.uk Flood Risk Map



CREDIT TABLE



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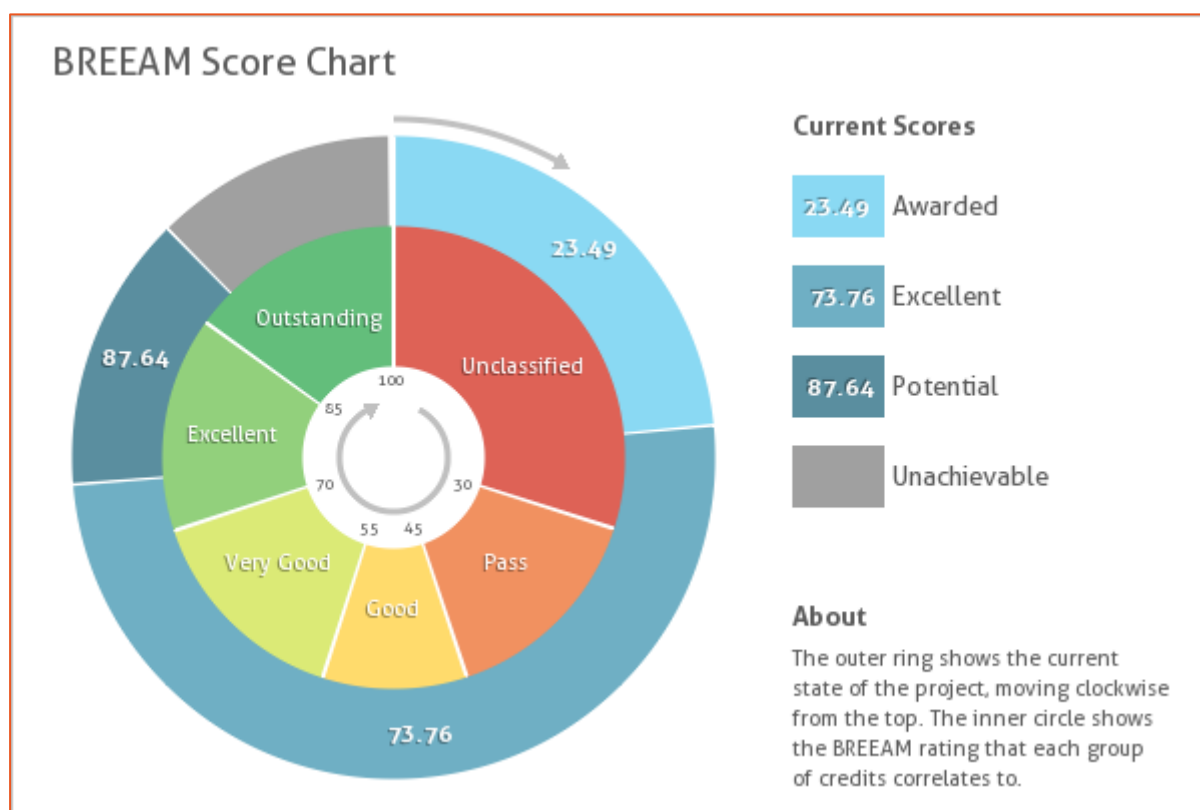
3.0 CREDIT TABLE

The following scenarios were outlined for the development and are outlined below:

Awarded: This score confirms the achieved percentage to date. As the assessment has commenced, 23.49% has already been awarded.

Excellent: Credits required in order to achieve a BREEAM Excellent rating.

Potential: A scenario containing additional credits, the majority of these are recommended as an assurance the BREEAM Excellent rating will be achieved in the event any credits under the Excellent scenario are lost. We recommend a development always targets a minimum margin of 5%-6% over the required 70%.



The following table outlines which credits are targeted within each scenario and those that have already been achieved:



		Available	Excellent	Potential	Awarded
Management					
Man 01	Project brief and design	4	4	4	0
Man 02	Life cycle cost and service planning	4	1	1	0
Man 03	Responsible construction practices	6 + 1e	7	7	0
Man 04	Commissioning and handover	4	4	4	0
		18 + 1e	16	16	0
Health & Wellbeing					
Hea 01	Visual comfort	4 + 1e	4	4	2
Hea 02	Indoor air quality	1	1	1	0
Hea 04	Thermal comfort	2	2	2	2
Hea 05	Acoustic performance	1	1	1	0
Hea 06	Security	1 + 1e	1	1	0
Hea 07	Safe and healthy surroundings	1	0	1	0
		10 + 2e	9	10	4
Energy					
Ene 01	Reduction of energy use and carbon emissions	13 + 5e	9	10	4
Ene 02	Energy monitoring	2	2	2	0
Ene 03	External Lighting	1	1	1	0
Ene 04	Low carbon design	3	2	2	0
Ene 06	Energy efficient transportation systems	2	2	2	0
		21 + 5e	16	17	4
Transport					
Tra 01	Transport assessment and travel plan	2	2	2	2
Tra 02	Sustainable transport measures	10	6	8	2
		12	8	10	4
Water					
Wat 01	Water consumption	5 + 1e	5	6	0
Wat 02	Water monitoring	1	1	1	0
Wat 03	Water leak detection	2	2	2	0
		8 + 1e	8	9	0
Materials					



Mat 01	Environmental impacts from construction products - Building life cycle assessment (LCA)	7 + 3e	1	7	0
Mat 02	Mat 02 Environmental impacts from construction products - Environmental Product Declarations (EPD)	1	1	1	0
Mat 03	Responsible sourcing of construction products	4 + 1e	2	3	0
Mat 05	Designing for durability and resilience	1	1	1	0
Mat 06	Material efficiency	1	1	1	0
		14 + 4e	6	13	0
Waste					
Wst 01	Construction waste management	5 + 1e	5	5	0
Wst 02	Use of recycled and sustainably sourced aggregates	1 + 1e	0	0	0
Wst 03	Operational waste	1	1	1	1
Wst 04	Speculative finishes (Offices only)	1	1	1	0
Wst 05	Adaptation to climate change	1 + 1e	1	1	0
Wst 06	Design for disassembly and adaptability	2	2	2	1
		11 + 3e	10	10	2
Land Use & Ecology					
LE 01	Site selection	2	1	1	1
LE 02	Ecological risks and opportunities	2 + 1e	2	2	2
LE 03	Managing impacts on ecology	3	3	3	3
LE 04	Ecological change and enhancement	4 + 1e	3	3	1
LE 05	Long term ecological management and maintenance	2	2	2	2
		13 + 2e	11	11	9
Pollution					
Pol 01	Impact of refrigerants	3	2	2	0
Pol 02	Local air quality	2	0	2	0
Pol 03	Flood and surface water management	5	2	2	2
Pol 04	Reduction of night time light pollution	1	1	1	0
Pol 05	Reduction of noise pollution	1	1	1	0
		12	6	8	2



3.1 Additional Credits

The credits detailed below should be taken into consideration if credits under the 'Targeted' scenario are lost. The recommended credits are highlighted **green** in the table above:

Hea 07: Safe and Healthy Surroundings – Outside Space

This credit requires that an outside space providing building users with an external amenity area is provided where building users can relax and take a break from work. This can be a terrace.

Ene 01: Reduction of Energy Use and Carbon Emissions – Energy Performance

This credit aims to encourage the reduction of operational energy demand. It is important to note that a minimum of 4 credits is mandatory for an Excellent rating. In order to achieve 6 credits under the Energy Performance section, a minimum of 0.6 Energy Performance Ratio is required.

Tra 02: Sustainable Transport Measures

In order to achieve a further 2 credits under the additional credit scenario a total of 6 sustainable transport points is required. Further sustainable transport measures to be considered for implementation to achieve the additional points and credits are:

Table 1.0: Sustainable Transport Measures

Assessment Option	Public Transport Measures	Points
1	1. The existing AI calculated in Tra 01 achieves the following: ≥ 4 for prison or MOD sites, rural location sensitive buildings, and other building group 3 ≥ 8 for all other building types	1
2	2. Demonstrate an increase over the existing Accessibility Index through negotiation with local bus, train or tram companies to increase the frequency of the local service provision for the development.	2
	OR	
	3. Demonstrate an increase over the existing Accessibility Index. This could be through provision of a diverted bus route, a new or enhanced bus stop, or other similar solutions.	3
	OR	
	4. Provide a public transport information system in a publicly accessible area.	3

**Table 1.0: Sustainable Transport Measures**

3	5. Provide a public transport information system in a publicly accessible area, to allow building users access to up-to-date information on the available public transport and transport infrastructure. This may include signposting to public transport, cycling, walking infrastructure or local amenities.	1
Assessment Option	Private Transport Measures	Points
4	6. Provide electric recharging stations of a minimum of 3kW for at least 10% of the total car parking capacity for the development.	1
5	7. Set up a car sharing group or facility to facilitate and encourage building users to car share. 8. Raise awareness of the sharing scheme with marketing and communication materials. 9. Provide priority spaces for car sharers for at least 5% of the total car parking capacity for the development. 10. Locate priority parking spaces nearest the development entrance used by the sharing scheme participants.	1
Assessment Option	Active Travel Measures	Points
6	11. During preparation of the brief, the design team consults with the local authority (LA) on the state of the local cycling network and public accessible pedestrian routes, to focus on whichever the LA deems most relevant to the project, and how to improve it. 12. Agree and implement one proposition chosen with the local authority. The proposition supported by the development is additional to existing local plans and has a significant impact on the local cycling network or on pedestrian routes open to the public.	2
7	13. Install compliant cycle storage spaces to meet the minimum levels set out on the basis of anticipated building occupancy.	1
8	14. Option 7 must be achieved. 15. Provide at least two compliant cyclists' facilities for the building users, (including pupils where appropriate to the building type): • Showers • Changing facilities • Lockers • Drying spaces	1
9	Existing Amenities: 16. At least three existing accessible amenities are present. These may be appropriate food outlets, access to cash, access to an outdoor open space access to recreation or sports facility, pharmacy, GP or postal service.	1
10	Enhanced Amenities: 17. Ensure a minimum of one new accessible amenity is provided.	2



Wat 01: Water Consumption - Exemplary

This credit aims to significantly reduce water consumption. To achieve the Exemplary credit a rainwater harvesting system would need to be implemented.

Mat 01: Environmental Impacts from Construction Products - Building Life Cycle Assessment (LCA)

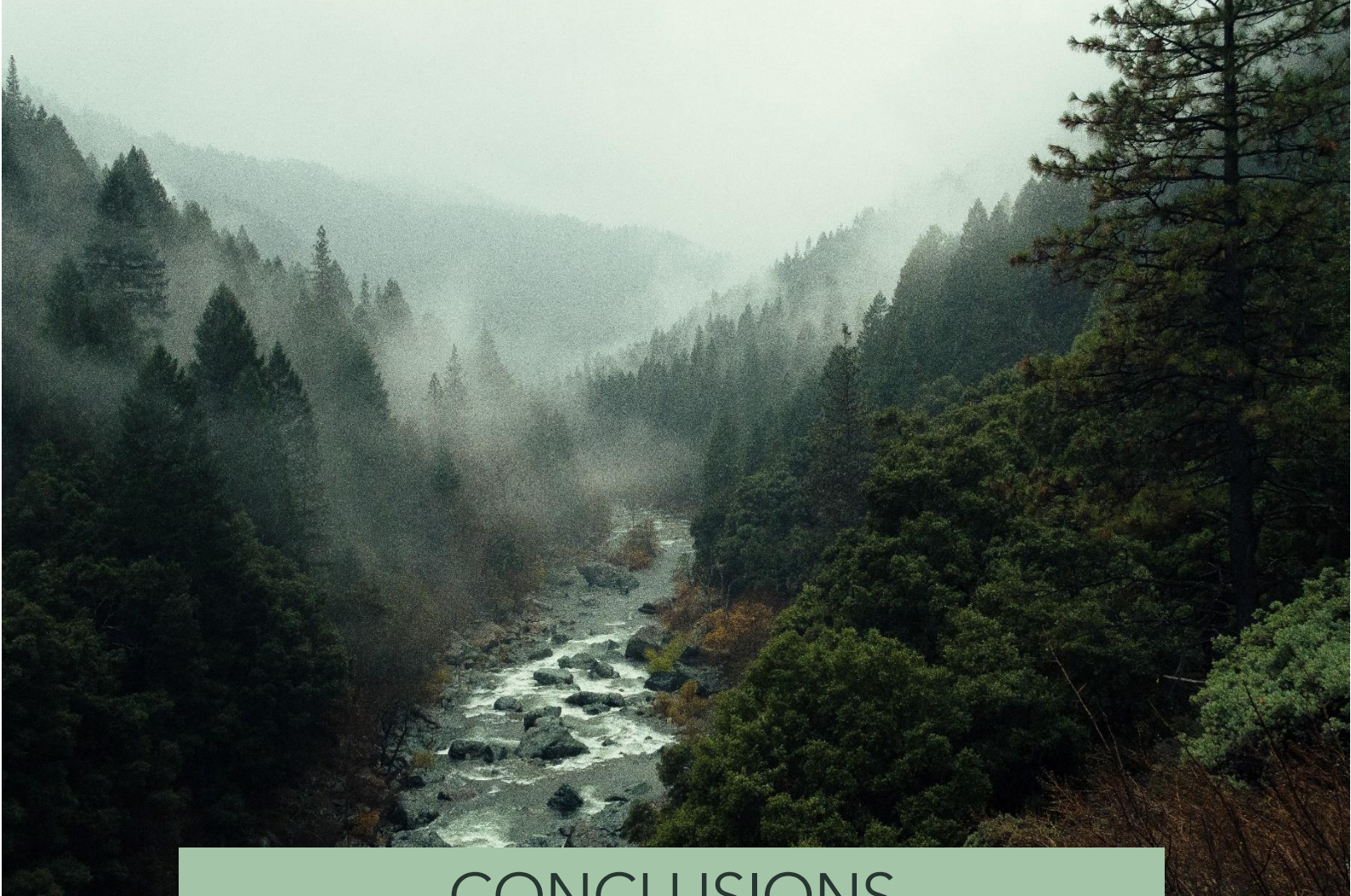
This credit aims to encourage the use of construction materials with a low environmental impact. This is achieved by conducting a life cycle assessment of the building's superstructure using the BREEAM simplified building LCA tool during concept design (RIBA stage 2). The results from the LCA are then submitted via the Mat01/01 submission tool. To achieve further credits within Mat 01, the project team must instead use a more complex LCA tool that is BREEAM IMPACT compliant. Multiple LCA appraisals must be completed at both concept and technical design, accompanied by an options appraisals report outlining with reasons, why one option was preferred over others. A further credit is available for completing an LCA for the building's substructure and hard landscaping.

Mat 03: Responsible Sourcing of Construction Products

This credit encourages the responsible sourcing of all materials. The assessed materials that go into the building are given points that determine the number of credits achieved. The number of points awarded are determined by the BRE depending on the third-party certification (ISO14001 or BES6001) covering these materials. In order to achieve 2 credits it is to be demonstrated that at least 20% of the available points are achieved. The third credit in the Target score is awarded where a compliant Sustainable Procurement Plan is produced.

Pol 02: Local Air Quality

Two credits can be achieved where the building is fitted with either non-combustible heating/hot water systems or alternatively heating and hot water is supplied by a system that does not emit more than 24mg/kWh NO_x gases.



CONCLUSIONS



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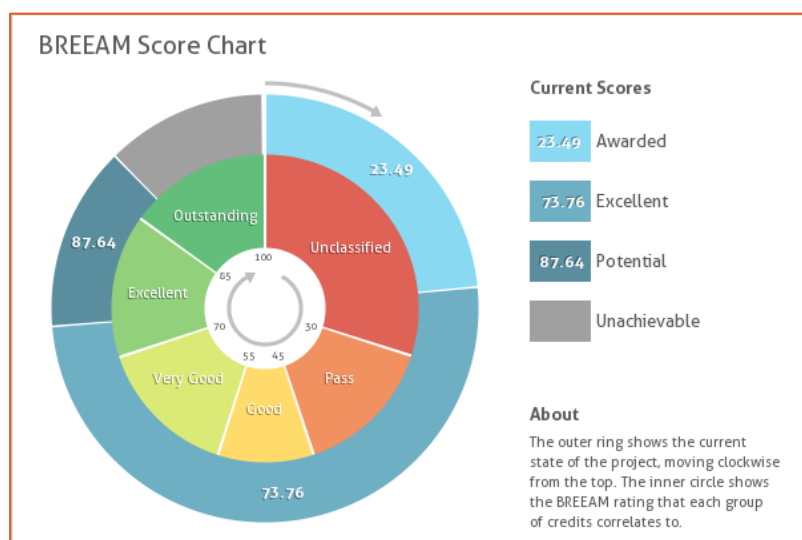
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4.0 CONCLUSIONS

An updated BREEAM Pre-Assessment has been undertaken for building 39 Deansgate to be developed in Manchester City Centre that reassessed the achievability of targeted credits. The client has selected a BREEAM 'Excellent' rating as the target for this development. Both an 'Excellent' and 'Potential' credit scenario have been established by Mainer Associates. The Potential scenario reflects a more onerous BREEAM rating and provides the project team with a selection of potential credits that could be targeted if credits within the 'Excellent' scenario are lost in the process. Credits required in addition to those outlined for the Excellent scenario have been detailed in the previous section.

The following results were concluded:



- Excellent: 73.76%
- Potential: 87.64%
- Awarded: 23.49%

In addition to the information above, we have provided a list of survey requirements (Appendix B), as well as a table demonstrating at which RIBA stages surveys/reports should be undertaken. These can be sent directly on to specialist organisations already working on the scheme to ensure that current work and future instructions incorporate the requirements of BREEAM. This will help avoid unnecessary additional costs later in the project programme.

The Appendices provide further information on the following:

- Appendix A: Details of evidence types accepted by the BRE
- Appendix B: Survey/Report requirements
- Appendix C: Detailed information requirements



APPENDIX A: BREEAM EVIDENCE REQUIREMENTS

Evidence does not necessarily need to be prepared specifically for the purpose of the BREEAM assessment. In many instances, the assessor should source readily available and prepared project information to demonstrate compliance. For this reason, BREEAM aims to avoid being prescriptive on the type of evidence required, although some issues do require specific documents to be provided.

The BREEAM Assessor and project team will find that many assessment issues require more than one piece or type of information to demonstrate compliance with one criterion. Alternatively, one piece of information may be sufficient to demonstrate compliance with multiple criteria.

To help project teams and the BREEAM Assessor understand how the different types of building information documentation they collate can be used as evidence at each stage of assessment, the evidence types are grouped broadly into three categories:

1. General evidence type.
2. Specific evidence type.
3. Other evidence type.

For some assessment issues, the assessor will require a mix of general and specific evidence types.

General evidence includes a broad list of defined building information commonly produced for a building project. One or more pieces of this type of information can be used to demonstrate compliance for one or more of the assessment issues and criteria, as deemed appropriate by the BREEAM Assessor for the stage of assessment. General BREEAM evidence types are listed in Table 2.9 on page 29, and not specifically in the Evidence section within each BREEAM issue. Not all general evidence types will be appropriate for all assessment issues, and it is the responsibility of the assessor to ensure that the evidence specifically demonstrates compliance and is fully referenced in the assessment submission. Specific evidence is particular building information that must be provided to verify compliance with the relevant criteria for the BREEAM credit sought. In all cases this is the only type of evidence acceptable to BRE Global Ltd for that particular issue or criterion. If the specific evidence is not provided and referenced appropriately in the assessment submission, the Quality Assurance audit will identify it as a non-conformity and a certification decision will be delayed until such time as the non-conformity is addressed. An example of specific evidence is a copy of the Building Regulations output document from the approved software for BREEAM issue Ene 01 which is listed in the evidence table for this issue.



When required, specific evidence is defined and listed in the Evidence section of the assessment issue for both interim and final stages of assessment. Specific evidence required to demonstrate compliance with particular criteria is listed but this evidence alone may not be sufficient to demonstrate full compliance. Additional general evidence types may also be required. For example for Mat 01: to demonstrate compliance with criteria 1–5 at the design stage, a copy of the Mat 01 Calculator tool is listed in the ‘Evidence’ table. However, in addition to the Mat 01 Calculator tool, further evidence is required to demonstrate how the inputs for this tool have been determined, i.e. general evidence types such as building specifications or drawings etc., confirming the material specifications to be used. Not all BREEAM issues have specific evidence requirements. Other types of evidence provided by a client or design team not listed in Table 2.9 on page 29 or the ‘Evidence’ section for each issue, can still be used. To avoid non-conformities and delays in certification, other types of evidence must be credible, robust, and traceable to the same assurance level as, or better than, specified or general evidence types defined in the technical manual. If in doubt, BRE should be contacted prior to awarding credits and referencing such evidence in the submission for QA and certification decision.

The tables below provide guidance on what the BRE accepts as evidence:

Ref	Document or Evidence Type	Description and Notes
E1	As constructed information	Information produced at the end of a project to represent what has been constructed. This will comprise a mix 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.
E3	BRE Global correspondence reference number	For example, the reference number for a BRE Global response to an assessor’s technical query.
E4	BREEAM Assessor’s site inspection report	A formal report based on the BREEAM Assessor’s own survey of the site or building to confirm compliance with BREEAM criteria. An assessor’s site inspection report will be distinct from their formal BREEAM 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.
E5	Building contracts	The building contract (or excerpts or clauses from it) between the client and the contractor for the construction of the project. 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 ISO 14001, BES 6001, FSC (Forest Stewardship Council), EPC (environmental profile certificate), EPD (environmental product declaration), Considerate Constructors etc.
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 another form of media (see also additional guidance on following pages).
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.
E9	Computer aided modelling results and outputs	Examples include thermal modelling, flooding, life cycle assessment, life cycle costing, ventilation modelling etc.
E10	Construction specification	The specification for the project or building.
E11	Construction stage data and information	For example, purchase orders, metering data, logbooks, commissioning records, reports etc.
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	Developed Design 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 extend of any performance-specified design.
E17	Feasibility study	Studies undertaken to test the feasibility of the Initial Project Brief for 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 examples, maps, public transportation timetables, product data or details, manufacturer's literature, government or EU standards or codes, EU labelling.
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, transportation analysis, commissioning reports, passive design analysis report, free cooling analysis report, life cycle assessment, landscape, and habitat management plan etc.
E22	Project Execution Quality Plan	The Project Execution Quality Plan is produced in collaboration with 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 design risks 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.

Written Commitments at the Interim Stage of the Assessment – Design Stage

At the interim design stage of assessment, letters, or emails to demonstrate intent to comply with BREEAM criteria can be used, provided they meet the requirements for communication records. Such evidence must make clear the actions that will be undertaken and evidence that will be provided, i.e. the commitment to ensure the project's compliance, particularly at the final stage of assessment. The party who makes the commitment must be clearly aware of the actions and evidence that needs to be undertaken and supplied to demonstrate compliance with BREEAM at the final stage of assessment. For example, in many circumstances it would not be acceptable for the design team to simply copy and paste the BREEAM criteria into a written commitment (BREEAM criteria do not generally prescribe solutions). The commitment should specifically detail how criteria are to be achieved (the solution) in the context of the assessment, and often copying and pasting the BREEAM criteria will not provide this detail. This therefore does not demonstrate the degree of confidence in the solution necessary for certification. 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 not unreasonable to expect formal design or specification information to be available to confirm compliance.



Written Commitments at the Final Stage of the Assessment – Post Construction

Two types of assessment can be carried out at the post-construction stage, a post-construction review of a design stage assessment, or a post-construction assessment where no design stage assessment has been carried out. The 'Final post-construction stage' column of the evidence table in each issue assumes that a design stage assessment has been completed and certified. Where a design stage assessment has not been completed, the assessor will need to review both the 'Interim design stage' and 'Final post-construction stage' evidence listed in the evidence table and ensure sufficient evidence is submitted with the assessment to demonstrate compliance with the criteria.

Evidence supplied at the post-construction stage must reflect the completed building and must therefore demonstrate what has actually been implemented. For example, if sub-meters have been specified at the 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 sub-meters.

Letters of commitment cannot be used to demonstrate compliance at the final, post-construction stage of assessment. The only exception to this is where the criteria require an action to take place after handover and possibly during the initial stages of building operation, i.e. after completion of the post-construction stage of assessment. An example could be a written commitment from the building owner or occupier making a commitment to conduct post occupancy evaluation.



APPENDIX B: BREEAM SURVEY/REPORT REQUIREMENTS

RIBA Stage Information - BREEAM 2018							
RIBA Stage	1	2	3	4	5	6	7
	Preparation & Brief	Concept Design	Developed Design	Technical Design	Construction	Handover	In-Use
BREEAM Stage	Pre-Assessment	Pre-Assessment & Design Stage	Design Stage	Design Stage	Design Stage & Post Construction	Post Construction Stage	Post Construction Stage & BREEAM In-Use
Ecology	LE - Ecologist Appointment / Selection of Assessment Route	LE - Ecology Report					
Consultation		Man 01 - Consultation (Project Delivery Planning & Interested Parties) Man 1 - Advisory Professional		Man 01 - Consultation Feedback (Interested Parties)			
Advisory Professional		Man 01 - Advisory Professional	Man 01 - Advisory Professional	Man 01 - Advisory Professional	Man 01 - Advisory Professional	Man 01 - Advisory Professional	Man 01 - Advisory Professional
Post-Occupancy Evaluation							Man 05 - POE
Security		Hea 06 - Security Needs Assessment					
LZCs & Passive Design		Ene 04 - Passive Design Analysis & LZC Study					
Adaption to Climate Change		Wst 05 - Adaption to Climate Change		Wst 05 - Adaption to Climate Change Study Recommendations embedded in the design			
Functional Adaptability		Wst 06 - Functional Adaptability Study		Wst 06 - Functional Adaptation measures included within the design			



Travel Plan		Tra 01 - Transport Assessment & Travel Plan	Tra 01 - Transport Assessment & Travel Plan				
Material Efficiency	Mat 06 - Set targets & report on opportunities & methods to optimise the use of materials	Mat 06 - Set targets & report on opportunities & methods to optimise the use of materials	Mat 06 - Set targets & report on opportunities & methods to optimise the use of materials	Mat 06 - Set targets & report on opportunities & methods to optimise the use of materials			
Indoor Air Quality Plan		Hea 02 - Indoor Air Quality Plan					
Pre-Demolition Audit		Wst 01 - Pre-demolition audit					
Sustainable Procurement Plan		Mat 03 - Sustainable procurement plan					
Energy Efficiency		Ene 01 - Operational Energy Performance Workshop					
Environmental Performance of Building		Mat 01 - LCA Appraisal					



Management 01 – Project Delivery Planning

Not all the items here will need to be included at this stage as some elements will be undertaken during the detailed design stage.

