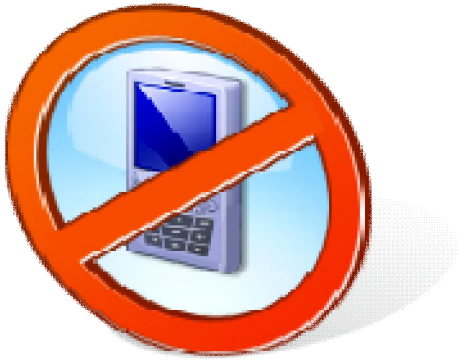
BREEAM Awareness Day
Higher Education

10th May 2011

Welcome & Introductions

- Sarah McCarrick

Housekeeping



Planet

Introductions

Whole table

- Name
- Occupation
- Sustainable quality of your workplace

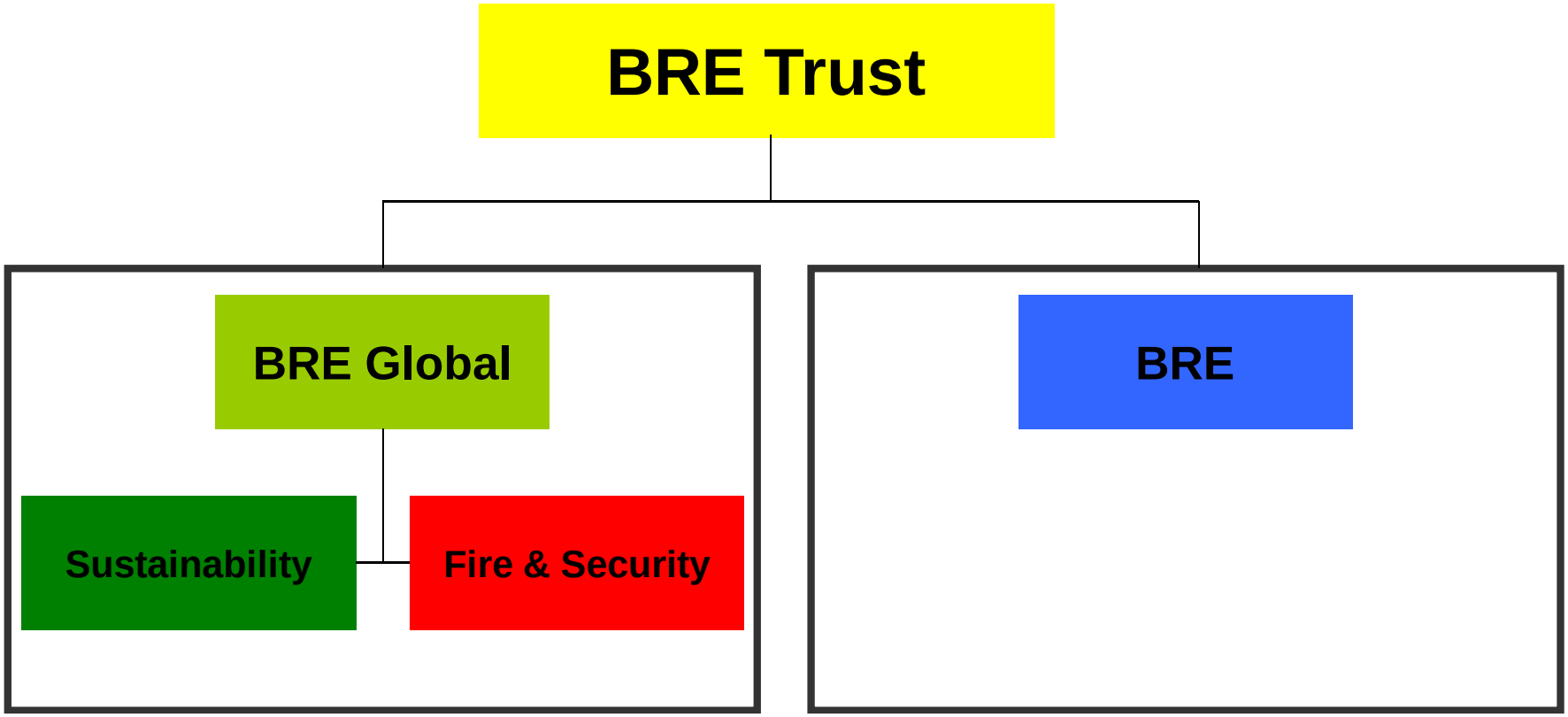
Day Overview

Morning

- **BREEAM overview**
- **Assessment Process**
- **Investigating criteria development**

Afternoon

- **The Technical Manual**
- **BREEAM In-Use**
- **Tips and resources**
- **Exemplar buildings**
- **Looking ahead**


BRE Trust
BRE Global
Sustainability
Fire & Security
BRE
Certification
Consultancy

Understanding BREEAM

- What is BREEAM?
- Aims and objectives
- Scope – building types

What is BREEAM?

- Environmental Assessment Method
- Certification scheme
- Voluntary
- Independent & credible
- Holistic
- Customer focused
- Issue based

BREEAM

- The world's longest established and most widely used environmental assessment method for buildings
  - Created in 1988 and launched in 1990

- Over 200,000 buildings certified, over 1 million buildings registered

- Network of over 2200 independent licensed assessors across the world

History

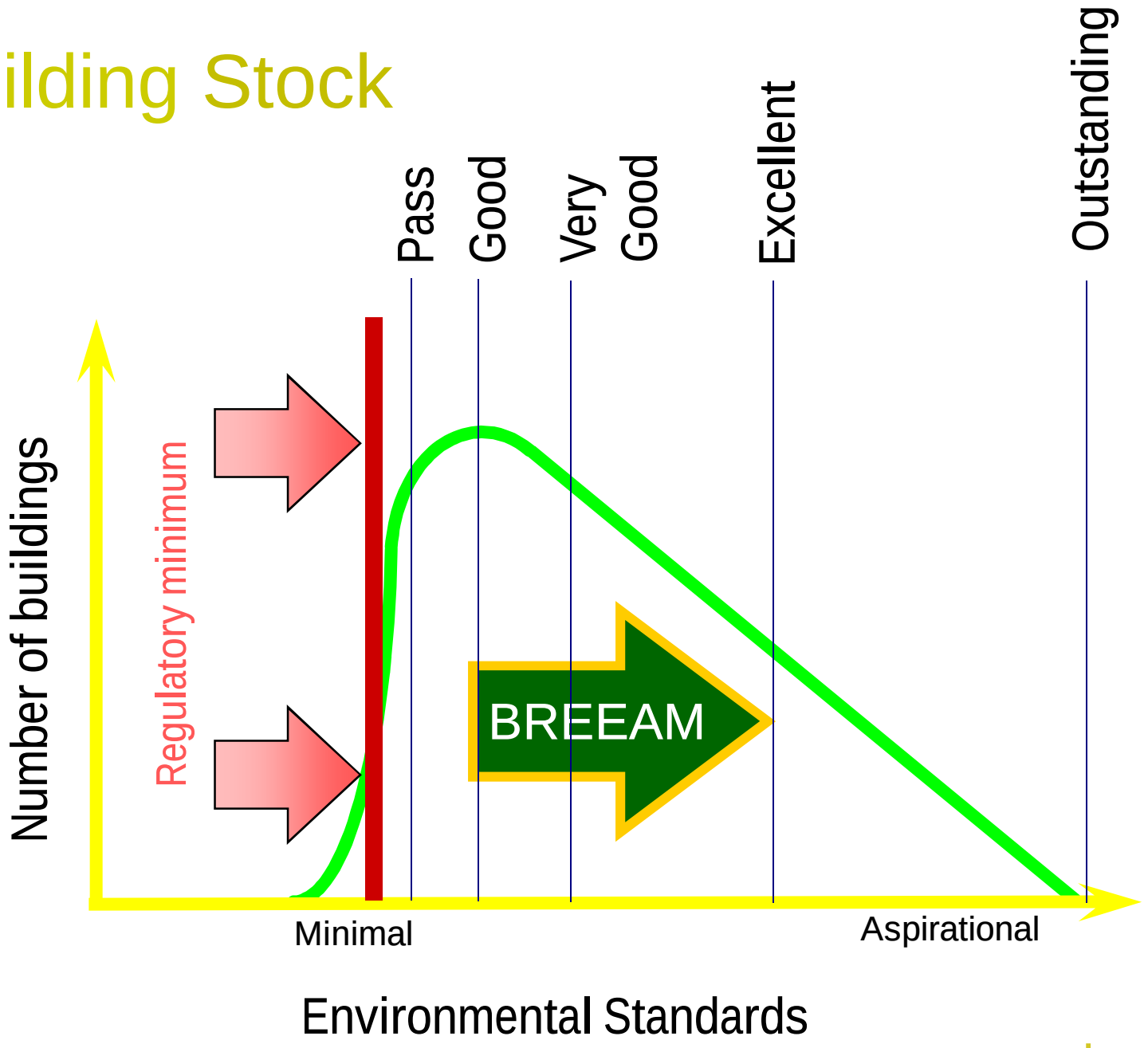
- 1990 - version for offices
- 1991 - version for retail superstores/supermarkets
- 1993 – version for Industrial units
- 1993 - version for existing offices
- 1998 - BREEAM 98 major re-vamp of offices
  - Current layout, weightings etc.
- 2002 - BREEAM Offices update (moved to annual update)
- 2003 - 2006 annual updates (new schemes introduced)
- 2008 – Major update to all schemes
  - Mandatory Post Construction Review
  - Minimum Standards
  - Innovation Credits
- 2008 – International versions

BREEAM Schemes

Aims & Objectives

- BREEAM family of schemes aim to
  - Consider a broad range of environmental concerns
  - Balance concerns against the need for a high quality, safe and healthy internal environment
  - Set criteria and standards surpassing those required by regulations
  - Mitigate the impacts of buildings on the environment
  - Challenge the market to provide innovative solutions
  - Provide a credible, environmental label for buildings
    - *Recognise buildings according to environmental benefits*
    - *Enable organisations to demonstrate progress towards corporate environmental objectives*
  - Stimulate demand for sustainable buildings

Building Stock



Drivers

- Building Regulations
  - Towards zero carbon from 2019 for all buildings
- UN framework Convention on Climate Change & Kyoto Protocol
  - Legally binding commitments for the reduction of greenhouse gases
- EU Renewable Energy Directive 15
  - 15% of energy consumption should be from renewable sources by 2020
- Climate Change Act 2008
  - places a legal obligation on Government to reduce carbon dioxide emissions by at least 80% by 2050 and 26% by 2020, against a 1990 baseline, with the trajectory defined by a system of five-year carbon budgets.
- Planning system
  - National ambitions will be tested through the planning system, both at regional and local level.

Resource Depletion

Non-renewable energy sources, do, as their name suggests, run out. Apart from their impact on global warming, they are finite.

Natural Gas (in cubic meters)	
Total world reserves Jan. 1st 2009:	174,436,171,550,404
World usage per second:	92,653
Estimated date of exhaustion:	07:19 Sep 12, 2068

Oil (in barrels)	
Total world reserves Jan. 1st 2009:	1,206,780,968,626
World usage per second:	986
Estimated date of exhaustion:	16:36 Oct 22, 2047

Uranium (in metric tonnes U-235)	
Total world reserves Jan. 1st 2009:	18,096
World usage per second:	0.0000042222017
Estimated date of exhaustion:	19:56 Nov 28, 2144

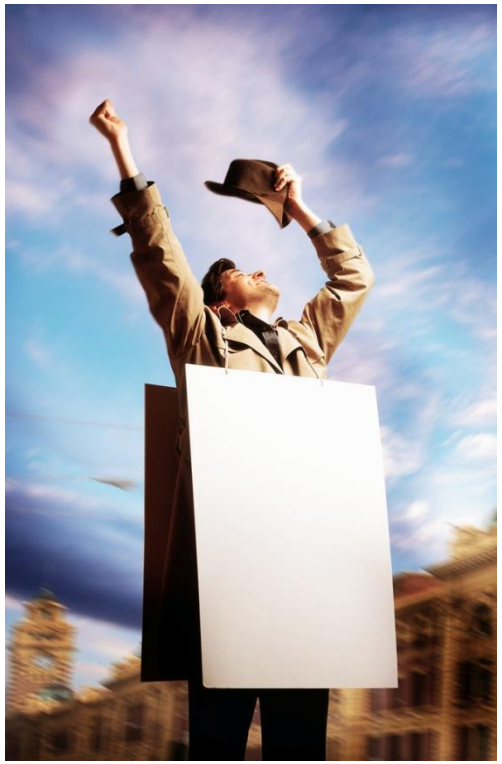
Coal (in metric tonnes)	
Total world reserves Jan. 1st 2009:	841,086,192,000
World usage per second:	203
Estimated date of exhaustion:	15:35 May 19, 2140

Construction industry and buildings

- Large impacts
  - Construction and demolition waste alone represents **32% of total UK waste** (DEFRA)
  - the energy used in constructing, occupying and operating buildings represents approximately **50% of greenhouse gas emissions in the UK**. (Environment Agency 2007)
  - Passenger transport vehicles account for a further **15% of CO2 emissions**. (EST)

Marketability

- Increasing evidence of higher rentable value
- Lower running costs
- Keeping ahead of the game
- Demonstrating credentials
  - BREEAM ratings
  - BREEAM Awards



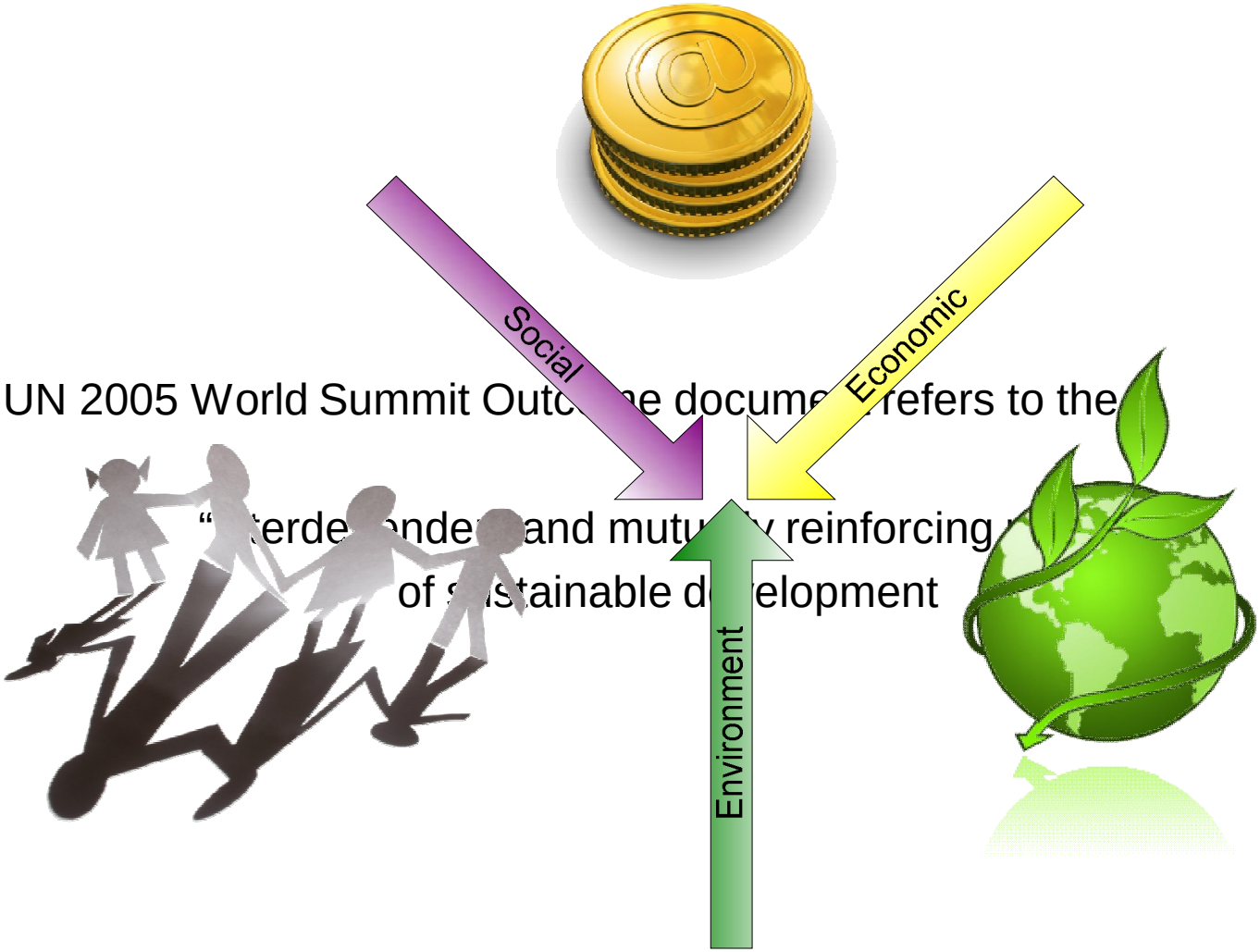
What is sustainable development?