1. Prior to completion of the Concept Design (RIBA Stage 2 or equivalent), the project delivery stakeholders (see definition below) have met to identify and define their roles, responsibilities, and contributions for each of the key phases of project delivery.

Project delivery stakeholders are:

The purpose of criterion 1 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 (where known), the design team and the principal contractor. With regards to contractors' involvement, it ensures their input in terms of formulating sustainable design solutions, commenting/inputting on the practicality and build ability of (one or more) design solutions and their impact on programming, cost etc.

BREEAM recognises 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 criterion 1 would not be possible. In these instances, to ensure the aim of the criteria is upheld, criterion 1 will be met provided that a suitably experienced person with substantial construction/contracting experience in projects similar to the proposed works is 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.

2. In defining the roles, responsibilities, and contributions for each key phase of the project, the following must be considered:

- a. End user requirements
- b. Aims of the design and design strategy
- c. Particular installation and construction requirements/limitations
- d. Occupiers' budget and technical expertise in maintaining any proposed systems
- e. Maintainability and adaptability of the proposals
- f. Operational Energy
- g. Requirements for the production of project and end user documentation
- h. Requirements for commissioning, training, and aftercare support.

Where the building occupants are not known, the list of considerations above still applies. The appropriate project delivery stakeholder considers each item, based on likely scenarios of building occupancy.

3. The project team demonstrate how the project delivery stakeholder contributions and the outcomes of the consultation process have influenced or changed the Initial Project Brief, including if appropriate, the Initial Project Brief Project Execution Plan, Communication Strategy, and the Concept Design.



Communication strategy: The RIBA Plan of Work 2013 defines the Communication Strategy as 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.

Concept design: The objective at this stage is to develop outline proposals including site and spatial planning, building form, structural and building services strategies, outline specifications, preliminary cost budgets including relevant project strategies which support or influence the design programme and the ability to comply with BREEAM requirements as the project progresses.

Activities can include: preparing the sustainability strategy, maintenance and operational strategy, handover strategies, carrying out risk assessments, reviewing the project programme, considering construction logistics to ensure efficiency, developing health and safety strategy, undertaking any third-party consultations as required, and any research and development aspects.

Man 01 – STAKEHOLDER CONSULTATION (Interested parties)

4. Prior to completion of the Concept Design stage, all relevant third-party stakeholders have been consulted by the design team and this covers the minimum consultation content (see definition below) on matters that cover the minimum consultation content (see methodology below).

The minimum consultation content of the consultation plan will be dependent on the building but would typically include the following:

1. Functionality, build quality and impact (including aesthetics).
2. Provision of appropriate internal and external facilities (for future building occupants and visitors/users).
3. Management and operational implications.
4. Maintenance resources implications.
5. Impacts on the local community, e.g. local traffic/transport impact.
6. Opportunities for shared use of facilities and infrastructure with the community/appropriate stakeholders, if relevant/appropriate to building type.
7. Compliance with statutory (national/local) consultation requirements.
8. Energy use and sustainability measures.
9. Implementing principles that deliver inclusive and accessible design.

In the case of educational building types, minimum content also includes:

10. How the building/grounds could best be designed to facilitate learning and provide a range of social spaces appropriate to the needs of pupils, students, and other users.

In the case of building types containing technical areas or functions, e.g. laboratories, workshops etc., minimum content also includes:



11. The end users' broad requirements for such facilities, including appropriate sizing, optimisation and integration of equipment and systems.

In the case of transportation hubs, minimum content also includes:

12. How to ensure a smooth, safe, and secure transition between different modes of transport, recognising the diversity of user needs including people of all ages and abilities.

5. Demonstrate how the stakeholder contributions and consultation exercise outcomes influence the Initial Project Brief and Concept Design.

6. Prior to completion of the detailed design (RIBA Stage 4, Technical Design or equivalent), all interested parties give and receive consultation feedback.

Management 01 – Advisory Professional

Man 01 – ADVISORY PROFESSIONAL (Concept Design)

8. The project team, including the client, formally agree strategic performance targets early in the design process (with the support of the BREEAM AP where appointed).

9. Involve a BREEAM AP in the project at an appropriate time and level to:

- a. Work with the project team, including the client, to consider the links between BREEAM issues and assist them in maximising the project's overall performance against BREEAM, from their appointment and throughout Concept Design.
- b. Monitor progress against the performance targets (see definition below) agreed above throughout all stages after their appointment where decisions critically impact BREEAM performance.
- c. Proactively identify risks and opportunities related to the achievement of the targets agreed under (above).
- d. Provide feedback to the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets.
- e. Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team.

Performance targets: Performance targets refer to the BREEAM rating and minimum standards required. Where appropriate, performance targets can be related to individual BREEAM credits. However, performance targets may also involve other targets related to issues covered in BREEAM assessments, e.g. energy, health and wellbeing.

Man 01 – ADVISORY PROFESSIONAL (Developed Design)

10. Criteria 8 and 9 have been achieved.

11. Involve the AP in the project at an appropriate time and level to:



- a. Work with the project team including the client, to consider the links between BREEAM issues and to assist them in maximising the projects overall performance;
- b. Monitor progress against the performance targets agreed under criterion 8 throughout all stages where decisions critically impact the specification and tendering process and the BREEAM performance;
- c. Proactively identify risks and opportunities related to the achievement of the targets agreed under criterion 8.
- d. Provide feedback to the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets.
- e. Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team.

Management 02 – Life Cycle Cost and Service Planning

Man 02 – ELEMENTAL LCC (Two credits)

1. A competent person carries out an online, entire asset LCC plan at Process Stage 2 (or Concept Design RIBA stage 2) together with any design options appraisals in line with 'Standardises method of life cycle costing for construction procurement PD 156865:2008.
2. The elemental LCC plan:
 - a. Provides an indication of future replacements costs over a period of analysis as required by the client (e.g. 20, 30, 50 or 60 years).
 - b. Includes service life, maintenance, and operation cost estimates.

The study period should be agreed with the client in line with the design life expectancy of the building. If life expectancy is not yet formally agreed the default design life of 60 years should be used for modelling purposes (in line with the UK default).

3. Demonstrate using appropriate examples provided by the design teams, how the elemental LCC plan has been used to influence building and systems design and specification to minimise life cycle costs and maximise critical value.

Man 02 – Component Level LCC Options Appraisals (One Credit)

4. A component level LCC option Appraisal has been developed by the end of the Process Stage 4 (Equivalent to Technical Design – RIBA Stage 4) in line with PD 156865:2008 and includes the following component types (where present):
 - a. Envelope: cladding windows and/or roofing.
 - b. Services: heat source, cooling source and controls.
 - c. Finishes: walls, floors and/or ceilings.
 - d. External spaces: alternative hard landscaping, boundary protection.

The component level LCC option appraisal should review all of the above component types (where present). However, you do not need to consider every single example cited under each component; only a selection of those most likely to draw valued comparisons. This is to ensure that a wide range of options are considered and help focus the analysis on components which would benefit the most from appraisal.

5. Demonstrate using appropriate examples provided by the design team, how the component level LCC cycle appraisal has been used to the influence building systems design/specification to minimise life cycle cost and maximise critical value.



Man 02 - CAPITAL COST REPORTING (One credit)

6. Report capital cost for the building in pounds per square metre (£k/m²) as part of the submission to BRE.

Management 05 - Post-Occupancy Evaluation

Man 01 - AFTERCARE SUPPORT (One credit)

1. Provide aftercare support to the building occupiers through having in place operational infrastructure and resources. This includes as a minimum:
 - 1.a A meeting between the aftercare support team or individual, and the building occupier or management team (prior to initial occupation, or as soon as possible thereafter) to:
 - 1.a.i Introduce the aftercare support available, including the content of the building user guide (where it exists) and training schedule.
 - 1.a.ii Present key information on the building including the design intent and how to use the building to ensure it operates as efficiently and effectively as possible.
 - 1.b On-site facilities management training including:
 - 1.b.i a walkabout of the buildingAND
 - 1.b.ii introduction to and familiarisation with the building systems, their controls and how to operate them in accordance with the design intent and operational demands.
 - 1.c Provide initial aftercare support for at least the first month of building occupation, e.g. weekly attendance on-site, to support building users and management (the level of frequency will depend on the complexity of the building and building operations).
 - 1.d Provide longer term aftercare support for occupiers for at least the first 12 months from occupation, e.g. a helpline, nominated individual or other appropriate system to support building users and management.
2. Establish operational infrastructure and resources to coordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months once the building is substantially occupied. This facilitates analysis of discrepancies between actual and predicted performance, with a view to adjusting systems and users' behaviours accordingly.

Man 05 - COMMISSIONING, IMPLEMENTATION (One Credit)

3. Complete the following commissioning activities over a minimum 12-month period once the building becomes substantially occupied:
 - a. Complex systems: The specialist Manager will: identify changes made by the owner/operator that may have caused impaired/improved performance; test all building services under full load conditions (spring and autumn); where applicable, carry out testing during extreme high/low occupancy; interview building occupants (where they are affected by the complex



services) to identify concerns on effectiveness of systems; produce monthly reports comparing sub-metered energy performance with predictions; identify inefficiencies and areas in need of improvement; and re-commission systems (following any work needed to serve revised loads) and incorporate any revisions in operating procedures into the operations and maintenance (O&M) manuals.

- b. Simple systems (natural ventilation): The external consultant/aftercare team/facilities manager will: Review thermal comfort, ventilation and lighting at three-, six- and nine-month intervals either by measurement or occupant feedback; they will identify deficiencies and areas in need of improvement; and re-commission systems and incorporate any relevant revisions in operating procedures into the O&M manuals.

Man 05 - POST-OCCUPANCY EVALUATION (POE) (One Credit)

4. The client or building occupier commits to carry out a POE exercise (see definition below) one year after the building is substantially occupied. This gains comprehensive in-use performance feedback (see criterion 5.b.v) and identifies gaps between design intent and in-use performance. The aim is to highlight any improvements or interventions that need to be made and to inform operational processes.

Post-Occupancy Evaluation (POE)

POE is also known as Building Performance Evaluation (BPE).

The POE is used to improve the building operation, occupants' comfort and other areas based on its outcomes. Therefore, the POE provides suggestions on potential improvements, including, but not limited to the following:

- Re-commissioning activities
- Measures that maintain or improve end users' comfort and productivity
- Health and safety

A POE can also be used as part of the stakeholder consultation at the briefing stage for a new building or the refurbishment of an existing one, in cases where the building occupants are the same. This can be achieved through the use of a questionnaire or workshops to highlight lessons from the old or existing building that could be taken into account in the design of the new project.

5.a. A review of the design intent and construction process (review of design, procurement, construction, and handover processes).

5.b. Feedback from a wide range of building users including facilities management on the design and environmental conditions of the building covering:

- 5.b.i. Internal environmental conditions (light, noise, temperature, air quality)
- 5.b.ii. Control, operation, and maintenance
- 5.b.iii. Facilities and amenities
- 5.b.iv. Access and layout



5.b.v. Energy and water consumption (see criterion 2. and methodology)

5.b.vi. Other relevant issues.

Methodology:

Data Collection and Provision.

Collection and monitoring of energy and water consumption data: This can be coordinated or carried out by a dedicated aftercare team, OR by the building owner/occupier's estates and facilities management team, where the building occupier is known and able to confirm compliance based on their existing or proposed operations for the building.

Provision of annual energy and water consumption: One way of demonstrating compliance with this criterion is for the client or end user to register and therefore commit the building for assessment under the relevant part of BREEAM In-Use scheme.

6. The independent party provides a report with lessons learned to the client and building occupiers.

7. The client or building occupier commits funds to pay for the POE in advance. This requires an independent party to be appointed to carry out the POE as described in criterion 5. Evidence of the appointment of the independent party and schedule of responsibilities which fulfils the BREEAM criteria are acceptable to demonstrate compliance.

Pollution 03 – Flood Risk Assessment. Flood and Surface Water Management

Pol 03 – PREREQUISITE

1. An appropriate consultant is appointed to carry out and demonstrate the developments compliance with all criteria.

Pol 03 – FLOOD RESILIENCE (Up to two credits)

2. **For two credits: Flood resilience:** A site specific flood risk assessment (FRA) confirms the development is in a flood zone that is defined as having low annual probability of flooding. The FRA takes all current and future sources of flooding into consideration.

Pol 03 – MEDIUM OR HIGH FLOOD RISK (One credit)

1. **For one credit:** Where a site-specific FRA confirms the development is in a flood zone that is defined as having a medium or high annual probability of flooding and is not in a functional floodplain (in accordance with current best practice national planning guidance). The FRA must take all current and future sources of flooding into consideration (see definition below). For smaller sites refer to 'Level of detail required in the FRA for smaller sites' definition below on page, which overrides criterion 2 above.



Sources of flooding: The Flood Risk Assessment (FRA) must detail the risk of flooding from the following sources:

1. Fluvial (rivers)
2. Tidal
3. Surface water: sheet run-off from adjacent land (urban or rural)
4. Groundwater: most common in low-lying areas underlain by permeable rock (aquifers)
5. Sewers: combined, foul or surface water sewers
6. Reservoirs, canals and other artificial sources.

The content of the FRA should be based on historic trends but should also account for predicted changes to the climate which may impact on the flood risk to the site in future.

AND

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

- a. The ground level of the building and access to both the building and the site, are designed (or zoned) so they are at least 600mm above the design flood level of the flood zone in which the assessed development is located (please see definition below);

600mm threshold: It is accepted that, for buildings 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 the credit is still achievable provided safe access to the site, and the ground floor of the building can be maintained (i.e. they are 600mm above the design flood level) to ensure the building and 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/infrastructure immediately adjacent to the site fall below the 600mm threshold, the credit can still be awarded, provided there are no other practical solutions for access to the site above this level and the assessed building, and access to it, 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.

For buildings located in medium or high flood risk zones, any areas used to store sensitive, historical, hazardous, valuable, and perishable materials, e.g. radioactive materials, microbiological facilities, server rooms, libraries, etc., must be located above the 600mm threshold.

OR

- b. The final design of the building and the wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach outlined in section 5 of BS 8533:2017.

Level of detail required in the FRA for smaller sites:

For smaller sites, e.g. less than 1 ha (10,000 m²), the level of detail required in the FRA will depend on the size of the site and the arrangement of buildings on that site. For a small site with a relatively simple arrangement of buildings this might consist of a brief report. For larger sites with a higher density of buildings a more detailed assessment would be appropriate.



For small simple sites (2000 m² and less), an acceptable FRA could be a brief report carried out by the contractor's engineer confirming the risk of flooding. This must include the risk from all sources of flooding, and information obtained from the Environment Agency, water company or sewerage undertaker, other relevant statutory authorities, site investigation and local knowledge.

Pol 03 - SURFACE WATER RUN-OFF (Two Credits)

5. Prerequisite: Surface water run-off design solutions must be bespoke, i.e. they must take account of the specific site requirements and natural or man-made environment of and surrounding the site. The priority levels detailed in the Methodology must be followed, with justification given by the appropriate consultant where water is allowed to leave the site.

Pol 03 - SURFACE WATER RUN-OFF - RATE (One Credit)

6. Drainage measures are specified so that the peak rate of run-off from the site to the watercourses (natural or municipal) shows a 30% improvement for the developed site compared with the pre-developed site. This should comply at the 1-year and 100-year return period events.
7. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified Sustainable Drainage Systems (SuDS) are in place.
8. Calculations include allowance for climate change. This should be made in accordance with current best practice planning guidance (below).

Current best practice national planning guidance

Please refer to the current guidance given in the following locations. It is the design team's responsibility to choose the most appropriate guidance from the links below:

- www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/
- www.gov.uk/guidance/pollution-prevention-for-businesses
- www.gov.uk/guidance/storing-oil-at-a-home-or-business

Pol 03 - SURFACE WATER RUN-OFF - VOLUME (One Credit)

9. Flooding of property will not occur in the event of local drainage system failure (caused by extreme rainfall or lack of maintenance); AND

EITHER

10. Drainage design measures are specified so that post-development run-off volume, over the development lifetime is no greater than it would have been prior to the assessed site's development. This must be for the 100-year 6-hour event, including an allowance for climate change.
11. Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other SuDS techniques.

OR (only where the previous two criteria cannot be achieved):

12. Justification from the appropriate consultant indicating why the above criteria cannot be achieved i.e. where infiltration or other SuDS techniques are not technically viable options.
13. Drainage design measures are specified so that the post development peak rate of run-off is reduced to the limiting discharge. The limiting discharge is defined as the highest flow rate from the following options:
 - a. The pre-development on-year peak flow rate
 - b. The mean annual flow rate (Qbar)
 - c. 2L/s/ha.



For the on-year peak flow rate, the one-year return period event criterion applies.

14. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place.
15. For either option, above calculations must include an allowance for climate change, this should be made in accordance with current best practice planning guidance.

Pol 03 - MINIMISING WATERCOURSE POLLUTION (One Credit)

16. There is no discharge from the developed site for rainfall up to 5mm (confirmed by the appropriate consultant).
17. Areas with low-risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using the SuDS Techniques.
18. Areas with high risk of contamination or spillage of substances such as petrol and oil, have separators (or an equivalent system) are installed in surface water drainage systems.
19. Chemical or liquid gas storage areas have a means of contaminant fitted to the site drainage system (i.e. shut off valves). This is to prevent the escape of the chemicals to natural watercourses in the event of a spillage or bunding failure.
20. All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as the SuDS manual and other relevant industry best practice. They must be bespoke solutions taking account of the specific site requirements and natural or man-made environment of and surrounding the site.
21. A comprehensive and up to date drainage plan of the site will be made available for the building or site occupiers.
22. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place.
23. All external storage and delivery areas are designed and detailed in accordance with the current best practice planning guidance.

Land Use and Ecology 02-05 - Ecology Report

The following would need to be completed by the ecologist:

The following sets out the requirements for the ecologist's qualifications and the content of the ecological report required under BREEAM credits LE 02, LE 03, LE 04 & LE 05.

LE 02 - IDENTIFYING AND UNDERSTANDING THE RISKS AND OPPORTUNITIES FOR THE PROJECT

This issue is now split into two parts:

- Survey and Evaluation
- Determining the ecological outcomes for the site

Prerequisite - Assessment route selection

1. An assessment route for the project has been determined using BREEAM Guidance Note GN34 BREEAM Ecological Risk Evaluation Checklist (see appended after this section).
2. The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site.

Assessment Route definitions:

Route 1: for sites, where ecological opportunities and risks are limited in nature:

This route is only appropriate where the level of ecological risk associated with the site is of a level that can practically 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. A lower level of reward



is available as this route does not involve the same level of input and expertise that would be available when using a Suitably Qualified Ecologist.

Route 2: For sites, where complex ecological systems are likely to be present:

This is the more comprehensive route of assessment and therefore can achieve a higher level of reward than Route 1. It must be conducted by a Suitably Qualified Ecologist (see definition below). This route will be mandatory for more sensitive sites and optional for those eligible for assessment under Route 1. This would be assessed by completing the Ecological Risk Evaluation Checklist.

Suitably Qualified Ecologist (SQE)

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

1. Holds a degree or equivalent qualification (e.g. 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 BREEAM:

- 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).

Credits awarded by ecological assessment route

	Project team member route (Route 1)	Ecologist route (Route 2)
Survey and evaluation	1 credit	1 credit
Determining the ecological outcomes for the site		1 credit
Exemplary criteria	1 credit	1 credit

Survey and Evaluation

Route 1:

3. Completion of the BREEAM Ecological Risk Evaluation Checklist indicates Assessment route 1 can be used as the assessment. It acts 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.

Route 2:

4. An appropriate individual is appointed at a project stage that ensures early involvement in site configuration and, where necessary, can influence strategic planning decisions.
5. Prior to the completion of the preparation and brief, an appropriate level of survey and evaluation (see Assessment route 2: For sites where complex ecological systems are likely to be present) has been carried out to determine the ecological baseline of the site, taking account of the zone of influence to establish:
 - a. Current and potential ecological value and condition of the site, and related areas within the zone of influence
 - b. Direct and indirect risks to current ecological value.



- c. Capacity and feasibility for enhancement of the ecological value of the site and, where relevant, areas within the zone of influence.
6. Data are collated and shared with the project team to inform the site preparation design or construction works.

Determining the ecological outcomes for the site (Routes 1 and 2)

7. Survey and evaluation criteria (criteria 3–6 above) relevant to the chosen route have been achieved.
8. During Concept Design, the project team liaise and collaborate with representative stakeholders to identify and consider ecological outcome for the sites (appropriate to the scale and type of development) for the project.
9. When determining the ecological outcome for the site, this must involve the identification, appraisal and selection of specific solutions and measures sufficiently early to influence key project planning decisions. This must be done in accordance with the following hierarchy of action:
 - a. Avoidance
 - b. Protection
 - c. Reduction or limitation of negative impacts
 - d. On site compensation and,
 - e. Enhancement considering the capacity and feasibility within the site, or where viable, off-site.
10. Following this the optimal ecological outcome for the site is selected after liaising with representative stakeholders and the project team.

LE 02 - EXEMPLARY CREDIT (ONE CREDIT)

Determine the ecological outcomes for the site (sustainability-related activities)

11. Achieve criteria 8 to 10.
12. When determining the optimal ecological outcome for the site consider, in addition to those outlined in criteria 8 to 10, the wider site sustainability-related activities and the potential for ecosystem service-related benefits. See Methodology below for a list of the minimum areas for consideration.
13. Achieve the credits of the assessment issues outlined below:
 - a. Assessment scope of both credits of Hea 07
 - b. Assessment scope - Achieve credits for 'Surface water run-off' and 'Minimising watercourse pollution' (Pol 03)
 - c. Assessment scope of Pol 05

Methodology for criteria 12:

Opportunities for integrating ecology with wider site sustainability-related activities and ecosystem service-related benefits, including as a minimum:

Landscape: landscape design, heritage and local character, green infrastructure

Health and Wellbeing: Recreational space, water quality measures, noise mitigation, air quality control.

Resilience: climate change mitigation, management of surface water run-off, flood risk management, climate sensitive urban design

Infrastructure: maximise the benefits of green infrastructure and optimising alignment with existing infrastructure on the site and the zone of influence.

Community and user involvement: Life cycle costing and service life planning (where targeted under Man 02)



LE 02 - METHODOLOGY

Assessment route 1: For sites where ecological opportunities and risks are limited in nature

Survey and evaluation

Completion of the BREEAM Ecological Risk Evaluation Checklist acts 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

The methodology for this assessment route is as outlined for Route 2.

The approach taken and considerations made should be appropriate to the scope and scale of the project. This is likely to necessitate the interpretation and therefore assessment of points in a simpler or more basic way, sensible for the project. This may result in some points listed not being applicable or being interpreted and applied at a level that is appropriate for the scope of the project.

Depending on the option selected, specialist input may be required to adequately consider certain points (e.g. off-site enhancement requires the support of an ecologist).

Assessment route 2: For sites where complex ecological systems are likely to be present

Survey and evaluation

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 (e.g. construction work), habitat fragmentation, and potentially harmful species
 - c. Indirect risks including water, noise 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.

There may be some projects where not all items listed above will be applicable or appropriate to the site. In these cases, the ecologist should justify why the items are considered not applicable.

Determining the ecological outcomes for the site - project team liaison and collaboration with relevant stakeholders.

Relevant project team members liaise with each other at appropriate times to support optimisation of the ecological outcomes for the site. Project members would include, but are not limited to:

- The client, owner, occupier
- Design, project, facilities team



- Specialist consultants. Examples could include:
 - Drainage engineer
 - Acoustic consultant
 - Landscape architect.

Where feasible, and where relevant project team members collaborate with relevant stakeholders at appropriate times to support optimisation of the ecological outcomes for the site. Relevant stakeholders may include, but are not limited to:

- Local government and other statutory relevant organisations
- Local community groups or organisations or charities. Examples could include:
 - the Wildlife Trusts
 - Local, regional and or national fauna focused groups (e.g. Buglife, RSPB, Bat Conservation Trust etc.)

Coordination of the liaison and collaboration is likely to happen by a central project team member with an overview of the project, its members, specialist contractors etc. and has the ability to instruct the work associated with delivering the ecological outcome for the site selected.

Determining the ecological outcomes for the site - General

Consider the following as appropriate to the nature and scale of the project:

1. Ecology focused topic areas include:
 - a. Ecological value and benefit offered (pre-, during and post-asset maintenance or project completion)
 - b. Biodiversity and ecosystem services benefits offered pre-, during and post-asset maintenance or project completion
 - c. Local microclimatic conditions
 - d. Habitat extent, quality, connectivity and fragmentation
 - e. Opportunities to enhance the value of existing habitats and biodiversity, or to restore or create new, more valuable ones
 - f. Opportunities to align and integrate with existing ecological features and initiatives in the zone of influence
 - g. The viability of assessment requirements points 9 (hierarchy of actions list and capacity and feasibility for enhancement).