The Bruntland commission definition of sustainable development;

'development that meets the needs of the present
without compromising the ability of future generations
to meet their own needs'

"Treat the Earth well. It was not given to you by your parents. It was loaned to you by your children"
- Kenyan Proverb

What is sustainable development?



The UN 2005 World Summit Outc[illegible]e docume[illegible] refers to the

"[illegible]terde[illegible]nde[illegible] and mutu[illegible]y reinforcing [illegible]

of [illegible]stainable d[illegible]elopment

Scope of BREEAM

Communities

Buildings

In-Use

Scope of BREEAM

- Offices
- Industrial
- Retail
- Education
  - Pre-Schools. Schools, F.E and H.E
- Healthcare
- Multi-Residential
- International
  - Europe Commercial
  - Bespoke
- BREEAM Other Buildings
  - Bespoke
  - Prisons
  - Courts
  - Data centres

What BREEAM schemes cannot assess (UK)

Any development that is a domestic dwelling including:

- Individual home units (with full facilities)
- Multi residential developments with limited communal space

Higher Education – brief history

- Until July 2009 University buildings had been assessed via BREEAM Bespoke
- In March 2008 BRE Global signed an agreement with:
  - *Association of Universities Directors of Estates (AUDE)*
  - *UK Higher Education Funding Councils*

    and
  - *HEEPI (Higher Education Environmental Performance Improvement, University of Bradford) provided day-to-day project co-ordination as part of the broader Green Build project (for more info: www.heepi.org.uk)*

To develop a BREEAM version relevant to the Higher Education sector

Higher Education – brief history

- 18 month development process with extensive consultation rounds, involving the HE sector as well as commercial organisations
- 12 Universities took part in pilot
- The Technical guidance was amended by BRE Global with input from sector experts to reflect the needs of the sector

Scope of BREEAM Education

- HE is an addition to the current scope
  - Schools
  - Further Education colleges

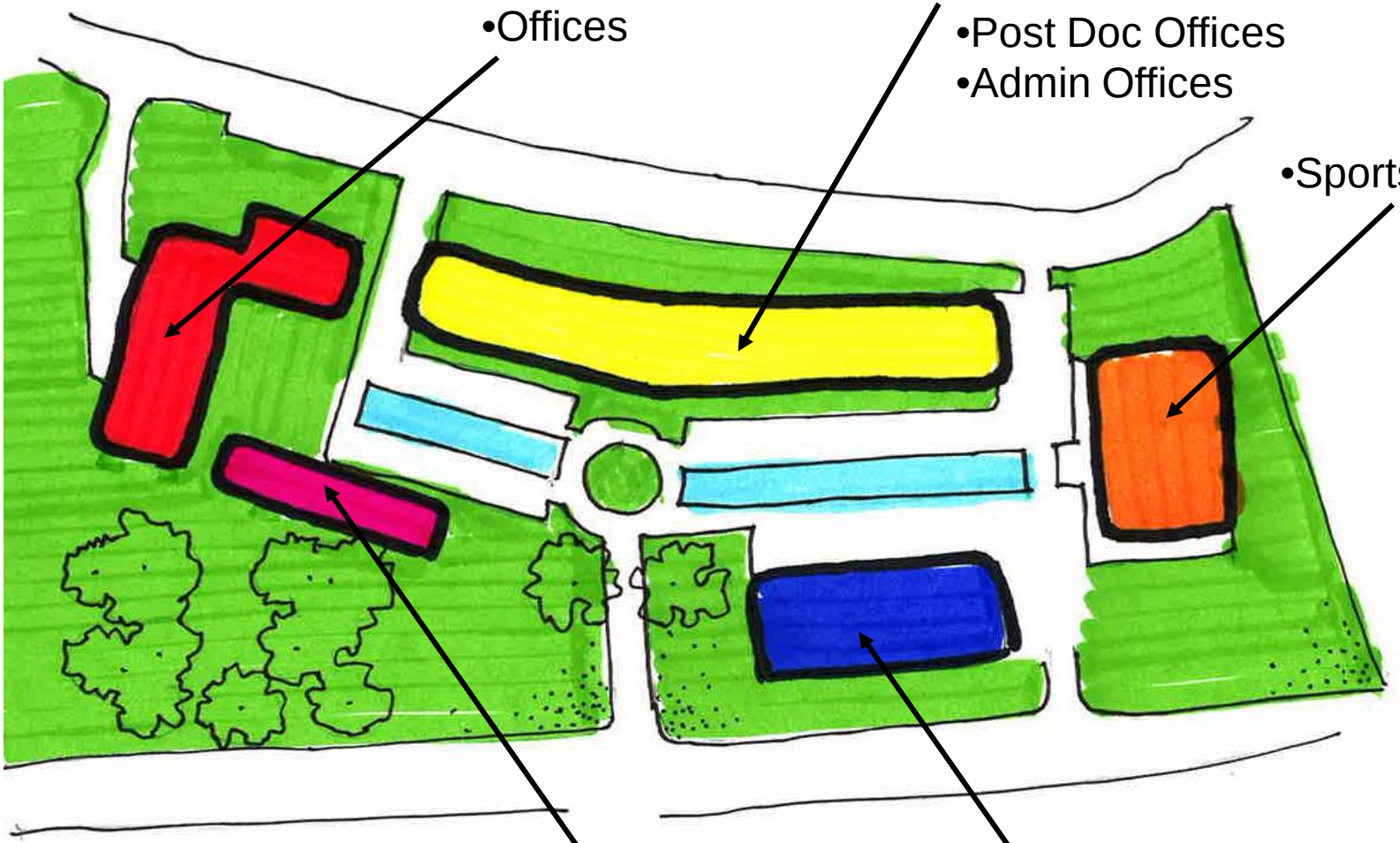
- BREEAM Education can be used to assess higher education establishments that provide degree level or above qualifications and research, such as a university

- The scope includes:
  - Teaching facilities
  - Learning resource centres
  - Laboratories
  - Student Unions
  - Mix of the above

Scope - exceptions

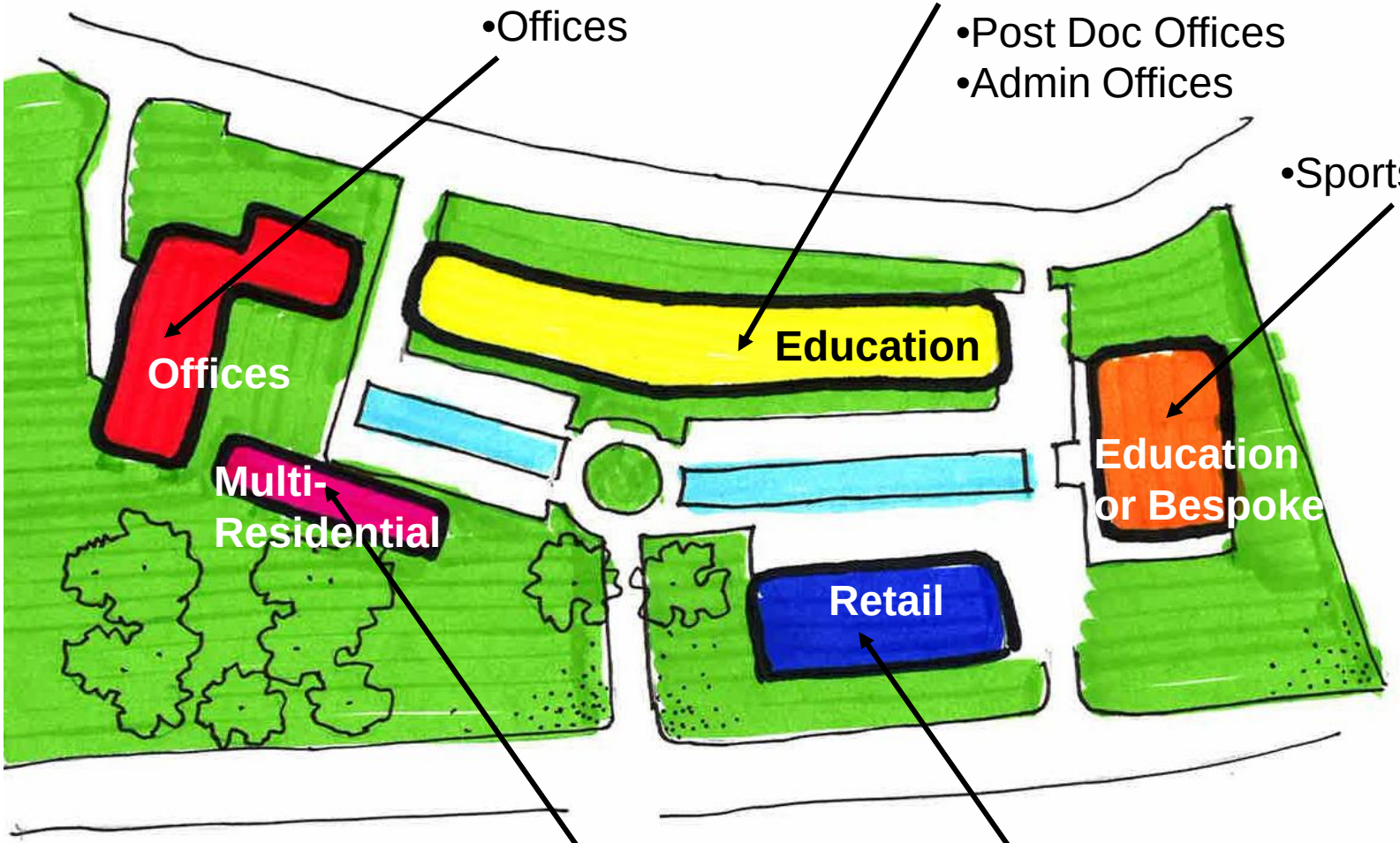
- Standalone associated areas, are assessed using other standard BREEAM schemes, e.g.
  - Data centres - BREEAM Data Centres
  - Staff and student accommodation (halls of residence) - BREEAM Multi-residential.
  - Sport facilities - BREEAM Bespoke
  - Office only buildings – BREEAM Offices
  - Retail only buildings – BREEAM Retail
  - Etc.
- Please note, if a building containing teaching, research and related support areas has also one of the above as an integral part of it, BREEAM Higher Education can be used
- Always confirm with BRE Global when in doubt

Which BREEAM scheme for the buildings on this campus?



- Lecture rooms
- Laboratories
- Break out rooms
- Post Doc Offices
- Admin Offices
- Offices
- Sports Hall
- Student Residences
- Restaurant
- Shop

Which BREEAM scheme for the buildings on this campus?



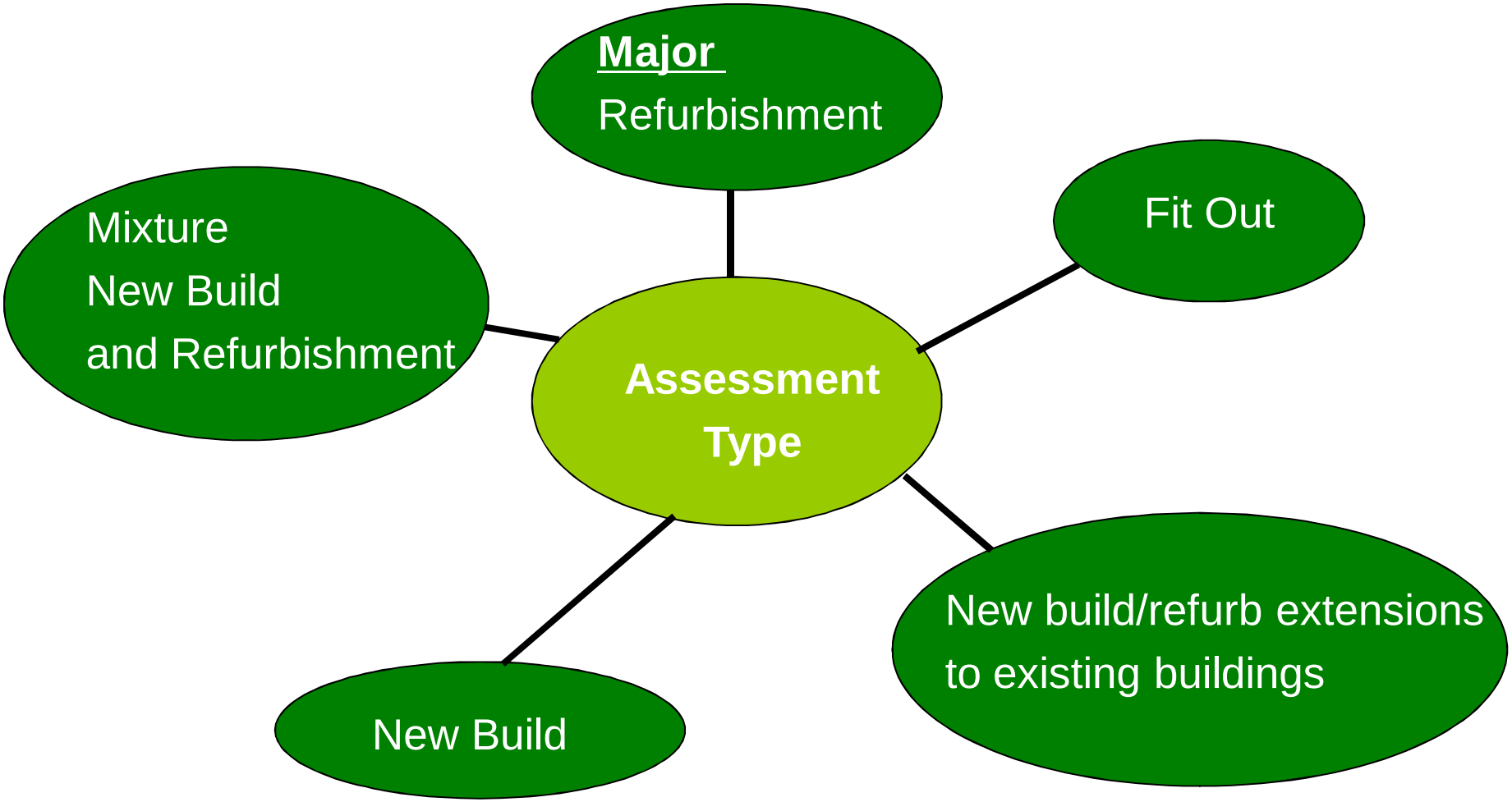
When is a BREEAM assessment required?

- BREEAM rating requirements set by many organisations including:
  - English Partnerships for all new developments involving their land
  - Office of Government Commerce for all new buildings
  - Welsh Assembly Government planning policy requirements
  - Local Authorities incorporating environmental standards as part of supplementary planning guidance

Key features of BREEAM

- Nine categories of environmental sustainability
- Applied at the building level
- 2 stage process – Design and Post Construction
  - Final certificate at post construction stage
- Mandatory standards – Man, Hea, Ene, Wat, Wst, LUE
- Top up with tradable credits
- Innovation credits
- Score is subject to environmental weightings