Determining the ecological outcomes for the site - Identification and selection of solutions and measures

When determining the associated solutions for the site the following should be considered:

1. Ecological, biodiversity and ecosystem services benefits, 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 and associated options.
 - b. Outline up-front and ongoing management and maintenance costs.
 - c. Long term management and maintenance implications.
 - d. Opportunities and barriers arising from management or procurement structures.
 - e. Availability of appropriate skills, budgets and other resources at all stages.

LE 03 - MANAGING NEGATIVE IMPACTS ON ECOLOGY

This issue is split into three parts:

- Identification and understanding the risks and opportunities for the site (Prerequisite)
- Planning, liaison, and implementation (one credit)
- Managing negative impacts on ecology.

Prerequisite:

1. LE 02 has been achieved



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

Credits are awarded according to the following assessment route:

	Project team member route (Route 1)	Ecologist Route (Route 2)
Planning, liaison and implementation	1 credit	1 credit
Managing negative impacts of the project (limitation or compensation)	1 credit	1 or 2 credits

LE 03 - PLANNING, LIAISON, IMPLEMENTATION AND DATA (One credit)

- Roles and responsibilities have been clearly defined, allocated and implemented to support successful delivery of project outcomes at an early enough stage to influence the concept design and design brief.
- Site preparation and construction works have been planned for and are implemented at an early project stage to optimise benefits and outputs.
- The project team liaising and collaborating with representative stakeholders, taking into consideration data collated and shared, have implemented solutions, and measures have been selected, during site preparation and construction works.

LE 03 - MANAGING NEGATIVE IMPACTS OF THE PROJECT (Up to two Credits)

Route 1 (One credit)

- Negative impacts from site preparation and construction works have been managed according to the hierarchy (see Methodology below) and no net impact has resulted.

Methodology

The following hierarchy must be followed when managing negative impacts of the site preparation and construction works:

- Avoidance of negative impacts on habitats and features of ecological value on the site.
- 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.
- 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.

Route 2 (Up to two credits):

- Negative impacts from site preparation and construction works have been managed according to the hierarchy and either
 - No overall loss of ecological value has occurred (2 credits);
 OR
 - The loss of ecological value has been limited as far as possible (1 credit).

For sites where complex ecological systems are likely to be present - Assessment route 2:

The following hierarchy must be followed when managing negative impacts of the site preparation and construction works:

- Items a-c detailed in Route 1.
- 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.

**LE 04 - CHANGE AND ENHANCEMENT OF ECOLOGICAL VALUE**

This issue is split into three parts:

- Identifying and understanding the risks and opportunities for the site (prerequisite)
- Planning, liaison, implementation, and data collation (one credit)
- Enhancement of ecology (up to three credits)

LE 04 - PREREQUISITE

1. LE 03 has been achieved. Including the following, specific to the aims of this issue:
 - a. Roles and responsibilities have been clearly defined, allocated and implemented to support successful delivery of project outcomes
 - b. Site preparation and construction works have been planned for and implemented at a stage that is sufficiently early in the project to optimise benefits and outputs.
2. The client or contractor confirms compliance is monitored against all relevant UK, EU or international legislation relating to the ecology of the site.

Credits awarded by ecological assessment route:

	Project team member route (Route 1)	Ecologist Route (Route 2)
Liaison, implementation and data	N/A	1 credit
Enhancement of Ecology	1 credit	Up to 3 credits

LE 04 - ENHANCEMENT OF ECOLOGY (One credit)**Route 1**

3. The project team liaising and collaborating with representative stakeholders, taking into consideration data collated and shared, have implemented solutions and measures based on recommendations from recognised 'local' ecological expertise, specialist input and guidance to inform the adoption of locally relevant ecological solutions and measures which enhance the site.
4. Data collated is provided to the local environmental records centres nearest to, or relevant for, the site.

LE 04 - LIAISON, IMPLEMENTATION AND DATA COLLECTION (One credit)**Route 2**

5. The project team liaising and collaborating with representative stakeholders, taking into consideration data collated and shared, have implemented the solutions and measures selected in a way that enhances ecological value in the following order:
 - a. On site, and where this is not feasible,
 - b. Off site within the zone of influence.

LE 04 - ENHANCEMENT OF ECOLOGY (Up to three credits)**Route 2**

6. Credits are awarded on a scale of 1 to 3, based on the calculation of the change in ecological value occurring as a result of the project. This must be calculated in accordance with the process set out in either GN 35 - BREEAM, CEEQUAL, HQM Ecology Assessment Issues - Route 1 or GN 36 - BREEAM, CEEQUAL, HQM Ecology Assessment Issues - Route 2 (whichever is applicable to the project).

Methodology - LE 04



Assessment Route 1 - Enhancing Site Ecology

Appropriate solutions and measures would vary from one site to another but may include:

1. Implementing relevant recommendations from Biodiversity actions plans;
2. Planting of ecologically appropriate species or those with a known attraction or benefit to local wildlife;
3. Adopting horticultural good practice (e.g. no or low use of residual pesticides);
4. Installing features to encourage existing local wildlife (such as nesting, roosting insect boxes) at appropriate locations on the site;
5. Increasing the porosity and texture of surfaces on site to encourage wildlife;
6. Introducing 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 for the purpose of enhancing the ecological value of the site, except where explicitly recommended by an ecologist (justification must be provided).

These are indicative examples. This list is not exhaustive and is provided for illustration purposes only.

Assessment Route 2 - For sites where complex ecological systems are likely to be present:

Determining the change in ecological value of the site using the full or simplified methodology:

BREEAM's Change in Ecological Value methodology builds on the existing 'Defra biodiversity metric' which is habitat based. The attributes used in the Defra biodiversity metric are the habitat types, their distinctiveness, condition, and area / length throughout the assessed project life cycle. This methodology follows the Defra metrics principles to quantify the impact of a development in terms of 'biodiversity units'. The calculation methodology has two routes applicable depending on the scale and size of the project and 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 using the 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 documented in BREEAM Guidance Note 36: BREEAM, CEEQUAL, HQM Ecology Assessment Issues Route 2.

Enhancement of Ecological Value in addition to the calculator tool

Enhancement of ecological value can take place through a variety of means including enhancement of biodiversity (habitats and species). Where the ecological enhancement recommended is not covered by BREEAM Change in Ecological Value Calculator, the ecologist report should clearly identify the enhancement options selected and implemented, outline why this was viable and meaningful solution, action, measure to enhance the ecological value of the site.

Data collation and application in throughout the project lifecycle

In addition to the data collated during Assessment issue 1, data collated during assessment of this issue should be shared with the project team to inform decision relating to the site preparation, design or construction works.

LE 05 - LONG TERM ECOLOGY MANAGEMENT AND MAINTENANCE

This issue is split into three parts:

- Roles and responsibilities, implementation and statutory obligations (prerequisite)
- Planning, liaison, data, monitoring and review, management and maintenance
- Landscape and management plan.

**LE 05 - PREREQUISITE (ROLES AND RESPONSIBILITIES, IMPLEMENTATION, STATUTORY OBLIGATIONS)**

1. The client or contractor has confirmed that compliance is being monitored against all relevant UK, EU and international standards relating to the ecology of the site.
2. Where pursued, LE04 has been achieved, including the following specific aims of this issue:
 - a. Roles and responsibilities have been clearly defined, allocated and implemented to support successful delivery project outcomes.
 - b. Site preparation and construction works have been planned for and implemented at a stage that is sufficiently early in the project to optimise benefit and outputs.

	Project team member route (Route 1)	Ecologist route (Route 2)
Liaison, monitoring implementation and evolving management and maintenance solutions	1 credit	1 credit
Landscape and habitat management plan		1 credit

LE 05 - PLANNING, LIAISON, DATA, MONITORING AND REVIEW MANAGEMENT AND MAINTENANCE (ONE CREDIT)

3. The project team liaise and collaborate with representative stakeholders, taking into consideration data collated and shared, on solutions and measures implemented to:
 - a. Monitor and review implementation and the effectiveness;
 - b. Develop and review management and maintenance solutions, actions or measures.
4. In support of the above and to help ensure their continued relevance over the period of the project the following should be considered:
 - a. Monitoring and reporting of on the ecological outcomes for site implemented at the design and construction stage.
 - b. Monitoring and reporting of outcomes and successes from the project.
 - c. Arrangements for the ongoing management of landscape and habitat connected to the project (on and, where relevant, off site)
 - d. Maintaining the ecological value of the site and its relationship or connection to its zone of influence.
 - e. Maintaining the site in line with the any sustainability linked activities e.g. ecosystems benefits (LE 02).
 - f. Remedial or other management actions are carried out which relate to those identified in LE 02, LE 03 and LE 04.
5. As part of the tenant or building owner information supplied, include a section on Ecology and Biodiversity to inform the owner or occupant of local ecological features, value and biodiversity on or near site.

LE 05 - LANDSCAPE AND ECOLOGY MANAGEMENT PLAN (OR SIMILAR) DEVELOPMENT (One Credit)

6. Landscape and ecology management plan, or similar is developed in accordance with BS 42020:2013 covering as a minimum the first five years after project completion and includes:
 - a. Actions and responsibilities, prior to handover to give to relevant individuals.
 - b. The ecological value and conditions of the site over the development life.



- c. Identification of opportunities for ongoing alignment with activities external to the development project and which supports the aims of BREEAM's Strategic Ecology Framework.
- d. Identification and guidance to trigger appropriate remedial actions to address previously unforeseen impacts.
- e. Clearly defined and allocated roles and responsibilities.
7. The landscape and management plan or similar is updated as appropriate to support maintenance of the ecological value of the site.

Methodology

Data collation and application in throughout the project life cycle

For both assessment routes: data collated during Assessment issue 1, data collated during assessment of this issue should be shared with the project team to inform decision relation to the site preparation, design or construction works.

Pollution 05 – Reduction of Noise Pollution

Where there are or will be noise-sensitive areas or buildings within 800m radius of the assessed development a noise impact assessment in compliance with BS 4142:2014 is commissioned. Noise levels must be measures or determines for:

- a. Existing background noise levels:
 - a. at the nearest or most exposed noise-sensitive development to the proposed assessed site;
 - b. including existing plant on a building, where the assessed development is an extension to the building.
- b. Noise rating level from the assessed building.

The noise impact assessment must be carried out by a suitably qualified acoustic consultant holding a recognised acoustic qualification and membership of an appropriate professional body.

The noise level from the assessed building, as measured in the locality of the nearest or most exposed noise-sensitive development, must be at least 5dB lower than the background noise throughout the day and night.

If the noise sources from the assessed building are greater than the levels described, measures have been installed to attenuate the noise at its source to a level where it will comply with the criterion.

Methodology – Compliance at the design stage:

At the design stage of assessment, where noise-sensitive areas or buildings are present, actual measurement is unlikely to be possible due to the planned but non-existent installation. In such situations, compliance can be demonstrated through the use of acousticians' calculations or by scale model investigations.

For such cases, BS 4142 states 'Determine the specific sound level by calculation alone if measurement is not practicable, for example if the source is not yet in operation. In such cases, report the method of calculation in detail and give the reason for using it'. Where prediction methods are not possible, measurement will be necessary using either a noise source similar to that proposed or measurement of the actual noise from the installation (once installed). Compliance with the latter approach requires a written commitment to appoint a suitably qualified acoustician to carry out the required measurements post-installation, and a further commitment to attenuate the noise source in compliance with criteria 4 above and 5 above (if proved necessary by the measurements).



Health and Wellbeing 05 – Acoustic Performance

This issue is split into two parts:

- Acoustic performance (up to three credits for all building types, except residential institutions)
- Acoustic performance for residential institutions.

Hea 05 – ACOUSTIC PERFORMANCE (Up to Three Credits)

1. The building meets the appropriate acoustic performance standards and testing requirements defined in the relevant building-type tables below. These tables define criteria for the acoustic principles of:
 - a. Sound insulation
 - b. Indoor ambient noise level
 - c. Room acoustics

OR

2. A suitably qualified acoustician (SQA) is appointed to define a bespoke set of performance requirements for all function areas in the building. The bespoke performance requirements use the three acoustic principles defined in criterion Hea 05 Acoustic performance - Criterion 1 above, setting out the performance requirements for each and the testing regime required.
- 3.

Acoustic Criteria – Education Buildings – Three Credits

First credit – Sound insulation

Criteria	Achieve the performance standards set out in Section 1 of Building Bulletin 93: Acoustic design of schools: performance standards, February 2015 (BB93) relating to airborne sound insulation between spaces and impact sound insulation of floors.
Testing requirement	A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the BB93 requirements and the Association of Noise Consultants (ANC) Good Practice Guide, Acoustic testing of Schools.

Second Credit – Internal indoor ambient noise levels

Criteria	Achieve the indoor ambient noise level standards set out within Section 1 of BB93 for all room types.
Testing requirement	A programme of acoustic measurements is carried out by a compliant test body in accordance with the ANC Good Practice Guide, Acoustic testing of schools.

Third credit – Room acoustics

Criteria	Room acoustics (Control of reverberation, sound absorption and speech transmission index (STI)): Teaching and study spaces achieve the requirements relating to reverberation time for teaching and study spaces set out within Section 1 of BB93. Open plan teaching spaces achieve the performance requirements relating to reverberation time and STI set out within Section 1 of BB93. Corridor and stairwells, for those that give direct access to teaching and study spaces, achieve the performance requirements relating to sound absorption.
Testing requirement	Teaching and study spaces:



	A programme of acoustic measurements is carried out by a compliant test body in accordance with the requirements of BB93 and ANC Good Practice Guide, Acoustic testing of schools. Open plan teaching spaces: A programme of acoustic measurements of reverberation time is carried out within open plan teaching spaces. The measurement is carried out by a compliant test body in accordance with the requirements of BB93 and ANC Good Practice Guide, Acoustic testing of schools. STI testing is not required. To demonstrate compliance the SQA shall undertake measurements of reverberation times to compare against the STI model. The SQA should provide a report confirming that the surface finishes and distribution of sound absorption within the completed space is in line with the design intent implemented within the STI model. Where significant changes or differences are observed, the SQA shall re-model the space accordingly to demonstrate that the STI measurement is met by the completed spaces. Corridors and stairwells: Installation of a specification compliant with the BB93 criteria demonstrates compliance. A site inspection by the developer or SQA is required to confirm that a compliant specification has been installed.
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Acoustic Criteria - Healthcare Buildings - Three credits

First credit - Sound insulation

Criteria	Achieve the airborne sound insulation performance standards set out in Section 2 of HTM 08-01: Acoustic design requirements, 2013 determined according to the privacy requirements using both Table 3 and Table 4 from HTM 08-01. The weighted standardised impact sound pressure level ($L'_{nT,w}$) must not exceed 65 dB for floors over noise-sensitive rooms, following the guidance in HTM 08-01.
Testing requirement	A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the requirements of Section 7 of HTM 08-01.

Second Credit - Internal indoor ambient noise levels

Criteria	The indoor ambient noise requirements for noise intrusion from external sources in Table 1 of HTM 08-01 are not exceeded. The values for internal noise from mechanical and electrical services in Table 2 of HTM 08-01 are not exceeded.
Testing requirement	A programme of acoustic measurements is carried out by a compliant test body in accordance with the Section 7 of HTM 08-01: Acoustics.

Third credit - Room acoustics

Criteria	Acoustic environment (Control of reverberation and sound absorption): Achieve the requirements relating to sound absorption set out in Section 2 of HTM 08-01.
Testing requirement	Installation of a specification compliant with the HTM08-01 criteria demonstrates compliance. A site inspection by the developer or SQA is required to confirm that a compliant specification has been installed.

**Acoustic Criteria - Office Buildings - Three credits****First credit - Sound insulation**

Criteria	The sound insulation between rooms and other occupied areas complies with the performance criteria given in Section 7 of BS 8233:2014. This should be based on the layout and function of the different spaces within the building.
Testing requirement	A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the acoustic testing and measurement procedures outlined in Hea 05 Acoustic performance section of this BREEAM issue.
Notes	If testing is to be carried out where the office is not yet furnished, then section 7.5 of BS 8233:2014 should be referred to when determining the performance criteria. Where the office is to be furnished at the time testing is carried out, then refer to section 7.7.6 of BS 8233:2014 for the relevant performance criteria.

Second Credit - Internal indoor ambient noise levels

Criteria	Achieve indoor ambient noise levels that comply with the design ranges given in Section 7 of BS 8233:2014.
Testing requirement	A programme of acoustic measurements is carried out by a compliant test body in accordance with the acoustic testing and measurement procedures outlined in Methodology below.

Third credit - Room acoustics

Criteria	Acoustic environment (control of reverberation and sound absorption): Achieve the requirements relating to sound absorption and reverberation times, where applicable, set out in Section 7 of BS 8233:2014.
Testing requirement	A programme of acoustic measurements is carried out by a compliant test body in accordance with the acoustic testing and measurement procedures outlined in the Methodology below. For spaces where the acoustic environment is controlled through the use of defined amounts of sound absorption, installation of a specification compliant with the BS 8233:2014 criteria demonstrates compliance. A site inspection by the developer or SQA is required to confirm that a compliant specification has been installed.

Acoustic Criteria - Law court Buildings - Three credits**First credit - Sound insulation**

Criteria	The sound insulation between acoustically sensitive rooms and other occupied areas complies with the performance targets given in Section 28 of Court Service Design Guide (CSDG), HMCS, 2010.
Testing requirement	A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the requirements of Section 28 of the CSDG and 'Calculation Procedures' where applicable.

Second Credit - Internal indoor ambient noise levels

Criteria	Achieve indoor ambient noise levels that comply with the requirements of Section 28 of the CSDG.
Testing requirement	A programme of acoustic measurements is carried out by a compliant test body in accordance with Section 28 of the CSDG

Third credit - Room acoustics

Criteria	Acoustic environment (Control of reverberation and sound absorption): Achieve the requirements relating to sound
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	absorption and reverberation times, where applicable, set out in Section 28 of the CSDG.
Testing requirement	A programme of acoustic measurements is carried out by a compliant test body in accordance with Section 28 of the CSDG and 'Calculation Procedures' where applicable.

Acoustic Criteria - Industrial, Retail, Prisons and Other building types - Three credits

First credit - Sound insulation

Criteria	The sound insulation between rooms and other occupied areas complies with the performance criteria given in Section 7 of BS 8233:2014. Alternatively, propose performance standard based on demonstrably best practice.
Testing requirement	A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the acoustic testing and measurement procedures outlined in the Methodology below.

Second Credit - Internal indoor ambient noise levels

Criteria	Achieve the requirements relating to sound absorption and reverberation times, where applicable, set out in Section 7 of BS 8233:2014
Testing requirement	A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the acoustic testing and measurement procedures outlined in the Methodology below.

Third credit - Room acoustics

Criteria	Achieve indoor ambient noise levels that comply with the design ranges given in Section 7 of BS 8233:2014
Testing requirement	A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the acoustic testing and measurement procedures outlined in the Methodology below. For spaces where the acoustic environment is controlled through the use of defined amounts of sound absorption, installation of a specification compliant with the BS 8233:2014 criteria demonstrates compliance. A site inspection by the developer or SQA is required to confirm that a compliant specification has been installed.

Residential institutions (short term and long-term stay) - up to four credits

First & Second credit - Sound Insulation

Criteria	One credit Airborne sound insulation values are at least 3 dB higher and impact sound insulation values are at least 3 dB lower than the performance standards in the relevant building regulations or standards. Two credits Airborne sound insulation values are at least 5 dB higher and impact sound insulation values are at least 5 dB lower than the performance standards in the relevant building regulations or standards.
Testing Requirement	A programme of pre-completion testing is carried out by a compliant test body based on the normal programme of testing described in the relevant building regulations or standards for every group or sub-group of dwellings (houses, flats or rooms for



	residential purposes) and this must demonstrate that the performance standards detailed within this table are achieved.
Third credit – Internal Indoor Ambient Noise Levels	
Criteria	Achieve indoor ambient noise levels that comply with the design ranges given in Section 7 of BS 8233:2014.
Testing Requirement	A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the acoustic testing and measurement procedures outlined in Methodology below.
Fourth credit – Room Acoustics	
Criteria	Achieve the requirements relating to sound absorption and within the common spaces of the building described in the relevant building regulations or building standards national guidance.
Testing requirement	Installation of a specification compliant with the relevant building described in the relevant building regulations or building standards national guidance demonstrates compliance. A site inspection by the developer or SQA is required to confirm that a compliant specification has been installed.

Methodology:

Hea 05 - Testing, Measurement and Calculation Procedures

Where specific guidance on number of testing locations, measurement methods and calculation is not stated in the criteria tables above for the relevant building type, or within the relevant standard or guidance referenced, the following procedures can be followed by the acoustician when measuring or calculating the levels required to demonstrate compliance with BREEAM 2018.

Measurements of sound insulation (airborne and impact) should be made in accordance with the relevant part of BS EN ISO 16283 series, or the successor to these standards. Measurements should be conducted between one in four pairs of adjacent rooms (or teaching spaces) of each room type or performance requirements category and construction type. Measurements of reverberation time should be made in accordance with the engineering grade (or better) requirements of BS EN ISO 3382-2:2008 and conducted within one in four rooms (or teaching spaces) of each room type of performance requirement category and construction type. For measurements of ambient noise, when no specific guidance is available, the following procedures should be used:

1. Noise from both internal sources (e.g. mechanical ventilation systems, plant noise, noise-making systems) and external sources (e.g. traffic noise transmitted via the building façade) should be included. Also, where windows are openable as part of the ventilation strategy, these should be assumed to be open for the purposes of calculations and measurements. If openable windows are present but do not form part of the background or permanent ventilation strategy, then these should be assumed to be closed for the purposes of calculations and measurements.
2. Noise from occupants and office equipment (e.g. computers) should not be included in the measurements.
3. Unless otherwise stated in the referenced document, a rate of testing of at least one in ten rooms or spaces of each performance level shall be subject to on-site performance testing.
4. Measurements should be made in at least four rooms in which noise levels can be expected to be greatest either because they are on the noisiest façade or because they are on a naturally ventilated façade.
5. Where different ventilation strategies are used, measurements should be conducted in rooms utilising each strategy. Otherwise, measurements should be made in rooms on the noisiest façade.
6. T in LA_{eq,T} is taken as the duration of the normal working day (typically 8 hours between 09.00 and 17.00).



7. Measurements need not be made over a period of 8 hours if a shorter measurement period would be suitably representative. In this case, measurements should be made when external noise levels are representative of normal conditions throughout the day.
8. Measurement periods less than 30 minutes may give representative values for indoor ambient noise levels and may be utilised where this is the case. However measurement periods shorter than 5 minutes should not be used.
9. Measurements should be taken in a minimum of three locations in rooms at a height of 1.2 m above the floor level and at least 1 m away from any surface.
10. The measured level of ambient noise should be used to determine compliance with the criteria for acoustically sensitive rooms. If at the time of acoustic commissioning it is not possible to measure ambient noise levels in the absence of construction or other extraneous noise sources that will not be present when the building is complete, then, for mechanical services the lower level of 35 dB, LA_{eq} or the lowest design limit for the acoustically sensitive space should be used.

The above is intended as guidance for undertaking acoustic testing or measurement to demonstrate compliance with the performance requirements in BREEAM. If the acoustician has felt it necessary to deviate from the above procedures, they should provide a reason for doing so and confirm that the alternative procedures are adequate for demonstrating that the building meets the acoustic performance requirements

Transport 01 – Transport Assessment and Travel Plan

Tra 01 – TRAVEL PLAN (Two credits)

1. During feasibility and design stages, develop a travel plan based on site specific travel assessment or statement.
2. The site specific travel assessment or statement covers as a minimum:
 - a. Existing travel patterns and opinions of existing building or site users towards cycling and walking, identifying constraints and opportunities, if relevant;
 - b. Travel patterns and transport impact of future building users;
 - c. Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children);
 - d. Reporting of the number and type of existing accessible amenities within 500m of the site;
 - e. Disabled access (accounting for varying levels of disability and visual impairment);
 - f. Calculation of the existing public transport Accessibility Index (AI), see Methodology below;
 - g. Current facilities for cyclists.
3. The Travel Plan includes proposals to increase or improve sustainable modes of transport and movement of people and goods during the buildings operation and use.
4. If the occupier is known, involve them in the development of the Travel Plan.
5. Demonstrate that the travel plan will be implemented post construction and be supported by the buildings management operation.

The following is a list of amenities to consider within a 500m radius:

- Appropriate food outlets
- Access to cash
- Outdoor open space
- Access to recreation or leisure facility for fitness or sports
- Publicly available postal facility
- Community facility
- Over the counter services – pharmacy
- Public sector GP surgery or general medical centre
- Childcare facilities or school

Methodology



Travel Assessment or Statement

A travel assessment is required where a proposed development is likely to have transport and related environmental impacts. The study area for a travel assessment should be determined in discussions between the developer and appropriate authorities. A transport statement is required if the proposed development is unlikely to have a notable transport impact. A transport statement can demonstrate compliance with BREEAM if relatively low numbers of trips or traffic flows, with minor transport impacts, are expected from the proposed development. For further guidance refer to www.gov.uk/government/publications/guidance-on-transport-assessment.

Calculation of the public transport Accessibility Index (AI)

1. Collate the following information to determine the public transport AI of the assessed building:
 - a. Distance (m) from the main building entrance to each compliant public transport node
 - b. Public transport types serving the compliant node e.g. bus or rail
 - c. Average number of services stopping per hour at each compliant node during the operating hours of the building for a typical day.
2. Use the BREEAM AI tool to calculate the AI

Calculating the average number of services

For the AI calculation, the frequency of public transport is the average number of services per hour. This average is calculated by determining the number of services stopping at the node (during the peak arrival and departure times for the building or the building's typical day's operating hours, see definition of 'operating hours') divided by the number of hours within that period. For example, the average number of services for a building that operates between 08:00-19:00 hrs (11 hours) within proximity of a bus stop with 35 stopping services during this period is 3.2 (equivalent to an average service frequency of approximately 20 minutes).