Types of projects that can be assessed



Introduction to BREEAM Categories

- Organise category cards in order of

1. Your view of environmental impact/importance
2. Importance as defined by the category weighting

breeam Categories

- Management

- Energy

- Water

- Land Use & Ecology

roperty and the Planet

- Health & Wellbeing

- Transport

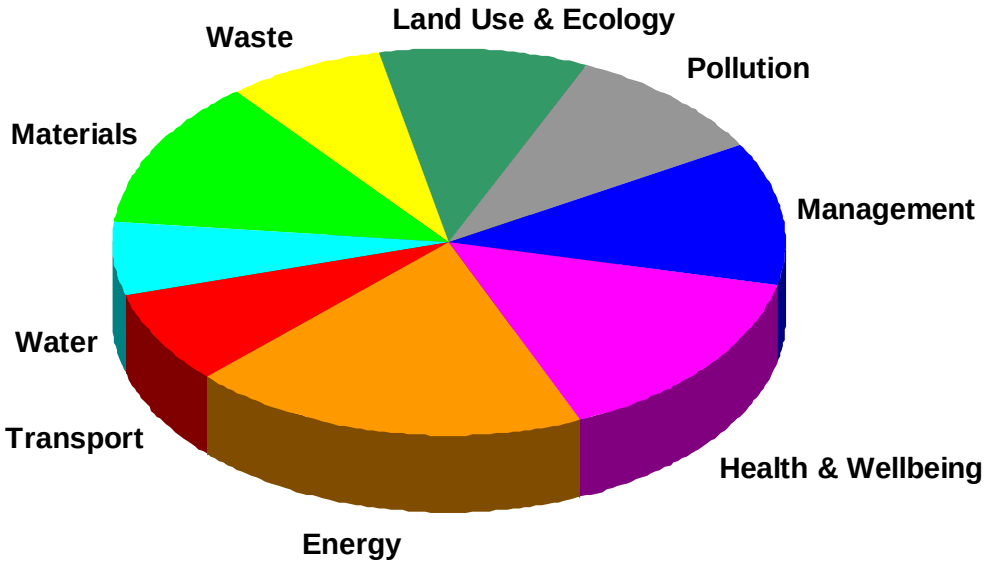
- Materials

- Waste

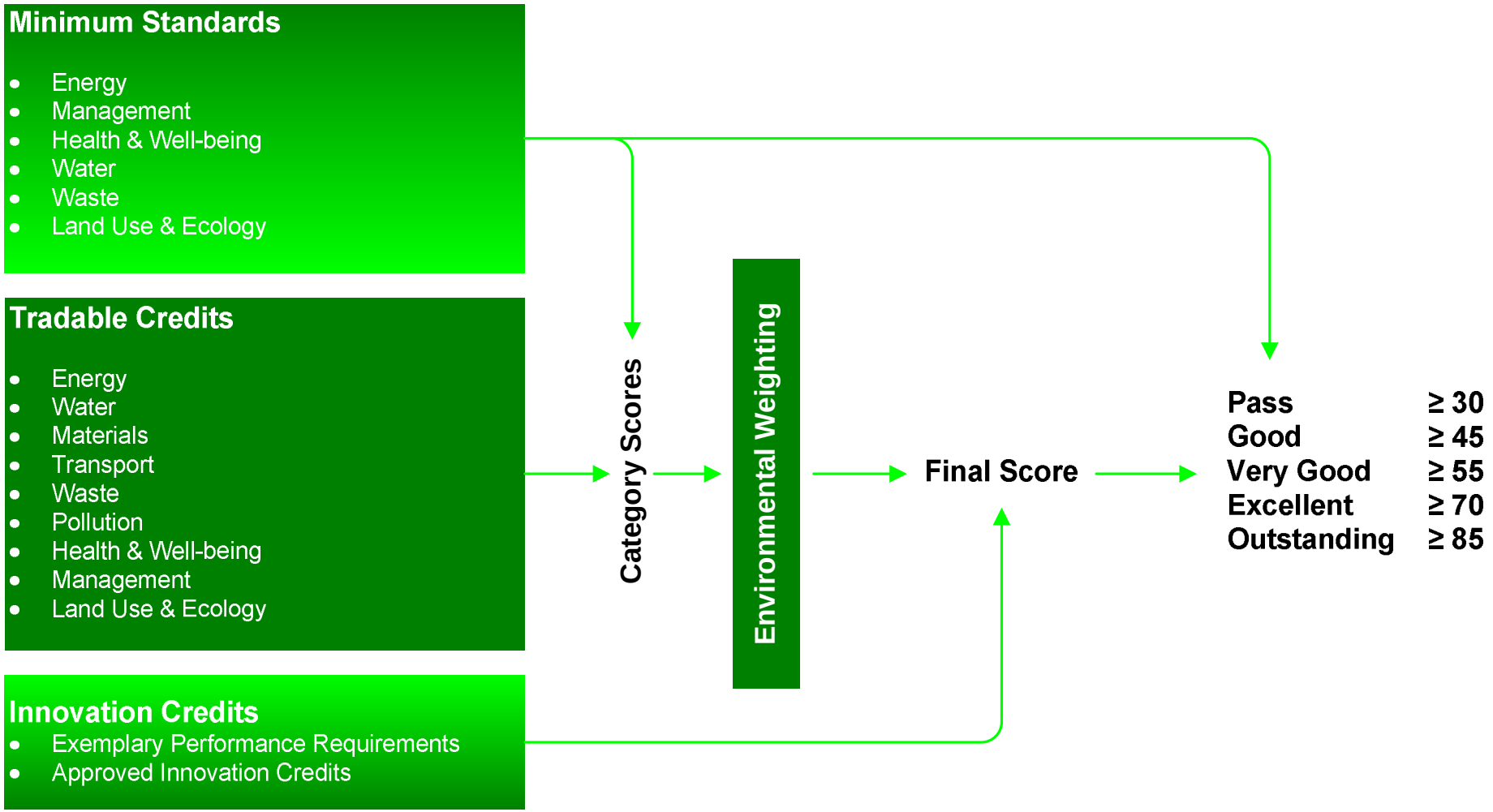
- Pollution

BREEAM Weightings

Category	Weighting
Management	**12%**
Health & Wellbeing	**15%**
Energy	**19%**
Transport	**8%**
Water	**6%**
Materials	**12.5%**
Waste	**7.5%**
Land Use & Ecology	**10%**
Pollution	**10%**



Scoring


Minimum Standards
Energy
Management
Health & Well-being
Water
Waste
Land Use & Ecology
Tradable Credits
Energy
Water
Materials
Transport
Waste
Pollution
Health & Well-being
Management
Land Use & Ecology
Innovation Credits
Exemplary Performance Requirements
Approved Innovation Credits
Category Scores
Environmental Weighting
Final Score
Pass ≥ 30
Good ≥ 45
Very Good ≥ 55
Excellent ≥ 70
Outstanding ≥ 85

Sample final scoring sheet

Stage of Assessment	BREEAM Score	BREEAM Rating
Interim - Design Stage	76.78%	EXCELLENT

Minimum BREEAM Standards					
Rating Level	Pass	Good	Very Good	Excellent	Outstanding
Minimum Standards Achieved	YES	YES	YES	YES	YES

Building Performance by Section					
	Environmental weighting	Credits available	Credits achieved	% Achieved	Weighted Score
Management	12%	10.00	9.00	90.00%	10.80%
Health & Wellbeing	15%	13.00	9.00	69.23%	10.38%
Energy	19%	21.00	14.00	66.67%	12.67%
Transport	8%	10.00	8.00	80.00%	6.40%
Water	6%	6.00	5.00	83.33%	5.00%
Materials	13%	13.00	11.00	84.62%	10.58%
Waste	8%	7.00	4.00	57.14%	4.29%
Land Use & Ecology	10%	10.00	6.00	60.00%	6.00%
Pollution	10%	12.00	8.00	66.67%	6.67%
				Total	72.78%
				Exemplary Level credits achieved	3.00%
				Approved and/or pre-approved Innovation credits	1.00%
				Total Innovation credits achieved	4.00%
				Total BREEAM Score	76.78%

Minimum Standards (M)

- Ensuring compliance with key BREEAM issues
- Comparability across schemes and buildings types
- Higher BREEAM rating sought means higher minimum requirements

- Issues with minimum requirements include:
  - Man 1 - Commissioning
  - Man 4 - Building user guide
  - Hea 4 - High frequency lighting
  - Ene 1 - Reduction of CO_2 emissions
  - Wat 1 – Water Consumption

BREEAM Rating / Minimum number of credits				
PASS	GOOD	VERY GOOD	EXCELLENT	OUTSTANDING
1	1	1	1	2
			1	2
			1	1
				1
				1

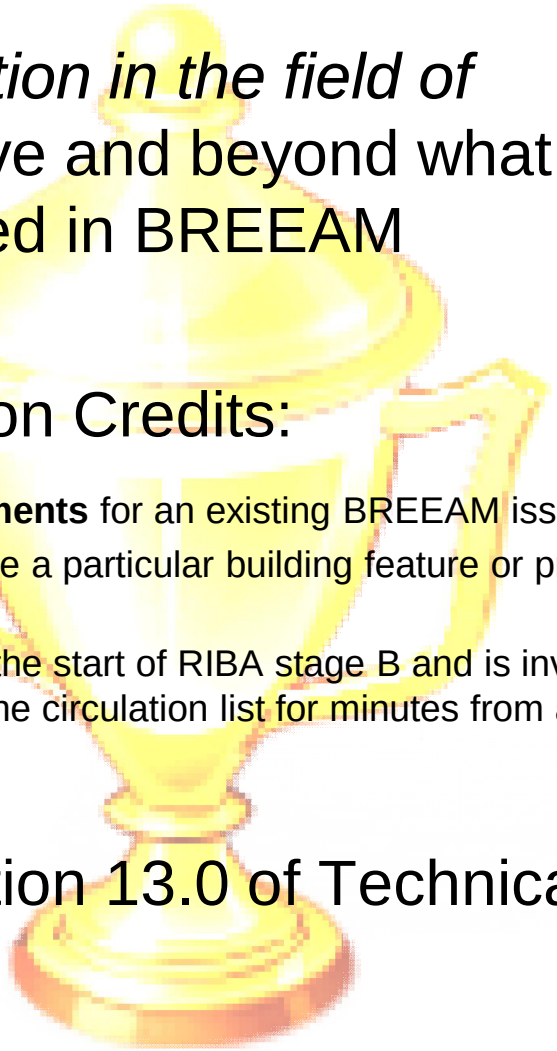
Innovation Credits (I)

- Additional recognition for '*innovation in the field of* ***sustainable performance'***, above and beyond what is currently recognised and rewarded in BREEAM

- Three ways of obtaining Innovation Credits:

  1. By meeting **exemplary level performance requirements** for an existing BREEAM issue
  2. Where an **application** is made to BRE Global to have a particular building feature or process recognised as **'innovative'**
  3. A BREEAM Accredited Professional is appointed at the start of RIBA stage B and is invited to attend all design team meetings and is included on the circulation list for minutes from all meetings.