Multiple services

Services that operate from more than one node within proximity of the building, the same bus serving two separate bus stops, must be considered only once, at the node in closest proximity to the building. Different services at the same node count as separate services.

Bi-directional routes

Routes will be bi-directional; however, for the purpose of calculating the index, consider only the direction with the highest frequency (in accordance with the PTAL methodology).

Campus or campus-style developments - entrance to consider when calculating the AI

The main entrance to the campus, e.g. further or higher education sites, can be used to determine the distance to a compliant node if 80% or more of the buildings are within 1000m of this entrance. If the site has more than one main entrance, either entrance can be used for the calculation. Where less than 80% of the buildings are within 1000m of the campus' main entrance, the assessed building's main entrance must be used to determine the distance to a compliant node. This aims to encourage the location of public transport nodes inside or on the periphery of large campuses.

Buildings 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. The Total AI is confirmed for the Point of Interest (POI) within the summary report, which can be downloaded and used as evidence of compliance for the assessed building. See tfl.gov.uk.

Operating hours in a typical day

A typical day represents the period when travel to and from the building by its users and visitors will be at its highest. For most buildings this should be taken as a mid-week day. In choosing a



typical day the assessor should check that timetabled information for that day is, within reason, representative of the public transport provision for the entire operating week (excluding Sundays). BREEAM considers a building's accessibility to be defined by how readily the public transport network can be used by the majority of building users travelling to and from the building. In most cases the normal operating hours of the building can be used. Where shift patterns see the majority of building users (over 80%) arriving or leaving during a certain period, for example an office building where the majority of office workers arrive between 8.00-10.00, that period can be used as an alternative to the operating hours of the building. This accounts for some building types that operate a 24-hour day and on a shift work basis. During typically deemed unsociable hours, where there is little if any public transport operating, such periods do not need to be accounted for in the assessment of this issue.

Travel plan proposals

As a minimum, the following measures shall be considered as part of the travel plan for development:

- Negotiation with local bus, train or tram companies an increase in the local service provision for the development
- Provision of a public transport information system in a publicly accessible area
- Provision of electric recharging stations
- Provision of parking priority spaces for car sharers
- Consultation with the local authority on the state of the local cycling network and on improvements
- Provision of dedicated and convenient cycle storage
- Provision of cyclists' facilities
- Lighting, landscaping and shelter to create pleasant pedestrian and public transport waiting areas
- Restrictions or charging for car parking
- Pedestrian and cyclist friendly (for all types of user regardless of the level of mobility or visual impairment) with the provision of cycle lanes, safe crossing points, direct routes, appropriate tactile surfaces, good lighting and signposting to other amenities, public transport nodes and adjoining off-site pedestrian and cycle routes
- Provision of suitable taxi drop-off or waiting areas
- Ensure rural buildings have appropriate access to transport to serve the local community adequately (where procured to do so, e.g. community centre).

Management 04 - Commissioning and Handover

Thermographic Survey

Stage: on completion

Testing and inspecting building fabric

Complete post-construction testing and inspection to quality-assure the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths (this is through airtightness testing and a thermographic survey). A suitably qualified professional undertakes the survey and testing in accordance with the appropriate standard.

Rectify any defects identified during post-construction testing and inspection prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building or element as defined at the design stage (see Methodology below).

Methodology:

Thermographic survey

Scope



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The thermographic survey must cover 100% of the treated spaces, unless it is a large complex building (see below). Ensure that all elements of the building fabric that enclose an internal heated or conditioned (treated) zone of the building are tested. This includes internal walls separating treated and untreated zones.

Large complex buildings

In the case of large complex buildings, it may be impractical for the thermographic survey and airtightness testing to cover 100% of the building. Where a complete thermographic survey is deemed impractical by a Level 2 qualified thermographic surveyor, the guidance in airtightness standard TSL2 should be followed on the extent of the survey and testing. This could include airports, large hospitals and high-rise buildings.

Remediation work

Any remediation work undertaken, resulting from a thermographic survey and airtightness test of the building, should be robust and durable, i.e. the remedial work must have the same performance characteristics and life expectancy of the surrounding elements.

Suitably Qualified Professionals - thermographic survey and airtightness testing

Thermography surveys and airtightness testing are to be undertaken by suitably qualified professionals in accordance with the appropriate standards, as follows:

1. Airtightness testing: by professionals with membership of Air Tightness Testing and Measurement Association (ATTMA) or Independent Air Tightness Testing Scheme (IATS) attained at organisational level maintaining UKAS (United Kingdom Accreditation Service) accreditation (as air tightness testing laboratories to ISO 17025).
2. Thermographic survey: by professionals holding a valid Category 2, e.g. PCN (Personnel Certification in Non-Destructive Testing) or QCF (Ofqual's Qualification and Credit Framework) or RQF (Regulated Qualifications Framework) Level 4, e.g. ABBE (Awarding Body for the Built Environment), certificate in thermography (as defined by the UKTA (UK Thermography Authority) website). Where a Category 2 or Level 4 thermographer is not available, the survey may be undertaken by a Category 1 thermographer and then the images interpreted by a Category 2 or Level 4 thermographer.

Thermal bridging assessments

It is good practice to carry out thermal bridging assessments at the design stage. This is encouraged through building regulations for energy conservation by allowing the use of actual values in the energy calculation, which could make a significant improvement over using the default values in the National Calculation Methodology. This is reflected in Ene 01 Reduction of energy use and carbon emissions, so no additional credit is offered within this issue for thermal bridging assessments. However, good thermal bridging design and assessment will contribute to successful building fabric testing results and the associated credit.

Materials 01 - Environmental Impacts from Construction Products - Building Life Cycle Assessment (LCA)

Superstructure (Up to 6 credits)

Comparison with the BREEAM benchmark during Concept Design (offices, industrial and retail buildings only)

Superstructure (offices, industrial and retail buildings (except for Simple Buildings and where Notes 1.1 and 1.2 below apply))



1. During the Concept Design, demonstrate the environmental performance of the building as follows:
 - a. Carry out a building LCA on of the superstructure design using either the BREEAM Simplified Building LCA tool or an IMPACT Compliant LCA tool according to the methodology (see Methodology below).
 - b. Submit the Mat 01/02 Results Submission Tool to BRE at the end of Concept Design, and before planning permission is applied for (that includes external material or product specifications).

Comparison with the BREEAM benchmark during Technical Design (offices, industrial and retail buildings only)

2. During Technical Design, demonstrate the environmental performance of the building as follows:
 - a. As criterion 1.a
 - b. Submit the Mat 01/02 Results Submission Tool to BRE at the end of Technical Design.

Where a project has not achieved criterion 1, criterion 2 may still be achieved.

Option appraisal during Concept Design (all building types)

3. For offices, industrial and retail building types, achieve criterion 1 (except where Notes 1.0, 1.1 and 1.2 below apply).
4. During Concept Design, identify opportunities for reducing environmental impacts as follows:
 - a. Carry out building LCA options appraisal of 2 to 4 significantly different superstructure design options (applicable to the Concept Design stage, see Methodology below).
 - b. Use a building LCA tool that is recognised by BREEAM (as suitable for assessing superstructure during Concept Design) according to the methodology (see Methodology below).
 - c. For each design option, fulfil the same functional requirements specified by the client and all statutory requirements (to ensure functional equivalency).
 - d. Integrate the LCA options appraisal activity within the wider design decision-making process. Record this in an options appraisal summary document.
 - e. Record the following in the Mat 01/02 Results Submission Tool: The differences between the design options; the design option selected by the client to be progressed beyond Concept Design; the reasons for selecting it and the reasons for not selecting the other design options.
 - f. Submit the Mat 01/02 Results Submission Tool to BRE at the end of Concept Design, and before planning permission is applied for (that includes external material or product specifications).

If the building LCA tool recognised by BREEAM and used for criteria 3 to 5 (and 6 to 9, if pursued) is not an IMPACT Compliant LCA tool and criteria 1 to 2 are applicable, then the BREEAM Simplified Building LCA tool (or an IMPACT Compliant LCA tool) shall be used for criteria 1 to 2.

Options appraisal during Technical Design (all building types)



5. During Technical Design identify opportunities for reducing environmental impacts as follows:
 - a. Carry out building LCA options appraisal of 2 to 3 significantly different superstructure design options (based on the selected Concept Design option and as applicable to the Technical Design stage, see Methodology below).
 - b. Use a building LCA tool that is recognised by BREEAM (as suitable for assessing superstructure during Technical Design) according to the methodology (see Methodology below).
 - c. As criteria 4.c to 4.e above. Where an options appraisal summary document was produced during Concept Design, update it to include the Technical Design options.
 - d. Submit the Mat 01/02 Results Submission Tool to BRE at the end of Technical Design.

Where a project has not achieved criteria 3 and 4, criterion 5 may still be achieved.

One credit - Substructure and Hard Landscaping Options Appraisal During Concept Design (All Building Types)

6. Criteria 3 and 4 are achieved.
7. During Concept Design identify opportunities for reducing environmental impacts as follows:
 - a. Carry out building LCA options appraisal of a combined total of at least six significantly different substructure or hard landscaping design options (at least two shall be substructure and at least two shall be hard landscaping).
 - b. Using a building LCA tool that is recognised by BREEAM (as suitable for assessing substructure and hard landscaping during Concept Design) according to the methodology (see Methodology below).

As criteria 4.c to 4.f above.

Exemplary Credit - Core Building Services Options Appraisal During Concept Design (All Building Types)

8. Criteria 3 to 4 are achieved.
9. During Concept Design identify opportunities for reducing environmental impacts as follows:
 - a. Carry out building LCA options appraisal of at least 3 significantly different core building services design options.
 - b. Use a building LCA tool that is recognised by BREEAM (as suitable for assessing core building services during Concept Design) according to the methodology (see Methodology below).
 - c. As criteria 4.c to 4.f above.

Exemplary credit - LCA and LCC Alignment (All Building Types) (One credit)

10. Achieve criteria 3 to 5.
11. Achieve Elemental LCC plan and Component Level LCC options appraisal credits (Man 02 Life cycle cost and service life planning).



12. Include design options appraised for criteria 3 to 4 (and 6 to 7 and 8 to 9, if pursued) during Concept Design in Assessment scope - The elemental LCC plan.
13. Include the design options appraised for criterion 5 during Concept Design in the 'Component level LCC option appraisal' (in Man 02 Life cycle cost and service life planning).
14. Integrate the aligned LCA and LCC options appraisal activity within the wider design decision-making process. Record this in an options appraisal summary document including the relevant cost information from the 'elemental LCC plan' and 'Component level LCC option appraisal'.

Exemplary Credit - Third Party Verification (All Building Types)

15. Criteria 1 to 7 (as applicable to the building type) are achieved.
16. A suitably qualified third party carries out the building LCAs or produces a report verifying the building LCAs accurately represent the designs under consideration during Concept Design and Technical Design with reference to the requirements of criteria 1 to 7 (and 8 to 14 if pursued).
17. For each LCA option, itemise the findings of the verification checks made by the suitably qualified third party in the report including, as a minimum, the quality requirements shown below).
18. Include details of the suitably qualified third party's relevant skills and experience and a declaration of their third-party independence from the project client and design team in the report.

Methodology

Comparison with the BREEAM benchmark and option appraisal (Criteria 1. to 9.)

One of the following two methods shall be used when undertaking comparison with the BREEAM benchmark criteria or options appraisal criteria. The first method shall be used when using the BREEAM Simplified Building LCA Tool. The second method shall be used for IMPACT Compliant tools and all other building LCA tools recognised by BREEAM to provide a more robust and detailed analysis of life cycle impacts. More information on the BREEAM Simplified Building LCA tool, IMPACT Compliant tools and other building LCA tools recognised by BREEAM can be found in the definitions.

Method using the BREEAM Simplified Building LCA Tool

Step 1: Identify the elements that are present in the building and are in scope, based on Scope of assessment as defined by BREEAM - please refer to the three table at the end of the Methodology section.

Step 2: In the BREEAM Simplified Building LCA tool, for the elements identified in step 1 only, select the elemental construction 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 3: For each of the elemental constructions, enter the total quantity in the building. Enter any further information required by the tool. Ensure that the quality requirements are adhered to (see table below).

Step 4: A total EcoPoint result is generated by the BREEAM Simplified Building LCA tool.



Step 5: Enter the required information from the BREEAM Simplified Building LCA tool into the Mat 01/02 Results Submission Tool according to the instructions in the tool. Enter any further information required by the Mat 01/02 Results Submission Tool. The Mat 01/02 Results Submission Tool will calculate the credit award for the building.

Method using an IMPACT Compliant LCA tool or another building LCA tool recognised by BREEAM

Step 1: Identify the elements that form the building and are in scope, based on Scope of assessment as defined by BREEAM – please refer to the three table at the end of the Methodology section.

Step 2: Using a building LCA tool that is recognised by BREEAM (see The Mat 01/02 Results Submission Tool), produce a building LCA model. Ensure as a minimum that all the in-scope elements are included. Ensure that the quality requirements are adhered to (see table below).

Step 3: Obtain the LCA results for the building from the tool only for the in-scope elements. Enter the results into the Mat 01/02 Results Submission Tool. Enter further information required by the tool including (but not necessarily limited to) construction and product descriptions, quantities, service lives, transportation distances, classifications and justification for design decisions. The Mat 01/02 Results Submission Tool will calculate the credit award for the building.

Depending on the functionality of the building LCA tool, the information required may be readily exportable for importing into the Mat 01/02 Results Submission Tool.

Significantly different design options

Significantly different design options are significantly different in terms of either the types of, or quantity of, construction products specified for one or more major elemental constructions that are within the scope of the assessment. This will depend on the stage of the assessment.

During Concept Design, different options are typically at the elemental construction level. Compare the options proposed with the following examples to determine if they can be considered significantly different for the Concept Design stage:

- For the majority of the element '1. External enclosing walls above ground floor level', option 'A' has a timber cladding external finish and option 'B' has cement render (each will likely have different substrates accordingly).
- For element '2. Superstructure/1. Frame', option 'A' is a concrete based frame and option 'B' is a steel-based frame.
- For element '2. Superstructure/1. Frame', option 'A' is a cast in-situ concrete based frame and option 'B' is a precast concrete based frame.
- For element '5. Central heating and cooling', option 'A' is a refrigerant distribution-based system and option 'B' is an air distribution-based system.

During Technical Design, different options are typically at the product level (within elemental constructions established during Concept Design). Compare the options proposed with the following examples to determine if they can be considered significantly different for the Technical Design stage:

- For element '1. External enclosing walls above ground floor level', where both options have cement render but 'A' is a different type of render from 'B'.
- For element '3. Roof', option 'A' has a one type of insulation and option 'B' has another type of insulation.



- For element '5. Central heating and cooling', the pipework manufacturer for option 'A' is different from option 'B'.

The Mat 01/02 Results Submission Tool contains functionality to assist in determining if the options are significantly different.

Superstructure – In-scope (criteria 1 to 5)

Level 1 Group element	Level 2 Element	Level 3 Sub-element
2. Superstructure	1. Frame	1. Steel frames 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. Roof	1. Roof structure 2. Roof coverings 3. Specialist roof systems 5. Rooflights, skylights and openings
	4. Stairs and ramps	1. Stair or ramp structures
	5. External walls	1. External enclosing walls above ground floor level 2. External enclosing walls below ground level 3. Solar or rain screening
	6. Windows and external doors	1. External windows
	7. Internal Walls and Partitions	1. Walls and partitions (Education only)

Substructure and hard landscaping – In-scope (applicable to criteria 6 and 7)

Level 1 Group element	Level 2 Element	Level 3 Sub-element
1. Substructure	1. Substructure	1. Standard foundations 2. Specialist foundation systems 3. Lowest floor construction 4. Basement excavation 5. Basement retaining walls
8. External works*	2. Roads, paths and pavings	1. Roads, paths and pavings 2. Special surfacings and pavings

*Include hard landscaping that is installed as part of the project under assessment and:

- Is within a defined curtilage of the building
- Or is clearly more associated with it (for example, an access road or car park that is intended to serve only the building under assessment or the building and, to a lesser extent, other buildings).

Hard landscaping with no such distinction shall be excluded.



Table 9.3 Core building Services – In-scope (applicable to criteria 8 and 9)

Level 1 Group element	Level 2 Element	Level 3 Sub-element
5. Services	5. Heat source	1. Heat source
	6. Space heating and Air-conditioning	1. Central heating
		2. Local heating
		3. Central cooling
		4. Local cooling
		5. Central heating and cooling
		6. Local heating and cooling
		7. Central air-conditioning
		8. Local air-conditioning
	7. Ventilation	1. Central ventilation
	9. Fuel installations and systems	2. Local ventilation
		3. Smoke extract or control
		1. Fuel storage
		2. Fuel distribution systems

Building-specific notes

Assessment Type Specific Notes

1.0 Simple Buildings

All criteria relevant to the building type and function apply except criteria 1 to 2 below.

1.1 Mixed Use Buildings

Where a single building use type accounts for $\geq 50\%$ of the net internal floor area, all criteria relevant to the building type and function apply. Where $< 50\%$, all criteria relevant to the building type and function apply except criteria 1 to 2 below.

1.2 Part New Build, Part Refurbishments

All criteria relevant to the building type and function apply except criteria 1 to 2 below.

Quality Requirements (see Criterion 17 and Methodology)

Item	Concept Design	Technical Design
Elemental construction quantities	$\pm 10\%$ of quantities shown in design documents	
LCA or EPD data type	Generic or manufacturer-specific. Use the closest matching data in the tool.	
Product quantities* (mass per unit of elemental construction)	Typical or generic values. Generic (non-project specific) elemental construction may be used.	$\pm 10\%$ of quantities shown in design documents. All elemental constructions shall be created from individual products.



Product transportation distances*		Typical or generic values. Project-specific distances may be used where known.
Product service lives and site wastage*		A reasonable estimate for the actual installation scenario.
Adhesives*	Excluded if the adhesive is applied to less than 20% of the product’s surface.	
Minor fixings* (e.g brackets, nails, screws), sealants and ironmongery items	Excluded.	
Study period*	60 years	
Results reported via the Mat 01/02 results Submission tool	Results reported separately for each environmental indicator, for each BS EN 15978:2011 module as follows: - Stage A: A1, A2 and A3 (may be combined). - Stage B: Each module possible in the building LCA tool - Stage C: As Stage	
*If the BREEAM Simplified Building LCA Tool is used, these items are fulfilled automatically.		

Materials 06 – Material Efficiency

- At the Preparation and Brief and Concept Design stages, set targets and report on opportunities and methods to optimise the use of materials. These must be done for each of the following stages (see Methodology below):
 - Preparation and Brief
 - Concept Design
 - Developed Design
 - Technical Design
 - Construction
- Develop and record the implementation of material efficiency, see Methodology below, during:
 - Developed Design
 - Technical Design
 - Construction
- Report the targets and actual material efficiencies achieved.

Methodology

Preparation and Brief

Objective	To set requirements that inform decisions throughout the design and construction of the project.
Participants	Client or client's agent with input from the design team if appointed.



Action	Assess the site, the likely project scale, and the client's functional and aesthetic requirements to set material efficiency objectives for the project.
Evidence	Dedicated report that sets out a clear framework to guide material efficiency activities throughout the design and construction of the project. The report should set out aims, objectives, targets, performance indicators, opportunities, constraints and responsibilities to guide material efficiency activities.
Concept Design	
Objective	Develop strategies to implement or action the materials efficiency requirements set under the Preparation and Brief stage.
Participants	Design team including at least: - Architect - Structural Engineer - Building Services Engineer
Action	Hold workshops with the project team to identify design opportunities to reduce or optimise materials use through design, specification, construction techniques etc.
Evidence	Minutes of the workshops held. Documentation demonstrating how the feedback from the workshop has been incorporated in the concept design of the project, for example: outline specification for materials selection, report on approximate predicted reductions in material quantities.
Developed Design and Technical Design	
Objective	Develop design proposals based on learning from the concept design.
Participants	All relevant members of the design team.
Action	Incorporate material efficiency measures and strategies identified in concept design into architectural, structural and building services design as appropriate. Review performance against previous stages and identify deviations.
Evidence	Report on deviations from previous stages and additional actions to be taken. Documentation demonstrating the incorporation of the outcomes from the concept stage and additional actions, for example: design drawings or specifications demonstrating materials efficiency measures undertaken.
Construction	
Objective	Implement material efficiency measures in construction.
Participants	Principal contractor.
Action	Implement material efficiency measures and strategies identified in previous stages in building construction and identify deviations. Identify further efficiencies as appropriate for this stage.
Evidence	Report on deviations from previous stages. Documented evidence of activity to further identify efficiencies at this stage, for example: meeting minutes, training events, waste reduction documentation etc.
This table is based on the principles set out in Parts 1 and 2 of the BS 8895 series of standards, and provides examples of how material efficiency can be considered at each work stage. As a minimum, the measures listed under the 'evidence' column must be met to show compliance with the issue.	



Waste 01 - Pre-demolition Audit

1. Complete a pre-demolition audit of any existing buildings, structures or hard surfaces being considered for demolition. This must be used to determine whether refurbishment or reuse is feasible and, in the case of demolition, to maximise the recovery of material for subsequent high grade or value applications. The audit must cover the content of Pre-demolition audit scope (below):
 - a. Be carried out at Concept Design stage (RIBA Stage 2) by a competent person prior to strip-out or demolition works;
 - b. Guide the design, consider materials for reuse and set targets for waste management;
 - c. Engage all contractors in the process of maximising high grade reuse and recycling opportunities
 - d. Compare actual waste arisings and waste management routes used with those forecast and investigate significant deviations from planned targets.
2. Make reference to the audit in the resource management plan (RMP) (see Definition below).

Pre-demolition audit scope

The pre-demolition audit must cover:

1. Identification and quantification of the key materials where present on the project;
2. Potential applications and any related issues for the reuse and recycling of the key materials in accordance with the waste hierarchy;
3. Opportunities for reuse and recycling within the same development;
4. Identification of local reprocessors or recyclers for recycling of materials;
5. Identification of overall recycling targets where appropriate;
6. Identification of reuse targets where appropriate;
7. Identification of overall landfill diversion rate for all key materials.

A Resource Management Plan (RMP) covers the non-hazardous waste related to on-site construction and dedicated off-site manufacture or fabrication (including demolition and excavation waste) generated by the building's design and construction.

Resource Management Plan (RMP)

An RMP aims to promote resource efficiency and to prevent illegal waste activities. Resource efficiency includes minimising waste at source and ensuring that clients, designers and principal contractors assess the use, reuse and recycling of materials and products on site and off site. A compliant RMP defines:

1. A target benchmark for resource efficiency, i.e. m^3 of waste per 100 m^2 or tonnes of waste per 100 m^2



2. Procedures and commitments to minimise non-hazardous waste in line with the target benchmark

3. Procedures to minimise hazardous waste; these are:

- a. A waste-minimisation target and details of waste minimisation actions to be undertaken;
- b. Procedures to estimate, monitor, measures and report on hazardous and non-hazardous site waste and demolition waste, where relevant, arising from work carried out by the principal contractor and all subcontractors. Waste data obtained from licensed external waste contractors needs to be reliable and verifiable, e.g. using data from EA/SEPA/EA Wales/NIEA waste return forms or from a PAS402 compliant company;
- c. Monthly reporting of all construction waste data throughout the project checked against what would be expected based on the stage of the project, invoices, etc., to validate completeness of waste reporting data;
- d. Procedures to sort, reuse and recycle construction waste into defined waste groups, either on site or through a licensed external contractor;
- e. Procedures to review and update the plan;
- f. The name or job title of the individual responsible for implementing the above.

Pre-demolition audit competent person

An individual who has appropriate knowledge of buildings, waste and options for reuse and recycling of different waste streams. Ideally this would be a demolition contractor but could also be the main contractor.



Pollution 01 – Impact of Refrigerants

BREEAM Pol 01 calculator

The BREEAM Pol 01 calculator is used to determine the number of credits achieved.

The direct effect life cycle CO₂-eq emissions (DEL_C) per kW of cooling and heating capacity are calculated using the following equation:

$$\frac{[\text{Refrigerant loss operational} + \text{refrigerant loss system retirement}] \times \text{GWP}}{\text{Cooling Capacity (kW)}}$$

Where:

Refrigerant loss operational: $(\text{Ref}_{\text{charge}} \times \text{Sys}_{\text{op-life}} \times (\text{L1} + \text{L2} + \text{S1} + \text{S2})) / 100$

Refrigerant loss system retirement = $\text{Ref}_{\text{charge}} \times (1 - (\text{Ref}_{\text{RecEff}} / 100))$

Where:

1. $\text{Ref}_{\text{charge}}$: Refrigerant charge (kg)
2. $\text{Sys}_{\text{op-life}}$: System operational lifetime (years)
3. $\text{Ref}_{\text{RecEff}}$: Refrigerant recovery efficiency factor (%)
4. L1: Annual leakage rate (units: % Refrigerant charge)
5. L2: Annual purge release factor (% Refrigerant charge)
6. S1: Annual service release (% Refrigerant charge)
7. S2: Probability factor for catastrophic failure (% refrigerant charge loss/year)
8. GWP: global warming potential of refrigerant
9. Cooling and heating capacity (kW).

The following default values must be used, where system-specific data are not available:

$\text{Sys}_{\text{op-life}}$: System operational design life (years): see Table 12.1 below.

$\text{Ref}_{\text{RecEff}}$: Refrigerant recovery efficiency factor (%): **95**

L1: Annual leakage rates (% refrigerant charge): see Table 12.2 below.

L2: Annual purge release factor (% refrigerant charge): **0.5** (if the system does not require an annual purge, zero should be used).

S1: Annual service release (% refrigerant charge): **0.25** (this applies where the system requires opening up to carry out the annual service. For systems which do not require opening up, there will be no associated annual release of refrigerant, therefore a default of zero should be used).