- Full details in the Innovation Section 13.0 of Technical Guide



Exemplary level requirements (I)

2. A *local LZC energy technology* has been installed in line with the recommendations of the above feasibility study and this method of supply results in a 15% reduction in the buildings CO_2 emissions.

3. Figures used for calculations of the percentage carbon production provided by LZC technology are based on the output from *approved energy modelling software*.

Exemplary level requirements

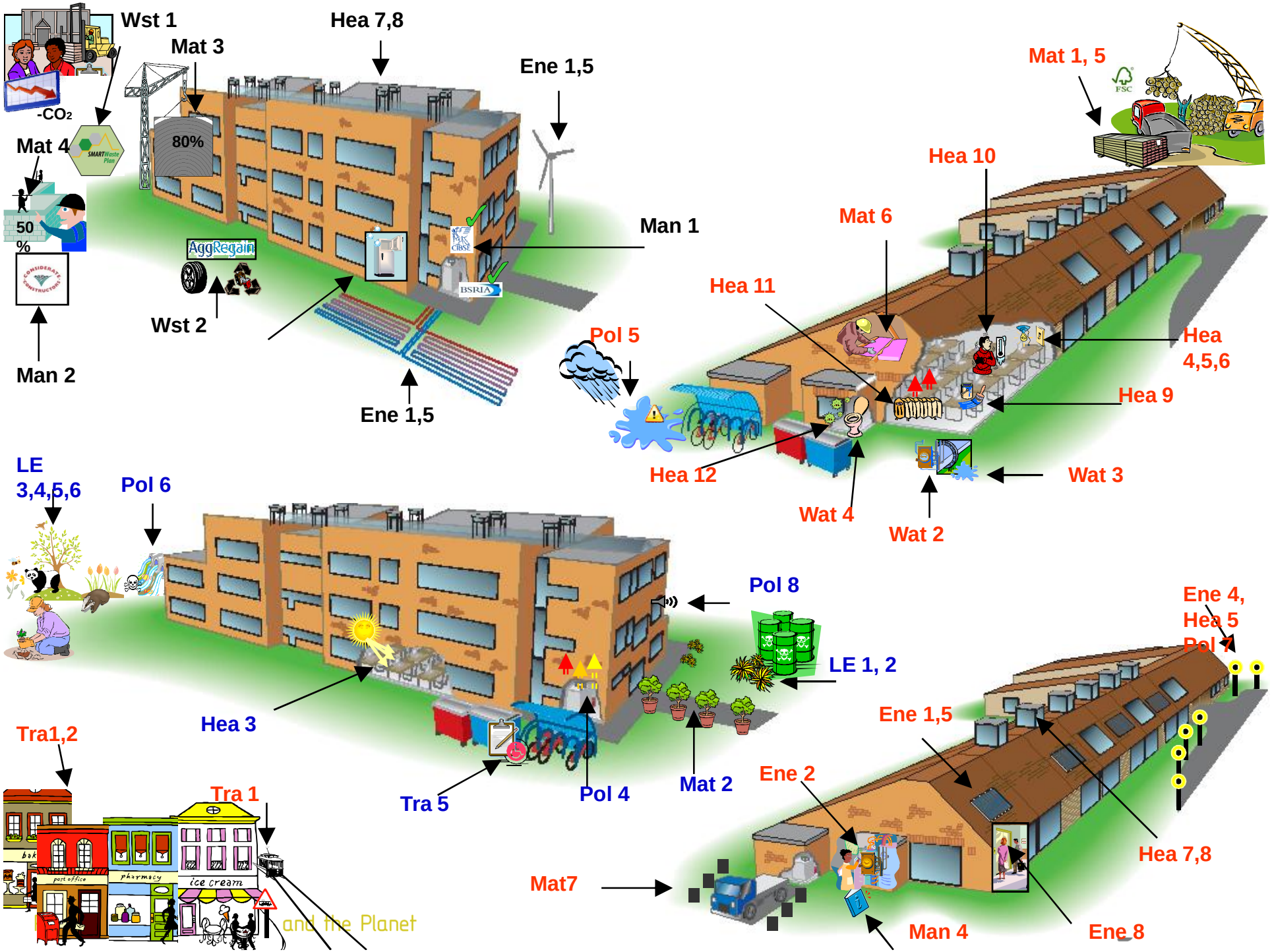
The following outlines the exemplary level requirements to achieve an *innovation credit* for this BREEAM issue.

1. The first credit for a feasibility study must be achieved.

2. A *local LZC energy technology* has been installed in line with the recommendations of the above feasibility study and this method of supply results in a 20% reduction in the buildings CO_2 emissions.

3. Figures used for calculations of the percentage carbon production provided by LZC technology are based on the output from *approved energy modelling software*.

Buildings complying with the exemplary level requirements would therefore achieve four credits for this issue.

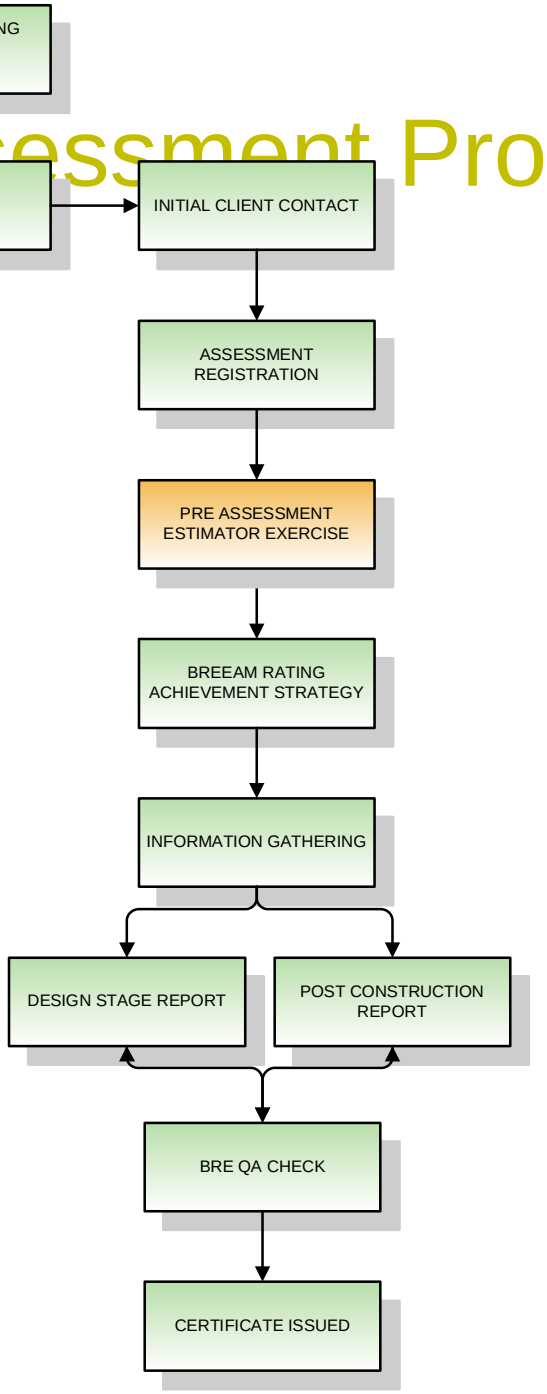

Wst 1
Mat 3
Hea 7,8
Ene 1,5
-CO₂
Mat 4
80%
50 %
Man 1
Wst 2
Man 2
Ene 1,5
Mat 1, 5
Hea 10
Mat 6
Hea 11
Pol 5
Hea 4,5,6
Hea 9
Hea 12
Wat 4
Wat 2
Wat 3
LE 3,4,5,6
Pol 6
Pol 8
LE 1, 2
Hea 3
Tra1,2
Tra 1
Tra 5
Pol 4
Mat 2
Ene 4, Hea 5 Pol
Ene 1,5
Ene 2
Hea 7,8
Mat7
Man 4
Ene 8
and the Planet