S2: Probability factor for catastrophic failure (% refrigerant charge loss/year): **1** (based on a failure rate of 1 in 100 systems).

The following information must be sourced from the design team's mechanical and electrical engineer or system manufacturer:

- System type
- $\text{Ref}_{\text{charge}}$: Refrigerant charge (kg)
- GWP: global warming potential of refrigerants
- Cooling and heating capacity (kW).

When manufacturers' provide figures used in the DEL_C calculation, the figures must be supported by published data, or such data must be readily available from the manufacturer. BREEAM Assessors must obtain this supporting evidence. The DEL_C calculation is a measure of the risk and severity of potential system leaks. The figures used must represent this for all installed systems; i.e. across the expected range of maintenance and use.

Table 12.1

System Type	Default system operational design life values (years)
Small or medium capacity chillers	15
Large capacity chillers	20
Unitary split	15
Variable Refrigerant Flow (VRF) system	15
All other systems	10

Note: These figures are based on those reported in LOT 6 for air-conditioning units and the British Refrigeration Association's (BRA) Guideline Methods of Calculating TEWI (Total Equivalent Warming Impact) (2006).

The following should be considered when determining whether the system specified is defined as small, medium or large:



- Large capacity chiller: centrifugal compressor;
- Medium capacity chiller: scroll or screw compressor;
- Small capacity chiller: scroll compressor.

Table 12.2

System Type	Annual leakage rate (% of charge per annum)
Cold storage and display systems	
Integral cabinets	3%
Split or condensing units	18%
Centralised	19%
Air-conditioning systems	
Unitary split	15%
Small-scale chillers	10%
Medium or large chillers	5%
Heat pumps	6%

Note: These figures are based on those reported in LOT 6 for air-conditioning units and also Table 2 of the Market Transformation Programmes Briefing Note for Commercial Refrigeration no. 36, 'Direct Emission of Refrigerant Gases' (version 1.2). The figures are based on the average of the leakage rates from the four separate studies reported in Table 2 (where a range is reported, the higher value was used).

Specification of multiple systems

Where more than one air-conditioning or refrigeration system is installed in the building, the assessor must source the relevant technical data for each system and enter it into the Pol 01 calculator. The calculator will then determine the weighted average DELC for the building.

Leak detection

The refrigerant leak detection criteria are applicable where any type of non-solid refrigerant is present, i.e. even if the refrigerant meets BREEAM's DELC CO₂-eq benchmarks. Exceptions to this are systems that use natural and environmentally benign refrigerants, such as air and water (e.g. lithium bromide or water absorption chillers) and installations of small multiple hermetically sealed systems. These types of system or refrigerants will achieve the leak detection credit by default.

District cooling systems

Where a project is connected to a district cooling system which is outside the scope of the project or the wider development (e.g. phased developments), the system does not need to be included in the assessment. This is because the design team will not have control over the specification of the system. If the design team do have control over the specification of the system, then it must be assessed.

Waste 05 – Adaptation to Climate Change

1. Conduct a climate change adaptation strategy appraisal using:
 - c. A systematic risk assessment to identify the impact of expected extreme weather conditions arising from climate change on the building over its projected life cycle. The assessment covers the installation of building services and renewable systems, as well as structural and fabric resilience aspects and includes (see Methodology below):
 - i. Hazard identification
 - ii. Hazard assessment



- iii. Risk estimation
 - iv. Risk evaluation
 - v. Risk management.
2. Develop recommendations or solutions based on the climate change adaptation strategy appraisal, before or during Concept Design, that aim to mitigate the identified impact.
3. Provide an update during Technical Design demonstrating how the recommendations or solutions proposed at Concept Design have been implemented where practical and cost effective. Omissions have been justified in writing by the assessor.

Methodology

As a minimum follow these steps when completing the climate change adaptation strategy appraisal:

Responsible individual

1. Nominate an individual to coordinate the necessary work and to be responsible for the final report. For example, this could be a BREEAM AP if appointed.

Hazard identification

1. Review the evidence and information from relevant bodies and resources (see Additional information on to identify and understand the expected impacts of increased extreme weather events and climate change on the building. Relevant bodies include, but are not limited to, the following:
 - a. Local authorities;
 - b. Statutory bodies, e.g. Defra, Environment Agency, Northern Ireland Environment Agency (NIEA), Scottish Environment Protection Agency (SEPA) etc.;
 - c. Technical bodies, e.g. CIBSE, UK Climate Impacts Programme (UKCIP).
2. As a guide, all adaptation plans should consider the following impacts of climate change and extreme weather events and describe how the design mitigates against them, where appropriate:
 - a. Flooding
 - b. Storms (including high winds)
 - c. Cold events
 - d. Heat waves (including temperature increases)
 - e. Drought (including reduced summer rainfall)
 - f. Milder winters
 - g. Wetter winters (including increased moisture and driving rain)
 - h. Warmer summers and increased solar radiation
 - i. Temperature variation
 - j. Precipitation, e.g. rain and snow
 - k. Subsidence or ground movement.
3. Identify likely hazards.

Hazard assessment

1. Identify the likelihood and the magnitude or scale of the hazards identified. This includes climate change scenarios and their potential impact throughout the lifetime of different building elements.

Risk estimation

1. Identify the risk presented by these hazards to the building and the likely impact of the hazards taking into account the following aspects as a minimum:
 - a. Structural stability
 - b. Structural robustness



- c. Weather proofing and detailing
- d. Material durability
- e. Health and safety of building occupants and others
- f. Impacts on building contents and business continuity.

Risk evaluation

1. Evaluate the potential impact of these risks on the building.
2. Determine the tolerable risk threshold.
3. Check the sensitivity of the risk assessment.
4. Identify areas where the risks are unacceptable to health and safety, life cycle assessment and financial terms.

Risk management

1. Identify risk reduction measures.
2. Mitigate the hazards as far as is practically feasible.
3. Adapt the design and specification to incorporate the measures identified by the risk assessment in the final design.

Waste 06 – Design for Disassembly and Adaptability

One credit - Design for disassembly and functional adaptability - recommendations

1. Conduct a study to explore the ease of disassembly and the functional adaptation potential of different design scenarios (see Methodology below) by the end of Concept Design.
2. Develop recommendations or solutions (see Methodology below) based on the study (criterion 1 above), during or prior to Concept Design, that aim to enable and facilitate disassembly and functional adaptation.

One credit - Disassembly and functional adaptability - implementation

3. Achieve criteria 1 and 2
4. Provide an update, during Technical Design, on:
 - a. How the recommendations or solutions proposed by Concept Design have been implemented where practical and cost effective. Omissions have been justified in writing to the assessor.
 - b. Changes to the recommendations and solutions during the development of the Technical Design.
5. Produce a building adaptability and disassembly guide to communicate the characteristics allowing functional adaptability and disassembly to prospective tenants.

Methodology

Functional adaptation strategy study

The study must consider the following as a minimum:

- Feasibility: The likelihood to contain multiple or alternative building uses, area functions and different tenancies over the expected life cycle, e.g. related to the structural design of the building.



- Accessibility: Design aspects that facilitate the replacement of all major plant within the life of the building, e.g. panels in floors and walls that can be removed without affecting the structure, providing lifting beams and hoists. Accessibility also involves access to local services, such as local power, data infrastructure etc.
- Versatility: The degree of adaptability of the internal environment to accommodate changes in working practices.
- Adaptability: The potential of the building ventilation strategy to adapt to future building occupant needs and climatic scenarios.
- Convertibility: The degree of adaptability of the internal physical space and external shell to accommodate changes of in-use.
- Expandability: The potential for the building to be extended, horizontally or vertically.
- 'Refurbishment potential': The potential for major refurbishment, including replacing the façade.

Functional adaptation implementation

The implementation will be specific to the building and scope of the project, but information should be made available to the assessor covering:

- Options for multiple building uses and area functions based on design details, e.g. modularity.
- Routes and methods for major plant replacement, e.g. networks and connections have flexibility and capacity for expansion.
- Accessibility for local plant and service distribution routes, e.g. detailed information on building conduits and connections infrastructure.
- The potential for the building to be extended, horizontally or vertically.

Ease of disassembly

Ease of disassembly is facilitated by principles allowing the building or parts of the building to be disassembled at the end of its life, or to be renovated rather than demolished, with individual components being used for other purposes. The study should consider the following as a minimum:

- Accessibility (see Functional adaptation strategy study).
- Durability: use materials which require less frequent maintenance, repair or replacement, considering them within the context of the life span of the building.
- Exposed and reversible connections: making the connections more visible provides opportunities to optimise material and product reuse. Welded connections prohibit disassembly and it is preferable to use screws and bolts to allow for disassembly and material reuse.
- Layer independence: designing building systems and components in layers so that removal, adjustment or replacement of some elements is feasible, especially when different components have different life spans and maintenance needs.
- Avoidance of unnecessary toxic treatments and finishes. Some finishes can contaminate the substrate in a way that they are no longer reusable or recyclable. This should be avoided unless finishes serve a specific purpose.



- Standardisation can accommodate reuse and upgrading. It involves aspects such as dimensions, components, connections and modularity.

Energy 04 - Low Carbon Design

Two credits - Passive design

One credit - Passive design analysis

1. Achieve the first credit Assessment scope - One credit - Thermal modelling to demonstrate that the building design delivers appropriate thermal comfort levels in occupied spaces.
2. The project team analyses the proposed building design and development during Concept Design to identify opportunities for the implementation of passive design measures.
3. Implement passive design measures to reduce the total heating, cooling, mechanical ventilation, lighting loads and energy consumption in line with the passive design analysis findings.
4. Quantify the reduced total energy demand and carbon dioxide (CO₂) emissions resulting from the passive design measures.

One credit - Free cooling

5. Achieve the passive design analysis credit.
6. Include a free cooling analysis in the passive design analysis carried out under criterion 2.
7. Identify opportunities for the implementation of free cooling solutions.
8. The building is naturally ventilated or uses any combination of the free cooling strategies listed in Free cooling analysis (below).

One credit - Low and zero carbon technologies

One credit - Low zero carbon feasibility study

9. An energy specialist completes a feasibility study by the end of Concept Design.
10. Establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy sources for the building or development, based on the feasibility study.
11. Specify local LZC technologies for the building or development in line with the feasibility study recommendations.
12. Quantify the reduced regulated carbon dioxide (CO₂) emissions resulting from the feasibility study.

Methodology

Passive design analysis

As a minimum, the passive design analysis should cover:

1. Site location
2. Site weather
3. Microclimate
4. Building layout
5. Building orientation
6. Building form
7. Building fabric
8. Thermal mass or other fabric thermal storage
9. Building occupancy type
10. Daylighting strategy



11. Ventilation strategy
12. Adaptation to climate change.

Any savings resulting from the incorporation of passive design measures should be demonstrated by comparing the energy demand or CO₂ emissions for the building with and without the proposed passive design measures adopted, as identified in the passive design analysis.

To enable a baseline for comparison to be established, a 'standard building' should be modelled with fabric performance equivalent to that of the local building regulations notional building (or for Scotland, an equivalent compliant building) and without the passive design measures (where feasible, i.e. building orientation is likely to be fixed). The glazing areas specified in the 'standard building' should be the same as those required by the Building Regulations Notional building.

This 'standard building' should be modelled as equivalent to the proposed building with the exception of any changes to account for passive design measures and fabric performance as seen in the table below.

Measure	'Standard Building'	'Proposed Building'
External shading devices	As notional	As designed
Fabric performance	As notional	As designed
Fabric proportions (i.e window size, location)	As notional	As designed
Thermal Mass	As notional	As designed
Daylighting	As notional	As designed
Ventilation	As notional	As designed

Any savings in energy demand or CO₂ emissions should then be calculated by comparing the respective Building Emission Rate (BER) outputs from two building models representing the 'proposed building' specification (fixed at a point as agreed by the project team and assessor), and the 'standard building' specification.

These calculations should be carried out by a building services engineer who is a member of the Chartered Institute of Building Services Engineers (CIBSE) or by an accredited energy assessor.

Free cooling analysis

The free cooling analysis should demonstrate consideration of the following technologies:

1. Night time cooling (which could include the use of a high exposed thermal mass)
2. Ground coupled air cooling
3. Displacement ventilation (not linked to any active cooling system)
4. Ground water cooling
5. Surface water cooling
6. Evaporative cooling, direct or indirect
7. Desiccant dehumidification and evaporative cooling, using waste heat
8. Absorption cooling, using waste heat.

The free cooling should apply to all occupied spaces in the building. Small IT rooms and lift motor rooms are excluded.

It should be demonstrated that the free cooling can meet the building's cooling demand. The calculation methods should take into account the passive design measures included in the analysis and should be carried out by a building services engineer who is a member of the Chartered Institute of Building Services Engineers (CIBSE) or by an accredited energy assessor. Where the free cooling approaches chosen cannot be adequately modelled by these methods, the use of any alternative



methods should be justified by the building services engineer or accredited energy assessor, demonstrating that these methods are appropriate.

Low and zero carbon feasibility study

The low zero carbon feasibility study should cover as a minimum:

1. Energy generated from LZC energy source per year
2. Carbon dioxide savings from LZC energy source 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. Any available grants
7. All technologies appropriate to the site and energy demand of the development
8. Reasons for excluding other technologies
9. If appropriate:
 - a. The building is connected to an existing local community CHP system or
 - b. the building is connected to an existing source of waste heat or power OR
 - c. a building or site CHP system is specified with the potential to export excess heat or power via a local community energy scheme; or
 - d. a source of waste heat or power is specified with the potential to export excess heat or power via a local
 - e. community energy scheme
10. Energy storage.

The reduction in regulated carbon dioxide (CO₂) emissions can be demonstrated by comparing regulated carbon dioxide (CO₂) emissions with LZC technologies to the actual building-regulated emissions without LZCs. When the CO₂ savings are compared for different technologies, they may be estimated separately from the building energy model where appropriate, e.g. by using manufacturers' data, simple hand calculations or spreadsheets. For the specified technologies, any CO₂ savings are estimated using dynamic simulation modelling. The energy supply used for the base case is mains gas and grid electricity. If mains gas is not available on site, then oil may be used instead. The base case includes any passive design or free cooling measures adopted for the first two credits. The actual building energy demands are calculated as for the passive design analysis. The carbon dioxide emissions factors used for the building regulations calculations are then applied.

Scope of LZC systems and how they are assessed

Recognised local LZC technologies

Technologies eligible to contribute to achieving the criteria must produce energy from renewable sources and meet all other ancillary requirements as defined by Directive 2009/28/EC.

The following requirements must also be met:

1. There must be a direct supply of energy produced to the building under assessment.
2. Technologies under 50 kWe or 45 kWth must be certified by a Microgeneration Certification Scheme (MCS), or equivalent, and installed by MCS (or equivalent) certified installers.
3. Combined heat and power (CHP) schemes above 50 kWe must be certified under the CHPQA standard. CHP schemes fuelled by mains gas are eligible to contribute to performance against this issue.



4. Heat pumps can only be considered as a renewable technology when used in heating mode. Refer to Annex VI of Directive 2009/28/EC for more detail on accounting for energy from heat pumps.

5. Where MCS or CHPQA certification is not available, the design team must investigate the availability of alternative accreditation schemes in line with the Directives listed above, or an equivalent country or regional directive or standard. Where an accreditation scheme exists, it should be used for the purpose of verifying compliance of the specified LZC technology. If no accreditation scheme exists in the country, the design team must demonstrate they have investigated the competence of the installer selected and are confident that they have the skill and competence to install the LZC technology appropriately.

Novel LZC technology not listed

Other systems may be acceptable as part of a LZC strategy under this issue but are not currently included as LZC technologies in any of the approved building energy calculation software packages. Acceptability will be dependent on the nature of the system proposed and the carbon benefits achieved. The BREEAM Assessor must confirm acceptability with BRE before an assessment is submitted. The calculation procedure for the new LZC technology should be submitted for consideration as a 'novel technology' to be included in the 'SBEM-Q' innovation process.

The novel technology would only be acceptable for the LZC credit if:

1. It is already demonstrably modelled in one of the approved dynamic simulation compliance tools OR
2. The calculation procedure has been accepted by the SBEM-Q process and integrated into the SBEM tool OR
3. It has been applied for and is in the process of being accepted for SBEM-Q.

For one-off LZC technology designs, where it is not viable to obtain SBEM-Q approval, an application for a BREEAM approved innovation credit can be submitted to BRE.

LZC technology already available on site

For developments where there is an existing LZC energy source that can supply a compliant percentage of energy to the assessed building, a feasibility study will still have to be carried out to demonstrate that the existing technology is the most appropriate for the assessed building or development. The study should seek to identify any other options to supply a higher proportion of the building's energy demand in addition to that supplied by the existing source. In order to be compliant, the LZC energy source must continue to provide low carbon energy to existing buildings and provide additional low carbon energy to the new building.

Waste heat from a building- related operational process

Waste heat from an operational process that takes place within the assessed building (or on the assessed site) can be considered as 'low carbon' for the purpose of this BREEAM issue. This is on the condition that the generation of the heat from the process is integral to the assessed building. Examples of operational processes and functions include manufacturing processes, high temperature oven or kiln, compressors serving process plant, micro-brewery, crematorium, testing and commissioning boilers for training or manufacture, and data centres. It does not include waste heat from IT or server rooms, which could be used as part of conventional heat recovery measures.



Community and near-site schemes

This BREEAM issue seeks to encourage the installation of on-site and near-site LZC technologies. 'Local' does not have to mean on site; community schemes (near site) can be used as a means of demonstrating compliance.

Waste heat from incineration

Waste heat from an incineration plant can only be considered as low carbon for the purpose of this BREEAM issue under the following circumstances:

1. All other LZC technologies have been considered and discounted in the feasibility study and; EITHER
2. The local authority or region in which the incineration plant is located is demonstrably meeting its annual waste reuse and recycling targets and waste management policies; OR
3. There is a near-site or on-site facility connected to the building, via a private wire arrangement, which is demonstrably removing reusable and recyclable waste material prior to incineration.

Biofuels

First generation biofuels

BREEAM does not recognise or reward building systems fuelled by first generation biofuels manufactured from feedstocks, e.g. biofuels manufactured from sugars, seeds, grain, animal fats etc. where these are grown or farmed for the purposes of biofuel production. This is due to the current uncertainty over their impact on biodiversity, global food production and greenhouse gas savings, plus the ease of interchangeability between fossil fuels. BREEAM may recognise systems using second generation biofuels or biofuels manufactured from biodegradable waste materials, e.g. biogas, waste vegetable oil, or locally and sustainably sourced solid biofuels, e.g. woodchip and wood pellets, where these are not interchangeable with fossil fuels or first generation biofuels.

Second generation biofuels and biofuels from waste streams

BREEAM recognises that biofuels produced from biomass which is a byproduct of other processes may provide a more sustainable alternative to fossil fuels. Typically, these use waste feedstock consisting of residual non-food parts of current food crops, industry waste such as woodchips, other waste vegetable matter and waste fish oil from sustainable fish stocks to produce biofuel. Such biofuels will, in principle, be recognised by BREEAM for the purposes of defining low or zero carbon technologies. However due to the emerging nature of such technologies, full details would be required for review by BRE Global prior to confirmation of acceptability, including the following:

1. Type, provenance and sustainability of the biomass feedstock
2. Avoidance or minimisation of fossil fuel use in extracting the biofuel
3. Minimising fossil fuel use in transporting the biomass or biofuel
4. Presence of a supply agreement and a robust supply chain
5. Compatibility of the biofuel with the specified boiler or plant and manufacturer's warranty issues.

The use of other recycled or waste-derived biofuels such as waste oil from catering may also be recognised by BREEAM subject to the above criteria. For smaller scale applications, the assessor will also need to demonstrate that the biofuel is locally sourced. BREEAM does not qualify the term



'locally sourced' or specify a minimum supply contract. However the assessor must determine and demonstrate that these are reasonable for the particular application.

Energy specialist

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

Waste 03 – Operational Waste

One credit - Operational waste

1. Provide a dedicated space for the segregation and storage of operational recyclable waste generated. The space is:
 - a. Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams;
 - b. Accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractors;
 - c. Of a capacity appropriate to the building type, size, number of units (if relevant) and predicted volumes of waste that will arise from daily or weekly operational activities and occupancy rates.
2. For consistent and large amounts of operational waste generated, provide:
 - a. Static waste compactors or balers; situated in a service area or dedicated waste management space;
 - b. Vessels for composting suitable organic waste OR adequate spaces for storing segregated food waste and compostable organic material for collection and delivery to an alternative composting facility;
 - c. A water outlet provided adjacent to or within the facility for cleaning and hygiene purposes where organic waste is to be stored or composted on site.

Methodology

Determining if the dedicated space complies

The design team demonstrates that the provision of waste management facilities for the assessed building is adequate given the building type, occupier (if known), operational function and likely waste streams and volumes to be generated.

Where it is not possible to determine what provision should be made, use the following guide for minimum storage space provision:

1. At least 2 m² per 1000 m² of net floor area for buildings < 5000 m²
2. A minimum of 10 m² for buildings ≥ 5000 m²
3. An additional 2 m² per 1000 m² of net floor area where catering is provided (with an additional minimum of 10 m² for buildings ≥ 5000 m²).

The net floor area should be rounded up to the nearest 1000 m².



General waste

The storage area for recyclable materials must be in addition to areas and facilities provided for dealing with general waste and other waste management facilities, e.g. compactors, balers and composters.

Internal storage areas

Where the facilities are situated internally, vehicular gate heights and widths, manoeuvring and loading space must be sized to ensure ease of access for vehicles collecting recyclable materials.

Health and Wellbeing 02 - Indoor Air Quality (IAQ) Plan

1. A site-specific indoor air quality plan has been produced and implemented in accordance with the guidance in Guidance Note GN06. The plan must be produced no later than the end of Concept Design. The objective of the plan is to facilitate a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during occupation of the building. The indoor air quality plan must consider the following:
 - a. Removal of contaminant sources
 - b. Dilution and control of contaminant sources:
 - i. Where present, consideration is given to the air quality requirements of specialist areas such as laboratories
 - c. Procedures for pre-occupancy flush out
 - d. Third party testing and analysis
 - e. Maintaining good indoor air quality in-use.



APPENDIX C: DETAILED INFORMATION REQUIREMENTS

Management		
Man 01 - Project brief and design:		
Requirement 1	Prior to completion of the Concept Design, the project delivery stakeholders (see Definitions) meet to identify and define for each key phase of project delivery: a. Roles b. Responsibilities c. Contributions.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	Consider each one of the following items when defining roles, responsibilities and contributions for each key phase of the project: a. End user requirements b. Aims of the design and design strategy c. Particular installation and construction requirements or limitations d. Occupiers' budget and technical expertise in maintaining any proposed systems e. Maintainability and adaptability of the proposals f. Operational energy (see Assessment scope) g. Requirements for the production of project and end user documentation h. Requirements for commissioning, training and aftercare support. Where the building occupants are not known, the list of considerations above still applies. The appropriate project delivery stakeholder considers each item, based on likely scenarios of building occupancy.	As per requirement 1.
Requirement 3	The project team demonstrates how the project delivery stakeholders'	As per requirement 1.



	contributions and the consultation process outcomes influence the following: a. Initial Project Brief b. Project Execution Plan (see Definitions) c. Communication Strategy (see Definitions) d. Concept Design.	
Requirement 4	Prior to completion of the Concept Design, the design team consult with all interested parties (see Definitions) on matters that cover the minimum consultation content (see Methodology).	Consultation plan setting out the process and scope of the consultation. One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 5	Demonstrate how the stakeholder contributions and consultation exercise outcomes influence the Initial Project Brief and Concept Design.	As per requirement 4.
Requirement 6	Prior to completion of the detailed design (RIBA Stage 4, Technical Design or equivalent), all interested parties (see Definitions) give and receive consultation feedback.	As per requirement 4.
Requirement 7	Additionally for Education, Healthcare, Law courts and Major transportation hub building types only: An independent party (see Definitions) carries out the consultation exercise. The Design Quality Indicator (DQI) and the Achieving Excellence Design Evaluation Toolkit (AEDET) could be used as methods to assess the design quality of buildings.	As per requirement 1.
Requirement 8	Prerequisite for BREEAM Advisory Professional credits (Concept and Developed Design): The project team, including the client, formally agree strategic performance targets (see Definitions) early in the design process (with the support of the BREEAM AP where appointed).	See Additional information on page 41. One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.



Requirement 9	Involve a BREEAM AP in the project at an appropriate time and level to: a. Work with the project team, including the client, to consider the links between BREEAM issues and assist them in maximising the project's overall performance against BREEAM, from their appointment and throughout Concept Design b. Monitor progress against the performance targets (see Definitions) agreed under criterion 8 throughout all stages after their appointment where decisions critically impact BREEAM performance c. Proactively identify risks and opportunities related to the achievement of the targets agreed under criterion 8 d. Provide feedback to the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets e. Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team.	As per requirement 8.
Requirement 10	Criteria 8 and 9 are achieved.	As per requirement 8.
Requirement 11	Involve the BREEAM AP in the project at an appropriate time and level to: a. Work with the project team, including the client, to consider the links between BREEAM issues and to assist them in maximising the project's overall performance against BREEAM throughout Developed Design b. Monitor progress against the performance targets agreed under criterion 8 throughout all stages where decisions critically impact the specification and tendering process and the BREEAM performance c. Proactively identify risks and opportunities related to the	As per requirement 8.



	achievement of the targets agreed under criterion 8 d. Provide feedback to the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets. e. Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team.	
Man 02 - Life cycle cost and service planning:		
Requirement 1	A competent person (see Definitions) carries out an outline, entire asset LCC plan at Process Stage 2 (equivalent to Concept Design - RIBA Stage 2) together with any design options appraisals in line with 'Standardised method of life cycle costing for construction procurement' PD 156865: 2008.	Elemental LCC plan. One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	The elemental LCC plan: a. Provides an indication of future replacement costs over a period of analysis as required by the client (e.g. 20, 30, 50 or 60 years); b. Includes service life, maintenance and operation cost estimates. The study period should ideally be agreed by the client, in line with the design life expectancy of the building. However, where the life expectancy of the building is not yet formally agreed (due to being at very early design stages), the default design life of 60 years should be used for modelling purposes (in line with the UK default).	As per requirement 1.
Requirement 3	Demonstrate, using appropriate examples provided by the design team, how the elemental LCC plan has been used to influence building and systems design and specification to minimise life cycle costs and maximise critical value.	As per requirement 1.
Requirement 4	A competent person develops a component level LCC options appraisal by	Component level LCC options appraisal plan. One or more



	the end of Process Stage 4 (equivalent to Technical Design – RIBA Stage 4) in line with PD 156865: 2008. The component level LCC includes (where present): - Envelope, e.g. cladding, windows, or roofing - Services, e.g. heat source cooling source, or controls - Finishes, e.g. walls, floors or ceilings - External spaces, e.g. alternative hard landscaping, boundary protection. The Component level LCC option appraisal should review all of the above component types (where present). However, you do not need to consider every single example cited under each component; only a selection of those most likely to draw valued comparisons. This is to ensure that a wide range of options are considered and help focus the analysis on components which would benefit the most from appraisal.	of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 5	Demonstrate, using appropriate examples provided by the design team, how the component level LCC options appraisal has been used to influence building and systems design and specification to minimise life cycle costs and maximise critical value.	As per requirement 4.
Requirement 6	Report the capital cost for the building in pounds per square metre of gross internal floor area (£k/m²) as part of the submission to BRE. See also Methodology and Additional information.	Predicted capital costs via BREEAM Projects. One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Man 03 - Responsible construction practices:		
Requirement 1	All timber and timber-based products used during the construction process of the project are 'legally harvested and traded timber' (see Definitions). For other	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can



	materials there are no prerequisite requirements at this stage.	be used to demonstrate compliance with these criteria.
Requirement 3	All parties who at any stage manage the construction site (e.g. the principal contractor, the demolition contractor) operate an EMS covering their main operations. The EMS must: a. Be third party certified, to ISO 14001: 2015, EMAS (EU Eco-Management and Audit Scheme) or equivalent standard; OR b. In compliance with BS 8555: 2016 have: i. Appropriate structure ii. Reached implementation stage phase four 'implementation and operation of the environmental management system' iii. Completed defined phase audits one to four.	As per requirement 1.
Requirement 4	All parties who at any point manage the construction site (e.g. the principal contractor, the demolition contractor) implement best practice pollution prevention policies and procedures on-site in accordance with Working at construction and demolition sites: PPG6, Pollution Prevention Guidelines.	As per requirement 1.
Requirement 5	Prerequisite for the BREEAM AP credit: The client and the contractor formally agree performance targets.	See Additional information. One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 6	Involve a BREEAM AP in the project at an appropriate time and level to: a. Work with the project team, including the client, to consider the links between BREEAM issues and assist them in achieving and if possible going beyond the design	As per requirement 5.



	intent, to maximise the project's performance against the agreed performance targets throughout the Construction, Handover and Close Out stages b. Monitor construction progress against the performance targets agreed under criterion 5 throughout all stages where decisions critically impact BREEAM performance c. Proactively identify risks and opportunities related to the procurement and construction process and the achievement of the targets agreed under criterion 5 d. Provide feedback to the constructors and the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets e. Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team and the provision to the assessor.	
Requirement 7	Achieve items listed as required for one credit in Table 4.1 Responsible construction management items.	As per requirement 5.
Requirement 8	Achieve criterion 7.	As per requirement 5.
Requirement 9	Achieve six additional items in Table 4.1 Responsible construction management items.	As per requirement 5.
Requirement 10	Assign responsibility to an individual for monitoring, recording and reporting energy use, water consumption and transportation data (where measured) resulting from all on-site construction processes (and dedicated off-site manufacturing) throughout the build programme. To ensure the robust collection of information, this individual must have the appropriate authority and responsibility to request and access the	As per requirement 5.



	data required. Where appointed, the BREEAM AP could perform this role.	
Requirement 11	First monitoring credit - Utility consumption Energy consumption Achieve criterion 10.	As per requirement 2.
Requirement 12	Set targets for the site energy consumption in kWh (and where relevant, litres of fuel used) as a result of the use of construction plant, equipment (mobile and fixed) and site accommodation.	As per requirement 2.
Requirement 13	Monitor and record data for the energy consumption described in criterion 12.	As per requirement 2.
Requirement 14	Report the total carbon dioxide emissions (total kgCO ₂ /project value) from the construction process via BREEAM Projects (for the purposes of potential future BREEAM performance benchmarking).	As per requirement 2.
Requirement 15	Water consumption Achieve criterion 10.	As per requirement 2.
Requirement 16	Set targets for the potable water consumption (m ³) arising from the use of construction plant, equipment (mobile and fixed) and site accommodation.	As per requirement 2.
Requirement 17	Monitor and record data for the potable water consumption described in criterion 16.	As per requirement 2.
Requirement 18	Use the collated data to report the total net water consumption (m ³), i.e. consumption minus any recycled water use from the construction process via BREEAM Projects (for the purposes of potential future BREEAM performance benchmarking).	As per requirement 2.



Requirement 19	Second monitoring credit - transportation of construction materials and waste Achieve criterion 10.	As per requirement 2.
Requirement 20	Set targets for transportation movements and impacts resulting from delivery of the majority of construction materials to site and construction waste from site. As a minimum cover: a. Transportation of materials from the point of supply to the building site, including any transport, intermediate storage and point of supply (see Definitions). Monitor as a minimum: i. Materials used in major building elements (i.e. those defined in BREEAM issue Mat 01 Environmental impacts from construction products - Building life cycle assessment (LCA)). ii. Ground works and landscaping materials. b. Transportation of construction waste from the construction gate to waste disposal processing or recovery centre gate. This monitoring must cover the construction waste groups outlined in the project's resource management plan.	As per requirement 2.
Requirement 21	Monitor and record data for the transportation movements as described in criterion 20.	As per requirement 2.
Requirement 22	Using the collated data, report separately for materials and waste, the total transport-related carbon dioxide emissions (kgCO ₂ eq), plus total distance travelled (km) via BREEAM Projects (for the purposes of potential future BREEAM performance benchmarking).	As per requirement 2.
Requirement 23	Achieve all items in Table 4.1.	One or more of the appropriate evidence types listed in The BREEAM



		evidential requirements on page 27 can be used to demonstrate compliance with these criteria.
Man 04 - Commissioning and handover:		
Requirement 0	Prior to handover, develop two building user guides (see Methodology) for the following users: a. A non-technical user guide for distribution to the building occupiers b. A technical user guide for the premises facilities managers. A draft copy is developed and discussed with users first (where the building occupants are known) to ensure the guide is most appropriate and useful to potential users.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 1	Prepare a schedule of commissioning and testing. The schedule identifies and includes a suitable timescale for commissioning and re-commissioning of all complex and non-complex building services and control systems and for testing and inspecting building fabric.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	The schedule identifies the appropriate standards for all commissioning activities to be conducted, where applicable, in accordance with: a. Current Building Regulations b. BSRIA guidelines c. CIBSE guidelines d. Other appropriate standards (see Methodology) Exclude from the assessment any process or manufacture-related equipment specified as part of the project. However, include such equipment in cases where they form an integral part of the building HVAC services, such as some heat recovery systems.	As per requirement 1.



Requirement 3	Where a building management system (BMS) is specified: a. Carry out commissioning of air and water systems when all control devices are installed, wired and functional b. Include physical measurements of room temperatures, off-coil temperatures and other key parameters, as appropriate, in commissioning results c. The BMS or controls installation should be running in auto with satisfactory internal conditions prior to handover d. All BMS schematics and graphics (if BMS is present) are fully installed and functional to user interface prior to handover e. Fully train the occupier or facilities team in the operation of the system.	As per requirement 1.
Requirement 4	Appoint an appropriate project team member to monitor and programme pre-commissioning, commissioning and testing. Where necessary include re-commissioning activities on behalf of the client.	As per requirement 1.
Requirement 5	The principal contractor accounts for the commissioning and testing programme, responsibilities and criteria within their budget and the main programme of works. Allow the required time to complete all commissioning and testing activities prior to handover.	As per requirement 1.
Requirement 6	Achieve criteria 1-5.	As per requirement 1.
Requirement 7	During the design stage, the client or the principal contractor appoints an appropriate project team member (see criterion 4), provided they are not involved in the general installation works for the building services systems, with responsibility for:	As per requirement 1.



	a. Undertaking design reviews and giving advice on suitability for ease of commissioning b. Providing commissioning management input to construction programming and during installation stages c. Management of commissioning, performance testing and handover or post-handover stages. For buildings with complex building services and systems, this role needs to be carried out by a specialist commissioning manager (see Definitions).	
Requirement 8	Achieve criteria 1-5.	As per requirement 1.
Requirement 9	Complete post-construction testing and inspection to quality-assure the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths (this is through air tightness testing and a thermographic survey). A suitably qualified professional (see Definitions) undertakes the survey and testing in accordance with the appropriate standard.	As per requirement 1.
Requirement 10	Rectify any defects identified during post-construction testing and inspection prior to building handover and close out. Any remedial work meets the required performance characteristics for the building or element as defined at the design stage (see Methodology).	As per requirement 1.
Requirement 11	Prior to handover, develop two building user guides (see Methodology) for the following users: a. A non-technical user guide for distribution to the building occupiers b. A technical user guide for the premises facilities managers. A draft copy is developed and discussed with users first (where the building occupants are known) to ensure the guide	As per requirement 1.



	is most appropriate and useful to potential users.	
Requirement 12	Prepare two training schedules timed appropriately around handover and proposed occupation plans for the following users: a. A non-technical training schedule for the building occupiers b. A technical training schedule for the premises facilities managers.	As per requirement 1.
Man 05 - Aftercare:		
Requirement 1	Provide aftercare support to the building occupiers through having in place operational infrastructure and resources. This includes as a minimum: a. A meeting between the aftercare support team or individual and the building occupier or management team (prior to initial occupation, or as soon as possible thereafter) to: i. Introduce the aftercare support available, including the building user guide (where existing) and training schedule and their content. ii. Present key information on the building including the design intent and how to use the building to ensure it operates as efficiently and effectively as possible. b. On-site facilities management training including: i. A walkabout of the building AND ii. Introduction to and familiarisation with the building systems, their controls and how to operate them in accordance with the design intent and operational demands. c. Provide initial aftercare support for at least the first month of building occupation, e.g.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.



	weekly attendance on-site, to support building users and management (the level of frequency will depend on the complexity of the building and building operations). d. Provide longer term aftercare support for occupiers for at least the first 12 months from occupation, e.g. a helpline, nominated individual or other appropriate system to support building users and management.	
Requirement 2	Establish operational infrastructure and resources to coordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months, once the building is substantially occupied. This facilitates analysis of discrepancies between actual and predicted performance, with a view to adjusting systems and user behaviours accordingly.	As per requirement 1.
Requirement 3	Complete the following commissioning activities over a minimum 12-month period, once the building becomes substantially occupied: a. Complex systems: The specialist commissioning manager will: i. Identify changes made by the owner or operator that might have caused impaired or improved performance ii. Test all building services under full load conditions, i.e. heating equipment in mid-winter, cooling and ventilation equipment in mid-summer and under part load conditions (spring and autumn) iii. Where applicable, carry out testing during periods of extreme (high or low) occupancy iv. Interview building occupants (where they are affected by the complex services) to identify problems or concerns	As per requirement 1.



	regarding the effectiveness of the systems v. Produce monthly reports comparing sub-metered energy performance to the predicted one (see Ene 01 Reduction of energy use and carbon emissions) vi. Identify inefficiencies and areas in need of improvement vii. Re-commission systems (following any work needed to serve revised loads), and incorporate any revisions in operating procedures into the operations and maintenance (O&M) manuals. b. Simple systems (naturally ventilated): The external consultant, aftercare team or facilities manager will: i. Review thermal comfort, ventilation, and lighting, at three, six and nine month intervals after initial occupation, either by measurement or occupant feedback ii. Identify deficiencies and areas in need of improvement iii. Re-commission systems and incorporate any relevant revisions in operating procedures into the O&M manuals.	
Requirement 4	The client or building occupier commits to carry out a POE exercise (see Definitions) one year after the building is substantially occupied. This gains comprehensive in-use performance feedback (see criterion 5.b.v) and identifies gaps between design intent and in-use performance. The aim is to highlight any improvements or interventions that need to be made and to inform operational processes.	As per requirement 1.



Requirement 5	An independent party (see Definitions) carries out the POE covering: a. A review of the design intent and construction process (review of design, procurement, construction and handover processes) b. Feedback from a wide range of building users including facilities management on the design and environmental conditions of the building covering: i. Internal environmental conditions (light, noise, temperature, air quality) ii. Control, operation and maintenance iii. Facilities and amenities iv. Access and layout v. Energy and water consumption (see criterion 2 and Methodology) vi. Other relevant issues, where appropriate (see Definitions).	As per requirement 1.
Requirement 6	The independent party provides a report with lessons learnt to the client and building occupiers.	As per requirement 1.
Requirement 7	The client or building occupier commits funds to pay for the POE in advance. This requires an independent party to be appointed to carry out the POE as described in criterion 5. Evidence of the appointment of the independent party and schedule of responsibilities which fulfils the BREEAM criteria are acceptable to demonstrate compliance.	As per requirement 1.
Health & Wellbeing		
Hea 01 - Visual comfort:		
Requirement 1	Identify areas at risk of glare using a glare control assessment. The glare control assessment also justifies any areas deemed not at risk of glare.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can



		be used to demonstrate compliance with these criteria.
Requirement 2	A glare control strategy designs out potential glare in all relevant building areas where risk has been identified. This should be achieved through building form and layout or building design measures.	As per requirement 1.
Requirement 3	The glare control strategy does not increase energy consumption used for lighting. This is achieved by: a. Maximising daylight levels in all weather, cloudy or sunny AND b. Ensuring the use or location of shading does not conflict with the operation of lighting control systems.	As per requirement 1.
Requirement 4	Daylighting criteria have been met using either of the following options: a. The relevant building areas meet good practice daylight factors and other criterion as outlined in Table 5.1 and Table 5.2, OR b. The relevant building areas meet good practice average and minimum point daylight illuminance criteria as outlined in Table 5.3. Additional alternative route for healthcare building types only: c. The relevant building areas meet the median daylight factors and minimum daylight factors in Table 5.4 (see Methodology).	Daylighting calculations. One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 5	95% of the floor area in 95% of spaces for each relevant building area is within 8m of an external wall. The external wall has a window or permanent opening that provides an adequate view out.	As per requirement 1.
Requirement 6	The window or opening must be $\geq 20\%$ of the surrounding wall area (refer to Definitions). Where the room depth is greater than 8m, compliance is only	As per requirement 1.



	possible where the percentage of window or opening is the same as, or greater than, the values in Table 1.0 of BS 8206: part 2.	
Requirement 7	In addition, the building type criteria in Table 5.6 are applicable to view out criteria.	As per requirement 1.
Requirement 8	Internal lighting Internal lighting in all relevant areas of the building is designed to provide illuminance (lux) levels and colouring rendering index in accordance with the SLL Code for Lighting 2012 and any other relevant industry standard. Internal lighting should be appropriate to the tasks undertaken, accounting for building user concentration and comfort levels.	As per requirement 1.
Requirement 9	For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 7 sections 2.4, 2.13 to 2.15, 2.20, and 6.10 to 6.20. This gives recommendations highlighting: a. Limits to the luminance of the luminaires to avoid screen reflections. (Manufacturers' data for the luminaires should be sought to confirm this) b. Any area where a surface is used to reflect light in to a space, such as uplighting, the recommendations refer to the luminance of the lit ceiling rather than the luminaire; a design team calculation is usually required to demonstrate this c. Recommendations for direct lighting, ceiling illuminance, and average wall illuminance.	As per requirement 1.
Requirement 10	External lighting All external lighting located within the construction zone is specified in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas and BS EN 12464-2:2014 Light and lighting - Lighting of work places - Part 2: Outdoor work places.	As per requirement 1.



	External lighting should provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night.	
Requirement 11	Where no external light fittings are specified (either separate from or mounted on the external building façade or roof), the criteria relating to external lighting do not apply and the credit can be awarded on the basis of compliance with criteria 8-9.c.	As per requirement 1.
Requirement 12	Zoning and occupant control Internal lighting is zoned to allow for occupant control. Zoning is in accordance with the criteria below for relevant areas present within the building: a. In office areas, zones of no more than four workplaces b. Workstations adjacent to windows or atria and other building areas separately zoned and controlled c. Seminar and lecture rooms: zoned for presentation and audience areas d. Library spaces: separate zoning of stacks, reading and counter areas e. Teaching space or demonstration area f. Whiteboard or display screen g. Auditoria: zoning of seating areas, circulation space and lectern area h. Dining, restaurant, café areas: separate zoning of servery and seating or dining areas i. Retail: separate zoning of display and counter areas j. Bar areas: separate zoning of bar and seating areas k. Wards or bedded areas: zoned lighting control for individual bed spaces and control for staff over groups of bed spaces l. Treatment areas, dayrooms, waiting areas: zoning of seating and activity areas and circulation space with controls accessible to staff.	As per requirement 1.



Requirement 13	Areas used for teaching, seminar or lecture purposes have lighting controls provided in accordance with CIBSE Lighting Guide 5.	As per requirement 1.
Requirement 14	In addition the building type criteria in Table 5.7 (where relevant).	As per requirement 1.
Requirement 15	Daylighting criteria have been met using either of the following options: a. Relevant building areas meet exemplary daylight factors and the relevant criteria in Table 5.8. b. Relevant building areas meet exemplary average and minimum point daylight illuminance criteria in Table 5.9.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 16	Lighting in each zone can be manually dimmed by occupants down to 20% of the maximum light output using dimmer switches positioned in accessible locations. Dimming and control gear should avoid flicker and noise.	As per requirement 15.
Hea 02 - Indoor air quality:		
Requirement 1	A site-specific indoor air quality plan has been produced and implemented in accordance with the guidance in Guidance Note GN06. The plan must be produced no later than the end Concept Design. The objective of the plan is to facilitate a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during occupation of the building. The indoor air quality plan must consider the following: a. Removal of contaminant sources b. Dilution and control of contaminant sources i. Where present, consideration is given for the air quality requirements of specialist areas such as laboratories c. Procedures for pre-occupancy flush out	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.



	d. Third party testing and analysis e. Maintaining good indoor air quality in-use.	
Requirement 2	The building has been designed to minimise the indoor concentration and recirculation of pollutants in the building as follows: a. Provide fresh air into the building in accordance with the criteria of the relevant standard for ventilation b. Ventilation pathways are designed to minimise the ingress and build-up of air pollutants inside the building (see Methodology) c. Where present, HVAC systems must incorporate suitable filtration to minimise external air pollution, as defined in BS EN 13779:2007 Annex A3. The specified filters should achieve a minimum Indoor Air Quality of IDA2 d. Areas of the building subject to large and unpredictable or variable occupancy patterns have carbon dioxide (CO₂) or air quality sensors specified and: i. In mechanically ventilated buildings or spaces: sensors are linked to the mechanical ventilation system and provide demand-controlled ventilation to the space ii. In naturally ventilated buildings or spaces: sensors either have the ability to alert the building owner or manager when CO₂ levels exceed the recommended set point, or are linked to controls with the ability to adjust the quantity of fresh air, i.e. automatic opening windows or roof vents e. For naturally ventilated or mixed mode buildings, the design demonstrates that the ventilation strategy provides adequate cross flow of air to maintain the required thermal comfort conditions and	As per requirement 1.



	ventilation rates in accordance with CIBSE AM10.	
Requirement 3	One credit Three out of the five product types meet the emission limits, testing requirements and any additional requirements listed in Table 5.11. Where wood-based products are not one of three selected product types, all wood-based products used for internal fixtures and fittings must be tested and classified as formaldehyde E1 class as a minimum.	As per requirement 1.
Requirement 4	Two credits All of the product types listed meet the emission limits, testing requirements and any additional requirements listed in Table 5.11.	As per requirement 1.
Requirement 5	The formaldehyde concentration in indoor air is measured post construction (but pre-occupancy) and does not exceed 100µg/m ³ averaged over 30 minutes (World Health Organisation guidelines for indoor air quality: Selected pollutants, 2010).	As per requirement 1.
Requirement 6	The formaldehyde sampling and analysis is performed in accordance with ISO 16000-2 and ISO 16000-3.	As per requirement 1.
Requirement 7	The total volatile organic compound (TVOC) concentration in indoor air is measured post construction (but pre-occupancy) and does not exceed 500µg/m ³ over 8 hours.	As per requirement 1.
Requirement 8	The TVOC sampling and analysis is performed in accordance with ISO 16000-5 and ISO 16000-6 or ISO 16017-1.	As per requirement 1.
Requirement 9	Where levels are found to exceed these limits, the project team confirms the measures that have, or will be, undertaken in accordance with the IAQ plan, to reduce	As per requirement 1.



	the TVOC and formaldehyde levels to within the above limits.	
Requirement 10	The measured concentration levels of formaldehyde ($\mu\text{g}/\text{m}^3$) and TVOC ($\mu\text{g}/\text{m}^3$) are reported, via the BREEAM Scoring and Reporting Tool.	As per requirement 1.
Requirement 11	Three of the product types listed meet the emission limits, testing requirements and any additional requirements listed in Table 5.12. Where wood-based products are not one of the three selected product types, all wood-based products used for internal fixtures and fittings must be tested and classified as formaldehyde E1 class as a minimum.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Hea 04 - Thermal comfort:		
Requirement 1	Thermal modelling has been carried out using software in accordance with CIBSE AM11 Building Energy and Performance Modelling.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	The software used to carry out the simulation at the detailed design stage provides full dynamic thermal analysis. For smaller and more basic building designs with less complex heating or cooling systems, an alternative less complex means of analysis may be appropriate (such methodologies must still be in accordance with CIBSE AM11).	As per requirement 1.
Requirement 3	The modelling demonstrates that: a. For air-conditioned buildings, summer and winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental Design, Table 1.5; or other appropriate industry standard (where this sets a higher	As per requirement 1.



	or more appropriate requirement or level for the building type) b. For naturally ventilated buildings: i. Winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5. Or other appropriate industry standard (where this sets a higher or more appropriate requirement or level for the building type) ii. The building is designed to limit the risk of overheating, in accordance with the adaptive comfort methodology outlined in either of the following standards as appropriate; CIBSE TM52: The limits of thermal comfort: avoiding overheating in European buildings or CIBSE TM59: Design methodology for the assessment of overheating risk in homes,.	
Requirement 4	For air-conditioned buildings, the PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied) indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.	As per requirement 1.
Requirement 5	Criteria 1-4 are achieved.	As per requirement 1.
Requirement 6	The thermal modelling demonstrates that the relevant requirements set out in criterion 3 are achieved for a projected climate change environment (see Definitions).	As per requirement 1.
Requirement 7	Where criterion 6 above is not met, the project team demonstrates how the building has been adapted, or designed	As per requirement 1.



	to be easily adapted in future using passive design solutions in order to subsequently meet the requirements under criterion 6.	
Requirement 8	For air-conditioned buildings, the PMV and PPD indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.	As per requirement 1.
Requirement 9	Criteria 1-4 are achieved.	As per requirement 1.
Requirement 10	The thermal modelling analysis (criteria 1-4) has informed the temperature control strategy for the building and its users.	As per requirement 1.
Requirement 11	The strategy for proposed heating or cooling systems demonstrates that it has addressed the following: a. Zones within the building, and how the building services could efficiently and appropriately heat or cool these areas. For example consider the different requirements for the central core of a building compared with the external perimeter adjacent to the windows b. The degree of occupant control required for these zones. This is based on discussions with the end user (or alternatively building type or use specific design guidance, case studies, feedback) and considers: i. User knowledge of building services ii. Occupancy type, patterns and room functions (and therefore appropriate level of control required) iii. How the user is likely to operate or interact with the systems, e.g. are they likely to open windows, access thermostatic radiator valves (TRV) on radiators, change air-conditioning settings etc.	As per requirement 1.



	iv. The user expectations (this may differ in the summer and winter) and degree of individual control (i.e. obtaining the balance between occupant preferences, for example some occupants like fresh air and others dislike draughts) c. How the proposed systems will interact with each other (where there is more than one system) and how this may affect the thermal comfort of the building occupants d. The need or otherwise for an accessible building user actuated manual override for any automatic systems.	
Hea 05 - Acoustic performance:		
Requirement 1	The building meets the appropriate acoustic performance standards and testing requirements defined in the relevant table. These tables define criteria for the acoustic principles of: a. Sound insulation b. Indoor ambient noise level c. Room acoustics. OR	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	A suitably qualified acoustician (SQA) is appointed to define a bespoke set of performance requirements for all function areas in the building. The bespoke performance requirements use the three acoustic principles defined in criterion Hea 05 Acoustic performance - criterion 1, setting out the performance requirements for each and the testing regime required.	As per requirement 1.
Hea 06 - Security:		
Requirement 1	A Suitably Qualified Security Specialist (SQSS) conducts an evidence based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can



	or equivalent). The purpose of the SNA will be to identify attributes of the proposal, site and surroundings which may influence the approach to security for the development.	be used to demonstrate compliance with these criteria.
Requirement 2	The SQSS develops a set of security controls and recommendations for incorporation in to the proposals. Those controls shall directly relate to the threats and assets identified in the preceding SNA.	As per requirement 1.
Requirement 3	The recommendations shall be incorporated into proposals and implemented in the as-built development. Any deviation from those recommendations shall be justified and agreed with the SQSS.	As per requirement 1.
Requirement 4	A compliant risk based security rating scheme has been used. The performance against the scheme has been confirmed by independent assessment and verification.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Hea 07 - Safe and healthy surroundings:		
Requirement 1	Where external site areas form part of the assessed development the following apply: Dedicated and safe cycle paths are provided from the site entrance to any cycle storage, and connect to offsite cycle paths where applicable.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	Dedicated and safe footpaths are provided on and around the site providing suitable links for the following: a. The site entrance to the building entrance b. Car parks (where present) to the building entrance c. The building to outdoor space, and d. Connecting to off-site paths where applicable.	As per requirement 1.