BREEAM Assessment Stages

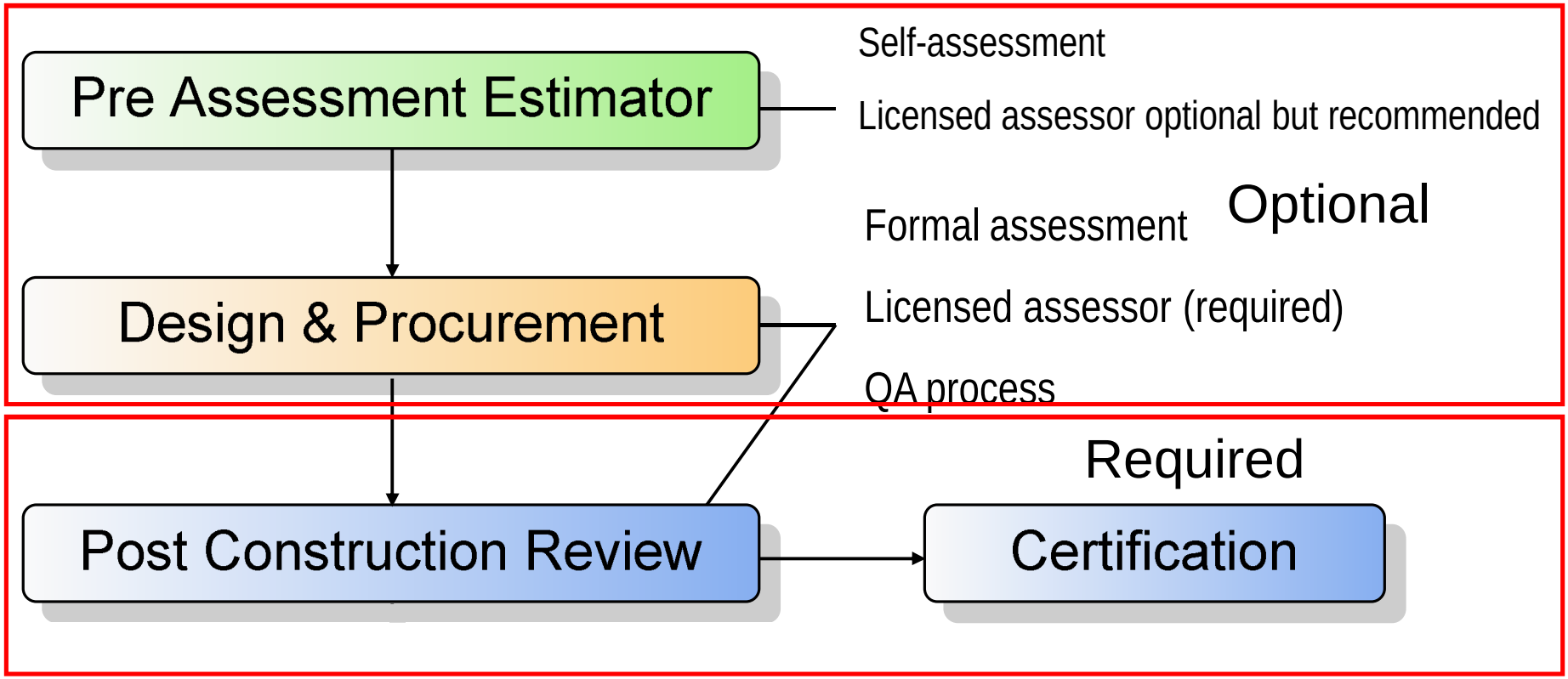
- Design Stage
  - To assess the design of new build, extension or major refurbishment
  - Results in **Interim** certificate

- Post Construction Stage
  - Ensures the completed building was constructed as specified in the D&P assessment
  - Results in **Final** certificate

BREEAM Assessment Process



BREEAM Assessment Process



Post Construction only is allowed but not recommended

Questions

Exercise – How issue criteria are developed

Example Issue - Reducing CO_2 emissions from transport

We want to devise criteria that if followed will reduce CO_2 emissions from transport. So we ask the following question:

Q1. What features in or near a building would reduce the CO_2 emissions from transport to and from that building?

Reducing transport CO_2

All the following could help reduce CO_2 emissions:

- Proximity to public transport
- Proximity to amenities
- Cyclist facilities
- Bus service for building occupants
- Lift shares
- Video conferencing
- Car pool – low emission vehicles

Proximity to Amenities

- Let us now hone in on just one of these issues – Proximity to amenities
- The challenge now is to develop some criteria that meet the intent of the issue

Two questions:

- Amenities – which ones?
  - If are asking for buildings to be close to amenities we need to specify which amenities
  - Which ones would you choose?
- Proximity – How far?
  - How close do they need to be?
  - Where do we draw the line?
  - How do we measure this (eg in walking time or actual distance)?

Tra 2 - Proximity to Key Amenities **1 Credit**

- Building is located within 500m of accessible local amenities appropriate to the building type and its users
  - Grocery shop and/or food outlet
  - Post box
  - Cash machine
- The distance must be measured via safe pedestrian routes e.g.
  - pavements and safe crossing points or, where provided, dedicated pedestrian crossing points
- The distance *should not be* measured in a straight line, ‘as the crow flies’

Information required ?

- Critically in BREEAM it is not enough to simply comply with the criteria – evidence has to be provided

- The assessor must provide tangible proof that the criteria are being met

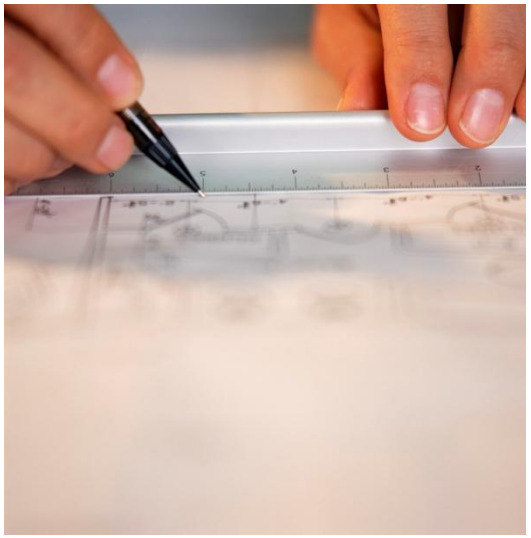
What evidence would you think would be needed at:

- Design Stage?
- Post Construction Stage?

Information required

Design stage

- Marked up site plan highlighting
  - Location of assessed building
  - Location and type of amenities
  - Route to amenities
  - Plan/map scale



Where amenities do not currently exist

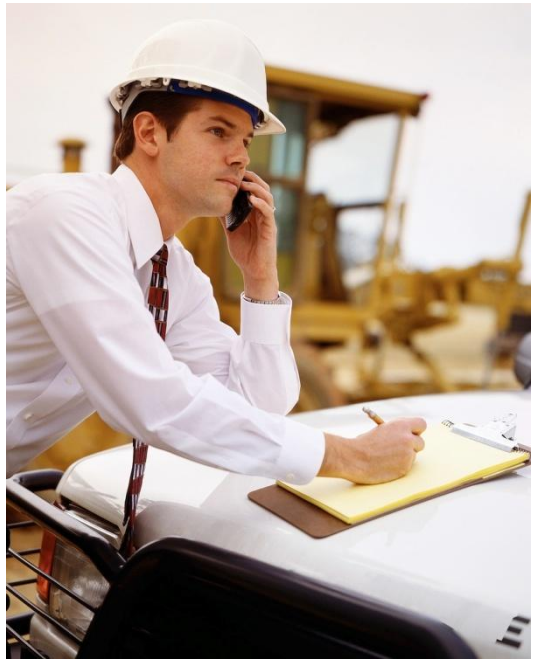
- Letter confirming
  - Location and type of amenities
  - Timescale of development

Information required

Post Construction Stage

- Assessors building/site inspection and photographic evidence confirming:
  - Existence of local amenities
  - Route and distance to the amenities