Requirement 3	Pedestrian drop off areas are designed off of, or adjoining to, the access road and should provide direct access to other footpaths.	As per requirement 1.
Requirement 4	Where vehicle delivery access and drop-off areas form part of the assessed development, the following apply: Delivery areas are not accessed through general parking areas and do not cross or share the following: a. Pedestrian and cyclist paths b. Outside amenity areas accessible to building users and general public.	As per requirement 1.
Requirement 5	There is a dedicated parking or waiting area for goods vehicles with appropriate separation from the manoeuvring area and staff and visitor car parking.	As per requirement 1.
Requirement 6	Parking and turning areas are designed for simple manoeuvring according to the type of delivery vehicle likely to access the site, thus avoiding the need for repeated shunting.	As per requirement 1.
Requirement 7	There is an outside space providing building users with an external amenity area.	As per requirement 1.
Energy		
Ene 01 - Reduction of energy use and carbon emissions:		
Requirement 1	Calculate an Energy Performance Ratio for New Constructions (EPR NC). Compare the EPR NC achieved with the benchmarks in Table 6.1 and award the corresponding number of BREEAM credits.	A copy of the building regulations output document from the approved software. The output documents must be based on the design stage of analysis. A copy of the building regulations output document from the design stage SAP calculations (where



		relevant for multiresidential buildings).
Requirement 2	Pre-requisite Prior to completion of the Concept Design, relevant members of the design team hold a preliminary design workshop focusing on operational energy performance.	Workshop minutes, agreed outcomes. One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 3	Undertake additional energy modelling during the design and post construction stage to generate predicted operational energy consumption figures (see Prediction of operational energy consumption).	Predicted energy consumption values, design assumptions, input data and risk assessments reported as detailed in the Energy Prediction and Post-occupancy guidance available from the BREEAM website. Confirmation of energy modeller's qualifications and experience. One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 4	Report predicted energy consumption targets by end use, design assumptions and input data (with justifications).	As per requirement 3.
Requirement 5	Carry out a risk assessment to highlight any significant design, technical, and process risks that should be monitored and managed throughout the construction and commissioning process.	As per requirement 3.
Requirement 6	The building achieves an $EPR_{NC} \geq 0.9$ and zero net regulated CO ₂ emissions (see Definitions).	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria. As above, plus evidence confirming:



		1. The total carbon neutral energy generation (kWh/yr) 2. The source of the carbon neutral energy 3. Calculated estimate of energy consumption from unregulated systems or process (kWh/yr) (only required if confirming zero regulated carbon or carbon negative exemplary credits) 4. Calculated estimate of exported energy surplus (only required if confirming carbon negative status).
Requirement 7	Energy generation from on-site and near-site LZO sources is sufficient to offset carbon emissions from regulated energy use plus a percentage of emissions from unregulated energy use.	As per requirement 6.
Requirement 8	Award the exemplary credits based on the percentage of additional emissions from unregulated energy that are offset by LZO sources (see Table 6.2).	As per requirement 6.
Requirement 9	The building is deemed carbon negative where > 100% (see Table 6.2) of carbon emissions from unregulated (and regulated) energy use are offset by energy generated from on-site and near-site LZO sources (see Definitions).	As per requirement 6.
Requirement 10	Achieve maximum available credits in Ene 02 Energy monitoring. In addition, preschools, primary schools, law courts, prisons and multi-residential buildings must separately monitor relevant function areas or departments in accordance with Assessment scope - Requirement 4.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria. The client's commitment to proceed to the Post-occupancy stage and report the energy consumption.



Requirement 11	The client or building occupier commits funds to pay for the post occupancy stage. This requires an assessor to be appointed and to report on the actual energy consumption compared with the targets set in 4 above.	As per requirement 10.
Requirement 12	The energy model (requirement 3) is: a. Submitted to BRE and b. Retained by the building owner.	As per requirement 10.
Ene 02 - Energy monitoring:		
Requirement 1	Install energy metering systems so that at least 90% of the estimated annual energy consumption of each fuel is assigned to the end-use categories (see Methodology).	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	Meter the energy consumption in buildings according to the total useful floor area: a. If the area is greater than 1,000m ² , by end-use category with an appropriate energy monitoring and management system b. If the area is less than 1,000m ² , use either: i. an energy monitoring and management system or ii. separate accessible energy sub-meters with pulsed or other open protocol communication outputs, for future connection to an energy monitoring and management system (see Definitions).	As per requirement 1.
Requirement 3	Building users can identify the energy consuming end uses, for example through labelling or data outputs.	As per requirement 1.
Requirement 4	Monitor a significant majority of the energy supply with:	As per requirement 1.



	a. An accessible energy monitoring and management system for: i. tenanted areas or ii. relevant function areas or departments in single occupancy buildings. OR b. Separate accessible energy sub-meters with pulsed or other open protocol communication outputs for future connection to an energy monitoring and management system for: i. tenanted areas or ii. relevant function areas or departments in single occupancy buildings.	
Requirement 5	Sub-meter per floor plate in large single occupancy or single tenancy buildings with one homogeneous function, for example hotel bedrooms, offices.	As per requirement 1.
Ene 03 - External Lighting:		
Requirement 1	No external lighting (which includes lighting on the building, at entrances and signs).	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	External light fittings within the construction zone with: a. Average initial luminous efficacy of no less than 70 luminaire lumens per circuit Watt b. Automatic control to prevent operation during daylight hours c. Presence detection in areas of intermittent pedestrian traffic.	As per requirement 1.
Ene 04 - Low carbon design:		
Requirement 1	One credit - Passive design analysis Achieve credit Hea04 Thermal Modelling to demonstrate that the building design	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can



	delivers appropriate thermal comfort levels in occupied spaces.	be used to demonstrate compliance with these criteria.
Requirement 2	The project team analyses the proposed building design and development during Concept Design to identify opportunities for the implementation of passive design measures (see Passive design analysis).	As per requirement 1.
Requirement 3	Implement passive design measures to reduce the total heating, cooling, mechanical ventilation, lighting loads and energy consumption in line with the passive design analysis findings.	As per requirement 1.
Requirement 4	Quantify the reduced total energy demand and carbon dioxide (CO ₂) emissions resulting from the passive design measures.	Results from a dynamic simulation model demonstrating the reduced energy demand and CO ₂ emissions from the specified passive design measures. One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 5	One credit - Free cooling Achieve the passive design analysis credit.	As per requirement 1.
Requirement 6	Include a free cooling analysis (see Free cooling analysis) in the passive design analysis carried out under criterion 2.	As per requirement 1.
Requirement 7	Identify opportunities for the implementation of free cooling solutions.	As per requirement 1.
Requirement 8	The building is naturally ventilated or uses any combination of the free cooling strategies listed in Free cooling analysis.	Results from a dynamic simulation model and other used methods demonstrating that the free cooling strategy can meet the building's cooling demand.



Requirement 9	An energy specialist (see Definitions) completes a feasibility study (see Low and zero carbon feasibility study) by the end of the Concept Design.	As per requirement 1.
Requirement 10	Establish the most appropriate recognised local (on site or near site) low or zero carbon (LZC) energy sources for the building or development (see Scope of LZC systems and how they are assessed), based on the feasibility study.	As per requirement 1.
Requirement 11	Specify local LZC technologies for the building or development in line with the feasibility study recommendations.	As per requirement 1.
Requirement 12	Quantify the reduced regulated carbon dioxide (CO ₂) emissions resulting from the feasibility study.	Results from a dynamic simulation model demonstrating reductions in CO ₂ emissions from the specified low zero carbon technology. One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Ene 06 - Energy efficient transportation systems:		
Requirement 1	For specified lifts, escalators or moving walks (transportation types): - Analyse the transportation demand and usage patterns for the building to determine the optimum number and size of lifts, escalators or moving walks - Calculate the energy consumption in accordance with BS EN ISO 25745 Part 2 or Part 3 for one of the following: - At least two types of system for each transportation type required; OR - An arrangement of systems for example for lift	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria



	systems, hydraulic, traction, machine room-less lift (MRL); OR iii. A system strategy that is 'fit for purpose' c. Consider the use of regenerative drives, subject to the requirements in Regenerative drives d. Specify the transportation system with the lowest energy consumption.	
Requirement 2	Achieve criteria 1.	As per requirement 1.
Requirement 3	Specify the following three energy efficient features for each lift: a. A standby condition for off-peak periods b. The lift car lighting and display lighting provides an average luminous efficacy across all fittings in the car of > 70 luminaire lumens per circuit Watt c. Use of a drive controller capable of variable speed, variable-voltage, and variable-frequency (VVVF) control of the drive motor.	As per requirement 1.
Requirement 4	Specify regenerative drives where their use is demonstrated to save energy.	As per requirement 1.
Transport		
Tra 01 - Transport assessment and travel plan:		
Requirement 1	During the feasibility and design stages, develop a travel plan based on a site-specific travel assessment or statement.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	The site-specific travel assessment or statement covers as a minimum: a. Existing travel patterns and opinions of existing building or site users towards cycling and	As per requirement 1.



	walking identifying constraints and opportunities, if relevant b. Travel patterns and transport impact of future building users c. Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children) d. Reporting of the number and type of existing accessible amenities, see Table 7.1 below, within 500m of the site e. Disabled access (accounting for varying levels of disability and visual impairment) f. Calculation of the existing public transport Accessibility Index (AI), see Methodology g. Current facilities for cyclists.	
Requirement 3	The travel plan includes proposals to increase or improve sustainable modes of transport and movement of people and goods during the building's operation and use, see Methodology.	As per requirement 1.
Requirement 4	If the occupier is known, involve them in the development of the travel plan.	As per requirement 1.
Requirement 5	Demonstrate that the travel plan will be implemented post construction and be supported by the building's management in operation.	As per requirement 1.
Tra 02 - Sustainable transport measures:		
Requirement 1	Achieve the Tra 01 transport assessment and travel plan credits.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	Identify the sustainable transport measures, see Table 7.4.	As per requirement 1.
Requirement 3	Award credits according to the Accessible Index (AI) of the project, and the total	As per requirement 1.



	number of points achieved for the options implemented, see Table 7.3.	
Water		
Wat 01 - Water consumption:		
Requirement 1	Use the BREEAM Wat 01 calculator to assess the efficiency of the domestic water-consuming components.	A completed copy of the BREEAM Wat01 calculator. Documentary evidence supporting the data used to complete the calculator tool. One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	Use the standard Wat 01 method (see Methodology) to compare the water consumption (L/person/day) for the assessed building against a baseline performance. Award BREEAM credits based upon Table 8.1. Where it is not possible to use the standard method, complete the assessment using the alternative Wat 01 method (see Methodology).	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 3	If a greywater or rainwater system (see Definitions) is specified, use its yield in L/person/day to offset potable water demand from components.	As per requirement 2.
Requirement 4	If a greywater or rainwater system is specified and installed: a. Greywater systems in compliance with BS 8525-1:2010 Greywater Systems - Part 1 Code of Practice b. Rainwater systems in compliance with BS 8515:2009+A1:2013 Rainwater Harvesting Systems - Code of practice.	As per requirement 2.



	Achieve Wat 02 criterion 6, if you intend to pursue a post occupancy stage certification.	
Requirement 5	Additionally for Healthcare building types only: If applicable, the flushing control for each WC or urinal must be suitable for operation by patients with frail or infirm hands or activated by electronic sensors (see 2.0).	As per requirement 2.
Requirement 6	Additionally for Prison building types only: 6 Sanitary components specified within a prison cell have a volume controller specified on the individual fittings or water supply to each cell (see Definitions).	As per requirement 2.
Requirement 1	Use the BREEAM Wat 01 calculator to assess the efficiency of the domestic water-consuming components.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria. A completed copy of the BREEAM Wat 01 calculator. Documentary evidence supporting the data used to complete the calculator tool.
Requirement 2	Use the standard Wat 01 method (see Methodology on the facing page) to compare the water consumption (L/person/day) for the assessed building against a baseline performance. Award BREEAM credits based upon Table 8.1 below. Where it is not possible to use the standard method, complete the assessment using the alternative Wat 01 method (see Methodology).	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 5	Additionally for Healthcare building types only: If applicable, the flushing control for each WC or urinal must be suitable for operation by patients with frail or infirm hands or activated by electronic sensors (see 2.0).	As per requirement 2.



Requirement 6	Sanitary components specified within a prison cell have a volume controller specified on the individual fittings or water supply to each cell (see Definitions).	As per requirement 2.
Requirement 8	The water consumption (L/person/day) for the assessed building achieves the 65% improvement described as exemplary performance in Table 8.1.	As per requirement 2.
Wat 02 - Water monitoring:		
Requirement 0	Specify a water meter on the mains water supply to each building. This includes instances where water is supplied via a borehole or other private source.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 1	Specify a water meter on the mains water supply to each building. This includes instances where water is supplied via a borehole or other private source.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	For water-consuming plant or building areas consuming 10% or more of the building's total water demand: a. Fit easily accessible sub-meters, OR b. Install water monitoring equipment integral to the plant or area.	As per requirement 1.
Requirement 3	For each meter (main and sub): a. Install a pulsed or other open protocol communication output, AND b. Connect it to an appropriate utility monitoring and management system, e.g. a building management system (BMS), for the monitoring of water consumption. If there is no BMS system in operation at Post-Construction stage, award credits provided that	As per requirement 1.



	the system used enables connection when the BMS becomes operational.	
Requirement 4	In buildings with swimming pools, or large water tanks and aquariums, fit separate sub-meters on the water supply of the above and any associated changing facilities (toilets, showers etc.) irrespective of their water consumption levels.	As per requirement 1.
Requirement 5	In buildings containing laboratories, fit a separate water meter on the water supply to any process or cooling loop for 'plumbed-in' laboratory process equipment, irrespective of their water consumption levels.	As per requirement 1.
Requirement 6	Additionally for those pursuing a post-occupancy stage certification: The water monitoring strategy used enables the identification of all water consumption for sanitary uses as assessed under Wat 01 (L/person/day), if a post occupancy stage certification is sought.	As per requirement 1.
Wat 03 - Water leak detection:		
Requirement 1	Install a leak detection system capable of detecting a major water leak: a. On the utilities water supply within the buildings, to detect any major leaks within the buildings AND b. Between the buildings and the utilities water supply, to detect any major leaks between the utilities supply and the buildings under assessment.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	The leak detection system is: a. A permanent automated water leak detection system that alerts the building occupants to the leak OR - an inbuilt automated diagnostic procedure for detecting leaks	As per requirement 1.



	b. Activated when the flow of water passing through the water meter or data logger is at a flow rate above a pre-set maximum for a pre-set period of time. This usually involves installing a system which detects higher than normal flow rates at meters or sub-meters. It does not necessarily require a system that directly detects water leakage along part or the whole length of the water supply system c. Able to identify different flow and therefore leakage rates, e.g. continuous, high or low level, over set time periods. Although high and low level leakage rates are not specified, the leak detection equipment installed must have the flexibility to distinguish between different flow rates to enable it to be programmed to suit the building type and owner's or occupier's usage patterns d. Programmable to suit the owner's or occupier's water consumption criteria e. Where applicable, designed to avoid false alarms caused by normal operation of large water consuming plant such as chillers. Where there is physically no space for a leak detection system between the utilities water meter and the building, alternative solutions can be used, provided that a major leak can still be detected.	
Requirement 3	Install flow control devices that regulate the supply of water to each WC area or facility according to demand, in order to minimise undetected wastage and leaks from sanitary fittings and supply pipework.	As per requirement 1.
Materials		
Mat 01 - Environmental impacts from construction products - Building life cycle assessment (LCA):		
Requirement 1	Comparison with the BREEAM benchmark during Concept Design (offices, industrial and retail buildings only Superstructure	- The Mat 01/02 Results Submission Tool.



	(offices, industrial and retail buildings (except for Simple Buildings and where Notes 1.1 and 1.2 apply) During the Concept Design, demonstrate the environmental performance of the building as follows: - Carry out a building LCA on of the superstructure design using either the BREEAM Simplified building LCA tool or an IMPACT Compliant LCA tool according to the methodology (see Methodology). - Submit the Mat 01/02 Results Submission Tool to BRE at the end of Concept Design, and before planning permission is applied for (that includes external material or product specifications).	
Requirement 2	Comparison with the BREEAM benchmark during Technical Design (offices, industrial and retail buildings only) During Technical Design, demonstrate the environmental performance of the building as follows: - As requirement 1.a - Submit the Mat 01/02 Results Submission Tool to BRE at the end of Technical Design. Where a project has not achieved requirement 1, requirement 2 may still be achieved.	As per requirement 1.
Requirement 3	Option appraisal during Concept Design (all building types) For offices, industrial and retail building types, achieve criterion 1 (except where Notes 1.0, 1.1 and 1.2 apply).	As requirements 1 to 2 - The options appraisal summary document - Evidence that the LCA options appraisal summary document has been received by the design team and client (meeting minutes, letter of acknowledgement) - Evidence of how the LCA design options have informed the design decision-making process (e.g. meeting minutes, documented design development showing how the LCA options have affected the design).



Requirement 4	During Concept design, identify opportunities for reducing environmental impacts as follows: a. Carry out building LCA options appraisal of 2 to 4 significantly different superstructure design options (applicable to the Concept Design stage, see Methodology). b. Use a building LCA tool that is recognized by BREEAM (as suitable for assessing superstructure during Concept Design) according to the methodology (see Methodology). c. For each design option, fulfil the same functional requirements specified by the client and all statutory requirements (to ensure functional equivalency). d. Integrate the LCA options appraisal activity within the wider design decision-making process. Record this in an options appraisal summary document. e. Record the following in the Mat 01/2 Results Submission Tool: The differences between the design options; the design option selected by the client to be progressed beyond Concept Design; the reasons for selecting it and the reasons for not selecting the other design options. f. Submit the Mat 01/02 Results Submission Tool to BRE at the end of Concept Design, and before planning permission is applied for (that includes external material or product specifications). If the building LCA tool recognised by BREEAM used for requirements 3 to 5 (and 6 to 9, if pursued) is not an IMPACT Compliant LCA tool and requirements 1 to 2 are applicable, then the BREEAM Simplified building LCA tool (or an IMPACT Compliant LCA tool) shall be used for requirements 1 to 2.	As per requirement 3.
Requirement 5	Options appraisal during Technical Design (all building types) During Technical Design identify opportunities for reducing environmental impacts as follows:	As requirements 3 to 4.



	a. Carry out building LCA options appraisal of 2 to 3 significantly different superstructure design options (based on the selected Concept Design option and as applicable to the Technical Design stage, see Methodology). b. Use a building LCA tool that is recognized by BREEAM (as suitable for assessing superstructure during Technical Design) according to the methodology (see Methodology). c. As requirements 4.c to 4.e above. Where an options appraisal summary document was produced during Concept Design, update it to include the Technical Design options. d. Submit the Mat 01/02 Results Submission Tool to BRE at the end of Technical Design. Where a project has not achieved requirements 3 and 4, requirement 5 may still be achieved.	
Requirement 6	Design (all building types) Requirements 3 and 4 are achieved.	- As requirements 3 to 4. - The LCA options appraisal summary document includes substructure and hard landscaping according to the requirements.
Requirement 7	During Concept Design identify opportunities for reducing environmental impacts as follows: a. Carry out building LCA options appraisal of a combined total of at least six significantly different substructure or hard landscaping design options (at least two shall be substructure and at least two shall be hard landscaping) b. Using a building LCA tool that is recognized by BREEAM (as suitable for assessing substructure and hard landscaping during Concept Design) according to the methodology (see Methodology). c. As requirements 4.c to 4.f above.	As per requirement 6.



Requirement 8	Requirements 3 to 4 are achieved.	- As requirements 3 to 4. - The LCA options appraisal summary document includes core building services according to the criteria.
Requirement 9	During Concept Design identify opportunities for reducing environmental impacts as follows: a. Carry out building LCA options appraisal of at least 3 significantly different core building services design options. b. Use a building LCA tool that is recognized by BREEAM (as suitable for assessing core building services during Concept Design) according to the methodology (see Methodology). c. As requirements 4.c to 4.f.	As per requirement 8.
Requirement 10	Achieve requirements 3 to 5.	- As requirement 5. - The 'elemental LCC plan' and 'Component level LCC option appraisal; in issue Man 02 Life cycle cost and service life planning'.
Requirement 11	Achieve Elemental LCC plan and Component Level LCC options appraisal credits (Man 02 Life cycle cost and service life planning).	As per requirement 10.
Requirement 12	Include design options appraised for requirements 3 to 4 (and 6 to 7 and 8 to 9, if pursued) during Concept Design in Assessment scope - The elemental LCC plan.	As per requirement 10.
Requirement 13	Include the design options appraised for criterion 5 during Concept Design in the 'Component level LCC option appraisal' in (Man 02 Life cycle cost and service life planning).	As per requirement 10.
Requirement 14	Integrate the aligned LCA and LCC options appraisal activity within the wider	As per requirement 10.



	design decision-making process. Record this in an options appraisal summary document including the relevant cost information from the 'elemental LCC plan' and 'Component level LCC option appraisal'.	
Requirement 15	Requirements 1 to 7 (as applicable to the building type) are achieved.	The third party's report: - Verifying the building LCAs accurately represent the designs under consideration. - Itemising the findings of their verification checks. - Evidence that the requirements of a Suitably qualified third party are fulfilled.
Requirement 16	A suitably qualified third party (see Definitions) carries out the building LCAs or produces a report verifying the building LCAs accurately represent the designs under consideration during Concept Design and Technical Design with reference to the requirements of requirements 1 to 7 (and 8 to 14 if pursued).	As per requirement 15.
Requirement 17	For each LCA option, itemise the findings of the verification checks made by the suitably qualified third party in the report including, as a minimum, the quality requirements show in Table 9.4.	As per requirement 15.
Requirement 18	Include details of the suitably qualified third party's relevant skills and experience and a declaration of their third party independence from the project client and design team in the report.	As per requirement 15.
Mat 02 - Mat 02 Environmental impacts from construction products - Environmental Product Declarations (EPD):		
Requirement 1	Specify construction products with EPD that achieve a total EPD points score of at least 20, according to the methodology.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can



		be used to demonstrate compliance with these criteria. The Mat 01/02 Results Submission tool. Copies of EPD certificates.
Requirement 2	Enter the details of each EPD into the Mat 01/02 Results Submission Tool, including the material category classification. The Mat 01/02 Results Submission Tool will verify the EPD points score and credit award.	As per requirement 1.
Mat 03 - Responsible sourcing of construction products:		
Requirement 1	All timber and timber-based products used on the project are legally harvested and traded timber as per the UK government's Timber Procurement Policy (TPP) (189) (see Definitions). Compliance with requirement 1 is a minimum requirement for achieving any BREEAM rating. There are no prerequisite requirements for other materials.	See The BREEAM evidential requirements for a list of general evidence types that can be used to demonstrate compliance with the relevant criteria for this issue. Evidence of level of responsible sourcing achieved for each construction product. For example, certificates. Completed copy of the Mat 03 Calculator tool. Evidence to show how the Mat 03 calculator tool has been completed.
Requirement 2	A sustainable procurement plan must be used by the design team to guide specification towards sustainable construction products. The plan must: a. Be in place before Concept Design. b. Include sustainability aims, objectives and strategic targets to guide procurement activities. Note: targets do not need to be achieved for the credit to be awarded but justification must be provided for targets that are not achieved. c. Include a requirement for assessing the potential to procure construction products locally. There must be a policy to procure	As per requirement 1.



	construction products locally where possible. d. Include details of procedures in place to check and verify the effective implementation of the sustainable procurement plan. In addition, if the plan is applied to several sites or adopted at an organisational level it must: e. Identify the risks and opportunities of procurement against a broad range of social, environmental and economic issues following the process set out in BS ISO20400:2017⁽¹⁷⁰⁾.	
Requirement 3	Use the Mat 03 calculator tool and methodology to determine the number of credits achieved for the construction products specified or procured. Credits are awarded in proportion to the scope of the assessment and the number of points achieved, as set out in Table 9.10.	As per requirement 1.
Requirement 3	Use the Mat 03 calculator tool and methodology to determine the number of credits achieved for the construction products specified or procured. Credits are awarded in proportion to the scope of the assessment and the number of points achieved, as set out in Table 9.10.	As per requirement 1.
Mat 05 - Designing for durability and resilience:		
Requirement 1	Protecting vulnerable parts of the building from damage Protection measures are incorporated into the building's design and construction to reduce damage to the building's fabric or materials in case of accidental or malicious damage occurring. These measures must provide protection against: a. Negative impacts of high user numbers in relevant areas of the building (e.g. corridors, lifts, stairs, doors etc.). b. Damage from any vehicle or trolley movements within 1m of the internal building fabric in	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.



	storage, delivery, corridor and kitchen areas. c. External building fabric damage by a vehicle. Protection where parking or manoeuvring areas are within 1 metre of the building façade and where delivery areas or routes are within 2 metres of the façade, i.e. specifying bollards or protection rails. d. Potential malicious damage to building materials and finishes, in public and common areas where appropriate.	
Requirement 2	Protecting exposed parts of the building from material degradation Key exposed building elements have been designed and specified to limit long and short term degradation due to environmental factors. This can be demonstrated through one of the following: a. The element or product achieving an appropriate quality or durability standard or design guide. See Table 9.14. If none are available, use BS 7543:2015⁽¹⁷²⁾ as the default appropriate standard OR b. A detailed assessment of the element's resilience when exposed to the applicable material degradation and environmental factors.	As per requirement 1.
Requirement 3	Include convenient access to the roof and façade for cost effective cleaning, replacement and repair in the building's design.	As per requirement 1.
Requirement 4	Design the roof and façade to prevent water damage, ingress and detrimental ponding. See Table 9.14 for an example list of relevant industry durability and quality standards.	As per requirement 1.
Mat 06 - Material efficiency:		
Requirement 1	At the Preparation and Brief and Concept Design stages, set targets and report on opportunities and methods to optimise	One or more of the appropriate evidence types listed in The BREEAM



	the use of materials. These must be done for each of the following stages. See Table 9.15. a. Preparation and Brief b. Concept Design c. Developed Design d. Technical Design e. Construction	evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	Develop and record the implementation of material efficiency, see Table 9.15, during a. Developed Design b. Technical Design c. Construction	As per requirement 1.
Requirement 3	Report the targets and actual material efficiencies achieved.	As per requirement 1.
Waste		
Wst 01 - Construction waste management:		
Requirement 3	Prepare a compliant Resource Management Plan (RMP) covering: a. Non-hazardous waste materials (from on-site construction and dedicated off-site manufacture or fabrication, see Definitions), including demolition and excavation waste. b. Accurate data records on waste arisings and waste management routes.	As per requirement 1.
Requirement 4	Meet or improve upon the benchmarks in Table 10.1 for non-hazardous construction waste, excluding demolition and excavation waste.	As per requirement 1.
Requirement 5	Meet, where applicable, the diversion from landfill benchmarks in Table 10.2 for non-hazardous construction waste and demolition and excavation waste generated.	As per requirement 1.



Requirement 6	Sort waste materials into separate key waste groups as per Table 10.3, either on-site or through a licensed contractor for recovery.	As per requirement 1.
Requirement 7	Non-hazardous construction waste generated, excluding demolition and excavation waste, is less than or equal to the exemplary level resource efficiency benchmarks (see Table 10.1).	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria. A copy of the Resource Management Plan and, where relevant, pre-demolition audit.
Requirement 8	The percentage of non-hazardous construction, demolition and excavation waste (if relevant) diverted from landfill meets or exceeds the exemplary level percentage benchmarks in Table 10.2.	As per requirement 7.
Requirement 9	All key waste groups in Table 10.3 for diversion from landfill are covered in the RMP.	As per requirement 7.
Requirement 10	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 compliant company (see Definitions).	As per requirement 7.
Wst 02 - Use of recycled and sustainably sourced aggregates:		
Requirement 0	If demolition occurs on site, to encourage the reuse of site-won material on site, complete a pre-demolition audit of any existing buildings, structures or hard surfaces in accordance with Assessment scope - Requirement 1 and Assessment scope - Requirement 2.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 1	Identify all aggregates uses and type on the project Table 10.5 and Table 10.6.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can



		be used to demonstrate compliance with these criteria. A completed copy of the Wst 02 calculator. Documentary evidence supporting the data used to complete the Calculator tool.
Requirement 2	Determine the quantity in tonnes for each identified use and aggregate type.	As per requirement 1.
Requirement 3	Identify the region in which the aggregate source is located.	As per requirement 1.
Requirement 4	Identify the distance in kilometres travelled by all aggregates by transport type.	As per requirement 1.
Requirement 5	Enter the information into the BREEAM Wst 02 calculator to calculate the Project Sustainable Aggregate points. The corresponding number of BREEAM credits will be awarded as shown in Table 10.4.	As per requirement 1.
Requirement 6	The Project Sustainable Aggregate points score meets or exceeds the exemplary level performance benchmark in Table 10.4.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria. A completed copy of the Wst 02 calculator. Documentary evidence supporting the data used to complete the Calculator tool.
Wst 03 - Operational waste:		
Requirement 1	Provide a dedicated space for the segregation and storage of operational recyclable waste generated. The space is: a. Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.



	b. Accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractors c. Of a capacity appropriate to the building type, size, number of units (if relevant) and predicted volumes of waste that will arise from daily or weekly operational activities and occupancy rates.	
Requirement 2	For consistent and large amounts of operational waste generated, provide: a. Static waste compactors or balers; situated in a service area or dedicated waste management space b. Vessels for composting suitable organic waste OR adequate spaces for storing segregated food waste and compostable organic material for collection and delivery to an alternative composting facility c. A water outlet provided adjacent to or within the facility for cleaning and hygiene purposes where organic waste is to be stored or composted on site.	As per requirement 1.
Requirement 3	Additionally for healthcare buildings only The specified or installed operational waste facilities are compliant with the relevant NHS guidelines for that part of the UK.	As per requirement 1.
Requirement 4	Additionally for multi-residential buildings with self-contained dwellings or bedsits only Provide three internal storage containers for each dwelling or bedsit with: a. A minimum total capacity of 30 litres b. No individual container smaller than 7 litres c. All containers in a dedicated non-obstructive position d. Storage containers for recycling in addition to non-recyclable waste storage	As per requirement 1.



Requirement 5	Provide home composting facilities and a home composting information leaflet within the kitchen area or communal space for each self-contained dwelling or bedsit.	As per requirement 1.
Requirement 6	Additionally for multi-residential buildings with individual bedrooms and communal facilities only Meet requirements 4.a and 4.b for self-contained dwellings or bedsits for every six bedrooms.	As per requirement 1.
Requirement 7	Locate recyclable storage in a dedicated, unobstructive position in communal kitchens or other appropriate communal space.	As per requirement 1.
Requirement 8	Provide home composting facilities and a home composting information leaflet within the kitchen area or communal space.	As per requirement 1.
Requirement 9	Provide a minimum of 10 litres of internal storage for compostable waste.	As per requirement 1.
Wst 05 - Adaptation to climate change:		
Requirement 1	Conduct a climate change adaptation strategy appraisal using: a. A systematic risk assessment to identify the impact of expected extreme weather conditions arising from climate change on the building over its projected life cycle. The assessment covers the installation of building services and renewable systems, as well as structural and fabric resilience aspects and includes (see Methodology): i. Hazard identification ii. Hazard assessment iii. Risk estimation iv. Risk evaluation v. Risk management.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	Develop recommendations or solutions based on the climate change adaptation	As per requirement 1.



	strategy appraisal, during or prior to Concept Design, that aim to mitigate the identified impact.	
Requirement 3	Provide an update during Technical Design demonstrating how the recommendations or solutions proposed at Concept Design have been implemented where practical and cost effective. Omissions have been justified in writing by the assessor.	As per requirement 1.
Requirement 4	Achievement of the following criteria demonstrates a holistic approach to the design and construction of the building's life cycle to mitigate against the impacts of climate change. Meet criteria 1 to 3.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 5	Meet the requirements or achieve credits of the assessment issues given in Table 10.11.	As per requirement 4.
Wst 06 - Design for disassembly and adaptability:		
Requirement 1	Conduct a study to explore the ease of disassembly and the functional adaptation potential of different design scenarios (see Methodology) by Concept Design.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria. Disassembly and functional adaptability study, implementation plan report, building adaptability and disassembly guide.
Requirement 2	Develop recommendations or solutions (see Functional adaptation implementation) based on the study (criterion 1 above), during or prior to Concept Design, that aim to enable and facilitate disassembly and functional adaptation.	As per requirement 1.



Requirement 3	Achieve requirements 1 and 2.	As per requirement 1.
Requirement 4	Provide an update, during Technical Design, on: a. How the recommendations or solutions proposed by Concept Design have been implemented where practical and cost effective. Omissions have been justified in writing to the assessor. b. Changes to the recommendations and solutions during the development of the Technical Design.	As per requirement 1.
Requirement 5	Produce a building adaptability and disassembly guide to communicate the characteristics allowing functional adaptability and disassembly to prospective tenants.	As per requirement 1.
Land Use & Ecology		
LE 01 - Site selection:		
Requirement 1	At least 75% of the proposed development's footprint is on an area of land which has previously been occupied (see Definitions).	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	A contaminated land professional's site investigation, risk assessment and appraisal has deemed land within the site to be affected by contamination. The site investigation, risk assessment and appraisal have identified: a. The degree of contamination b. The contaminant sources or types c. The options for remediating sources of contamination which present an unacceptable risk.	As per requirement 1.
Requirement 3	The client or principal contractor confirms that remediation of the site will be carried out in accordance with the remediation	One or more of the appropriate evidence types listed in The BREEAM



	strategy and its implementation plan as recommended by the contaminated land professional (see Definitions).	evidential requirements can be used to demonstrate compliance with these criteria. A copy of the remediation strategy and implementation plan.
LE 02 - Identifying and understanding the risks and opportunities for the site:		
Requirement 1	An assessment route (see Definitions) for the project has been determined using BREEAM Guidance Note GN34 BREEAM Ecological Risk Evaluation Checklist.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site.	As per requirement 1.
Requirement 3	Route 1 Completion of the BREEAM Ecological Risk Evaluation Checklist indicates assessment Route 1 can be used as the assessment (See Methodology).	As per requirement 1.
Requirement 4	Route 2 An appropriate individual is appointed at a project stage that ensures early site determination and, where necessary, can influence strategic planning decisions.	As per requirement 1.
Requirement 5	Prior to the completion of the preparation and brief, an appropriate level of survey and evaluation (see Assessment route 1: For sites where ecological opportunities and risks are limited in nature on the facing page) has been carried out to determine the ecological baseline of the site taking account of the zone of influence, to establish. a. Current and potential ecological value and condition of the site, and related areas within the zone of influence.	As per requirement 1.



	b. Direct and indirect risks to current ecological value c. Capacity and feasibility for enhancement of the ecological value of the site and, where relevant, areas within the zone of influence.	
Requirement 6	Data are collated and shared with project team to inform the site preparation, design or construction works.	As per requirement 1.
Requirement 7	Survey and evaluation criteria (requirements 3-6) relevant to the chosen route have been achieved.	As per requirement 1.
Requirement 8	During Concept design, the project team liaise and collaborate with representative stakeholders to identify and consider site-wide outcomes (appropriate to the scale and type of development) for the project.	As per requirement 1.
Requirement 9	When determining the site-wide outcome, this must involve the identification, appraisal and selection of specific solutions and measures sufficiently early to influence key project planning decisions. This must be done in accordance with the following hierarchy of action: a. avoidance b. protection c. reduction or limitation of negative impacts d. on site compensation. e. enhancement, considering the capacity and feasibility within the site, or where viable, off-site.	As per requirement 1.
Requirement 10	Following this the optimal site-wide outcome is selected after liaising with representative stakeholders and the project team.	As per requirement 1.
Requirement 11	Achieve requirements 8 to 10.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can



		be used to demonstrate compliance with these criteria.
Requirement 12	When determining the optimal ecological outcome for the site consider, in addition to those outlined in requirements 8 to 10, 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.	As per requirement 11.
Requirement 13	Achieve the credits of the assessment issues outlined below: a. Assessment scope on page 115 - Both credits b. Assessment scope on page 311 - Achieve credits for 'Surface water run-off' and 'Minimising watercourse pollution' c. Assessment scope on page 326	As per requirement 11.
LE 03 - Managing negative impacts on ecology:		
Requirement 1	LE 02 has been achieved.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	The client or contractor has confirmed that compliance is monitored against all relevant UK, and EU or International legislation relating to the ecology of the site.	As per requirement 1.
Requirement 3	Roles and responsibilities have been clearly defined, allocated and implemented to support successful delivery of project outcomes at an early enough stage to influence the concept design or design brief.	As per requirement 1.
Requirement 4	Site preparation and construction works have been planned for and implemented	As per requirement 1.



	at an early project stage to optimise benefits and outputs.	
Requirement 5	The project team liaising and collaborating with representative stakeholders, taking into consideration data collated and shared, have implemented solutions, and measures have been selected (see Assessment scope), during site preparation and construction works.	As per requirement 1.
Requirement 6	Route 1 (one credit) Negative impacts from site preparation and construction works have been managed according to the hierarchy (see Methodology) and no net impact has resulted.	As per requirement 1.
Requirement 7	Route 2 (two credits) Negative impacts from site preparation and construction works have been managed according to the hierarchy (see Assessment route 2: For sites where complex ecological systems are likely to be present) and either: a. No overall loss of ecological value has occurred (2 credits) OR b. The loss of ecological value has been limited as far as possible (1 credit)	As per requirement 1.
LE 04 - Enhancement of Ecological value:		
Requirement 1	LE 03 has been achieved. Including the following, specific to the aims of this issue: a. Roles and responsibilities have been clearly defined, allocated and implemented to support successful delivery of project outcomes b. Site preparation and construction works have been planned for and implemented at an early enough project stage to optimise benefits and outputs.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.



Requirement 2	The client or contractor confirms compliance is monitored against all relevant UK, EU or international legislation relating to the ecology of the site.	As per requirement 1.
Requirement 3	Route 1 The project team liaising and collaborating with representative stakeholders have sought and implemented solutions and measures based on recommendations from recognised 'local' ecological expertise, specialist input and guidance to inform the adoption of locally relevant ecological solutions and measures which enhance the site.	As per requirement 1.
Requirement 4	Data collated is provided to the local environmental records centres nearest to or relevant for the site. OR	As per requirement 1.
Requirement 5	Route 2 - Liaison, implementation and data collation The project team liaising and collaborating with representative stakeholders have implemented the solutions and measures selected in a way that enhances ecological value in the following order: a. On site, and where this is not feasible, b. Off site within the zone of influence.	As per requirement 1.
Requirement 6	Route 2 Credits are awarded on a scale of 1 to 3, based on the calculation of the change in ecological value occurring as a result of the project. This must be calculated in accordance with the process set out in either GN 35 - BREEAM, CEEQUAL, HQM Ecology Assessment Issues - Route 1 or GN 36 - BREEAM, CEEQUAL, HQM Ecology Assessment Issues - Route 2 (whichever is applicable to the project).	As per requirement 1.
LE 05 - Long term management and maintenance:		



Requirement 1	The client or contractor has confirmed that compliance is being monitored against all relevant UK, EU and local best practice standards relating to the ecology of the site.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	Where pursued, LE 04 has been achieved. Including the following specific aims of this issue: a. Roles and responsibilities have been clearly defined, allocated and implemented to support successful delivery of project outcomes. b. Site preparation and construction works have been planned for and implemented at an early enough project stage to optimise benefits and outputs.	As per requirement 1.
Requirement 3	Planning, liaison, data, monitoring and review management and maintenance The project team liaise and collaborate with representative stakeholders, taking into consideration data collated and shared, on solutions and measures implemented to: a. monitor and review implementation and the effectiveness b. develop and review management and maintenance solutions, actions or measures.	As per requirement 1.
Requirement 4	In support of the above and to help ensure their continued relevance over the period of the project the following should be considered: a. Monitoring and reporting of on the ecological outcomes for site implemented at the design and construction stage b. Monitoring and reporting of outcomes and successes from the project c. Arrangements for the ongoing management of landscape and habitat connected to the project (on and, where relevant, off site)	As per requirement 1.



	d. Maintaining the ecological value of the site and its relationship or connection to its zone of influence e. Maintaining the site in line with the any sustainability linked activities, e.g. ecosystems benefits (LE 02). f. Remedial or other management actions are carried out which relate to those identified in LE 02, LE 03 and LE 04.	
Requirement 5	As part of the tenant or building owner information supplied, include a section on Ecology and Biodiversity to inform the owner or occupant of local ecological features, value and biodiversity on or near the site.	As per requirement 1.
Requirement 6	Landscape and ecology management plan (or similar) development Landscape and ecology management plan, or similar, is developed in accordance with BS 42020:2013⁽²¹⁰⁾ covering as a minimum the first five years after project completion and includes: a. Actions and responsibilities, prior to handover, to give to relevant individuals b. The ecological value and condition of the site over the development life. c. Identification of opportunities for ongoing alignment with activities external to the development project and which supports the aims of BREEAM's Strategic Ecology Framework d. Identification and guidance s to trigger appropriate remedial actions to address previously unforeseen impacts e. Clearly defined and allocated roles and responsibilities.	As per requirement 1.
Requirement 7	The landscape and management plan or similar is updated as appropriate to support maintenance of the ecological value of the site.	As per requirement 1.
Pollution		



Pol 01 - Impact of refrigerants:		
Requirement 1	Three credits - No refrigerant use No refrigerant use within the installed plant or systems. OR alternatively, where the building does use refrigerants, the three credits can be awarded as follows:	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	Prerequisite All systems with electric compressors comply with the requirements of BS EN 378:2008 ⁽²¹¹⁾ (parts 2 and 3). Refrigeration systems containing ammonia comply with the Institute of Refrigeration Ammonia Refrigeration Systems code of practice ⁽²¹²⁾ .	As per requirement 1.
Requirement 3	Impact of refrigerant Two credits The direct effect life cycle CO ₂ equivalent emissions (DEL _C) of $\leq 100 \text{ kgCO}_{2e}/\text{kW}$. For systems which provide cooling and heating, the worst performing output based on the lower of kW cooling output and kW heating output is used to complete the calculation. To calculate the DEL _C refer to the relevant definitions in the Methodology below and Additional information sections. OR	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria. Completed copy of the Pol 01 Calculator tool. Documentary evidence supporting the data used to complete the calculator tool.
Requirement 4	4 Refrigerants used have a Global Warming Potential (GWP) ≤ 10 . OR	As per requirement 1.
Requirement 5	One credit Systems using refrigerants have DEL _C of $\leq 1000 \text{ kgCO}_{2e}/\text{kW}$ cooling and heating capacity.	As per requirement 3.
Requirement 6	One credit - Leak detection All systems are hermetically sealed or only use environmentally benign refrigerants. See Leak detection and Hermetically sealed systems OR	As per requirement 1.
Requirement 7	Where the systems are not hermetically sealed. a. Systems have:	As per requirement 1.



	i. A permanent automated refrigerant leak detection system, that is robust and tested and capable of continuously monitoring for leaks. OR ii. An inbuilt automated diagnostic procedure for detecting leakage is enabled. b. In the event of a leak, the system must be capable of automatically responding and managing the remaining refrigerant charge to limit loss of refrigerant (see Automatic isolation and containment of refrigerant on).	
Pol 02 - Local air quality:		
Requirement 1	All heating and hot water is supplied by non-combustion systems. For example only powered by electricity. or alternatively;	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	Emissions from all installed combustion plant that provide space heating and domestic hot water do not exceed the levels set in Table 12.4 and Table 12.5. The measurements must be provided by manufacturers, following the labelling requirements of the European directive 2009/125/EC. No credits can be awarded for Pol 02 if any of the combustion appliances are not covered in Table 12.4 and Table 12.5.	As per requirement 1.
Requirement 3	Emissions from all installed combustion plant that provide space heating and domestic hot water do not exceed the levels set in Table 1.21 and Table 1.22.	As per requirement 1.
Pol 03 - Flood and surface water management:		



Requirement 1	Prerequisite An appropriate consultant is appointed to carry out and demonstrate the development's compliance with all criteria.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	Two credits - Low flood risk A site-specific flood risk assessment (FRA) confirms the development is in a flood zone that is defined as having a low annual probability of flooding. The FRA takes all current and future sources of flooding into consideration (see Sources of flooding).	As per requirement 1.
Requirement 3	One credit - Medium or high flood risk A site-specific FRA confirms the development is in a flood zone that is defined as having a medium or high annual probability of flooding and is not in a functional floodplain. . The FRA must take all current and future sources of flooding into consideration (see Sources of flooding). For smaller sites refer to Level of detail required in the FRA for smaller sites, which overrides requirement 2.	As per requirement 1.
Requirement 4	To increase the resilience and resistance of the development to flooding, one of the following must be achieved: a. The ground level of the building and access to both the building and the site, are designed (or zoned) so they are at least 600mm above the design flood level of the site's flood zone (see 600mm threshold). b. The final design of the building and the wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach outlined in section 5 of BS8533:2011⁽²¹⁸⁾.	As per requirement 1.
Requirement 5	Prerequisite for surface water run-off credits Surface water run-off design solutions must be bespoke, i.e. they must take account of the specific site	As per requirement 1.



	requirements and natural or man-made environment of and surrounding the site. The priority levels detailed in the Methodology must be followed, with justification given by the appropriate consultant where water is allowed to leave the site.	
Requirement 6	One credit - Surface Water Run-Off - Rate Drainage measures are specified so that the peak rate of run-off from the site to the watercourses (natural or municipal) shows a 30% improvement for the developed site compared to the pre-developed site. This should comply at the 1-year and 100-year return period events.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria. Calculation results for the pre- and postdevelopment peak rate of run-off.
Requirement 7	Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified Sustainable Drainage Systems (SuDS) are in place.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements on page 27 can be used to demonstrate compliance with these criteria. No 'specific' evidence applies at Design Stage.
Requirement 8	Calculations include an allowance for climate change. This should be made in accordance with current best practice planning guidance (see definitions).	As per requirement 1.
Requirement 9	One credit - Surface Water Run-Off - Volume Flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance); AND EITHER	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria. Information showing the proposed drainage solution, system failure flood flow routes, potential flood ponding levels and ground floor levels.



Requirement 10	Drainage design measures are specified so that the post-development run-off volume, over the development lifetime, is no greater than it would have been prior to the assessed site's development. This must be for the 100-year 6-hour event, including an allowance for climate change (see requirement 14).	One or more of the appropriate evidence types listed in The BREEAM evidential requirements on page 27 can be used to demonstrate compliance with these criteria. Calculation results for the pre- and post-development volume of run-off.
Requirement 11	Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other SuDS techniques. OR (only where requirements 10 and 11 cannot be achieved):	As per requirement 10.
Requirement 12	Justification from the appropriate consultant indicating why the above requirements cannot be achieved, i.e. where infiltration or other SuDS techniques are not technically viable options.	As per requirement 10.
Requirement 13	Drainage design measures are specified so that the post-development peak rate of run-off is reduced to the limiting discharge. The limiting discharge is defined as the highest flow rate from the following options: a. The pre-development one-year peak flow rate b. The mean annual flow rate (Qbar) c. 2L/s/ha. For the one-year peak flow rate, the one-year return period event criterion applies.	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria. Calculation results for the pre- and post-development volume of run-off Calculation results for the limiting discharge.
Requirement 14	Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place.	As per requirement 7.
Requirement 15	For either option, above calculations must include an allowance for climate change; this should be made in accordance with current best practice planning guidance.	As per requirement 1.



Requirement 16	There is no discharge from the developed site for rainfall up to 5mm (confirmed by the appropriate consultant).	As per requirement 1.
Requirement 17	Areas with a low risk source of watercourse pollution have an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques.	As per requirement 1.
Requirement 18	Areas with a high risk of contamination or spillage of substances such as petrol and oil, have separators (or an equivalent system) are installed in surface water drainage systems.	As per requirement 1.
Requirement 19	Chemical or liquid gas storage areas have a means of containment fitted to the site drainage system (i.e. shut-off valves). This is to prevent the escape of chemicals to natural watercourses in the event of a spillage or bunding failure.	As per requirement 1.
Requirement 20	All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as the SuDS manual (227) and other relevant industry best practice. They must be bespoke solutions taking account of the specific site requirements and natural or man-made environment of and surrounding the site.	As per requirement 1.
Requirement 21	A comprehensive and up to date drainage plan of the site will be made available for the building or site occupiers.	As per requirement 1.
Requirement 22	Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place.	As per requirement 7.
Requirement 23	All external storage and delivery areas are designed and detailed in accordance with	As per requirement 1.



	the current best practice planning guidance.	
Pol 04 - Reduction of night time light pollution:		
Requirement 1	External lighting pollution has been eliminated through effective design that removes the need for external lighting. This does not adversely affect the safety and security of the site and its users. OR alternatively, where the building does have external lighting, one credit can be awarded as follows:	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria.
Requirement 2	The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the Institute of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, 2011 ⁽¹⁷⁹⁾ .	As per requirement 1.
Requirement 3	All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00.	As per requirement 1.
Requirement 4	If safety or security lighting is provided and will be used between 23:00 and 07:00, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP guidance notes.	As per requirement 1.
Requirement 5	Illuminated advertisements are designed in compliance with ILP PLG05 The Brightness of Illuminated Advertisements ⁽²²⁶⁾ .	As per requirement 1.
Pol 05 - Reduction of noise pollution:		
Requirement 1	There are no noise-sensitive areas within the assessed building or within 800m radius of the assessed site. OR	One or more of the appropriate evidence types listed in The BREEAM evidential requirements can



		be used to demonstrate compliance with these criteria.
Requirement 2	Where there are noise-sensitive areas within the assessed building or noise-sensitive areas within 800m radius of the assessed site, a noise impact assessment compliant with BS4142:2014 is commissioned. Noise levels must be measured or determined for: a. Existing background noise levels i. at the nearest or most exposed noise-sensitive development to the proposed assessed site ii. including existing plant on a building, where the assessed development is an extension to the building b. Rating noise level from the assessed building.	As per requirement 1.
Requirement 3	The noise impact assessment must be carried out by a suitably qualified acoustic consultant.	As per requirement 1.
Requirement 4	The noise level from the assessed building, as measured in the locality of the nearest or most exposed noisesensitive development, is a difference to the background noise of at least -5dB throughout the day and night.	As per requirement 1.
Requirement 5	If the noise sources from the assessed building is greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with the requirement.	As per requirement 1.
Innovation		
AI - Approved Innovation:		
Requirement 2	One innovation credit can be awarded for each innovation application approved by	One or more of the appropriate evidence types



	BRE Global, where the building complies with the criteria defined within an approved innovation application form.	listed in The BREEAM evidential requirements can be used to demonstrate compliance with these criteria. A copy of the Approved Innovation Application Form AND A copy of the Innovation Application Report stating the application outcome as 'approved' AND Relevant documentary evidence demonstrating specification of the approved innovation.
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