- If amenities not yet in existence
  - Evidence as per design stage



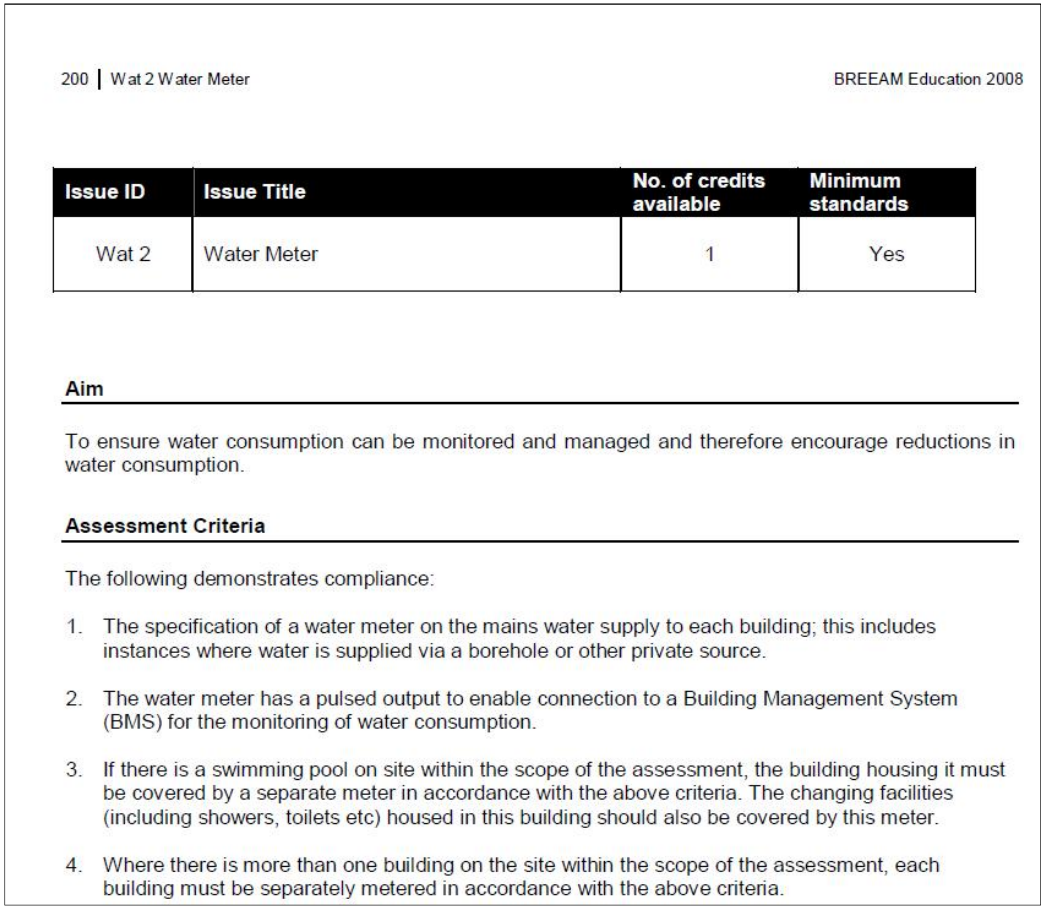
Technical Guide

Introduction to the BREEAM Technical Manual

- Section 1 : Introduction
  - Schedule of changes
  - Terms & Conditions of use
  - What is BREEAM
  - Development & Governance
  - Technical & Commercial credibility
  - The BREEAM Scheme Assessor Manuals
  - Understanding the BREEAM Manuals – Worked example
- Section 2: Scope of BREEAM Scheme
- Section 3: Scoring & Weighting
- Section 4-12: Categories
- Section 13: Innovation
- Section 14: Technical checklists

Headings found in every Issue

- Issue ID
- No. of credits available
- Minimum Standards
- Issue Aim
- Assessment Criteria
  - **Continues…**



200 | Wat 2 Water Meter BREEAM Education 2008

Issue ID	Issue Title	No. of credits available	Minimum standards
Wat 2	Water Meter	1	Yes

Aim

To ensure water consumption can be monitored and managed and therefore encourage reductions in water consumption.

Assessment Criteria

The following demonstrates compliance:

1. The specification of a water meter on the mains water supply to each building; this includes instances where water is supplied via a borehole or other private source.
2. The water meter has a pulsed output to enable connection to a Building Management System (BMS) for the monitoring of water consumption.
3. If there is a swimming pool on site within the scope of the assessment, the building housing it must be covered by a separate meter in accordance with the above criteria. The changing facilities (including showers, toilets etc) housed in this building should also be covered by this meter.
4. Where there is more than one building on the site within the scope of the assessment, each building must be separately metered in accordance with the above criteria.

Headings found in every Issue

- Compliance Notes
- Schedule of Evidence
  - Design and Post Construction
- Additional Information
  - Relevant Definitions
- References
  - See Appendix

Compliance Notes	
New Build	There are no additional or different criteria to those outlined above specific to new build projects.
Refurbishment	There are no additional or different criteria to those outlined above specific to refurbishment projects.
Extensions to existing buildings	There are no additional or different criteria to those outlined above specific to the assessment of extensions to existing buildings.
Fit Out Only	There are no additional or different criteria to those outlined above specific to fit out-only assessments.
No landscaped areas	This issue does not apply where there are no landscaped areas within the construction zone of the assessed building. In such instances the BREEAM assessor's spreadsheet tool will filter the issue from the list of applicable issues.

Schedule of Evidence Required

Req.	Design Stage	Post Construction Stage
1&2	Design team confirmation via assessment meeting minutes, letter or email confirming the irrigation strategy for the site **AND** Proposed site plan, marked up to illustrate the scope of the irrigation specified **AND** One of the following: A copy of the specification clause confirming: • Type of irrigation system and controls. **OR** Manufacturer's information detailing: • The technical details of the specified system.	Assessor's building/site inspection and photographic evidence confirming: • The implementation of the proposed strategy. • If relevant, the installation of the specified system.

Additional Information

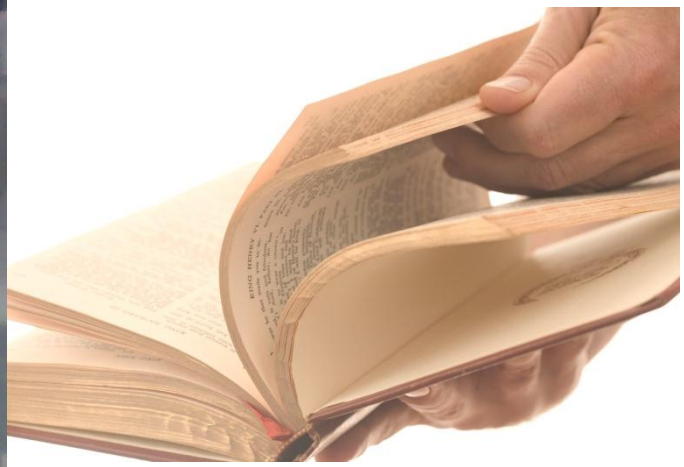
Relevant definitions

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

Management

- Man 1 Commissioning
- Man 2 Considerate constructors
- Man 3 Construction site impacts
- Man 4 Building User Guide
- Man 5 Site Investigation
- Man 6 Consultation
- Man 7 Shared Facilities
- Man 8 Security
- Man 9 Publication of building information
- Man 10 Development as a learning resource
- Man 11 Ease of Maintenance
- Man 12 Life Cycle Costing

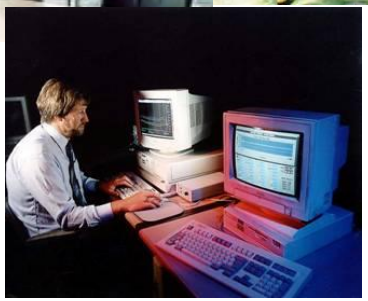
MAN 4 :
Building user guide
Second credit related to HE laboratory areas only



- Laboratory User Guide
- Specific Contents:
  - *Training*
  - *Safety & Emergency procedures*
  - *Energy & Environmental strategy*
  - *Materials & Waste*
  - *Checklist of safety and best practice daily procedures*

Health & Wellbeing issues

- Hea 1 Daylighting
- Hea 2 View out
- Hea 3 Glare Control
- Hea 4 High Frequency lighting
- Hea 5 Internal & external lighting levels
- Hea 6 Lighting zones and controls
- Hea 7 Potential for natural ventilation
- Hea 8 Indoor air quality
- Hea 9 Volatile organic compounds
- Hea 10 Thermal comfort
- Hea 11 Thermal zoning
- Hea 12 Microbial contamination
- Hea 13 Acoustic performance
- Hea 16 Drinking water
- Hea 17 Specification of laboratory fume cupboards



HEA 1 : Daylighting

Please note: HE's requirements are different from Schools' and FE's; 2nd credit only available for HE

- Two credits available:
  - **One** credit for **60%** floor area of *occupied* floor space that has average 2% DF
  - **Two** credits for **80%** floor area of *occupied* floor space that has average 2% DF
- Stepped approach to daylight factor reflects the size and complexity of HE buildings.
- **Exempt:**
  - Areas where activities are carried out that require strictly controlled environmental conditions, such as the exclusion of natural light at all times

HEA 17 : Specification of laboratory fume cupboards

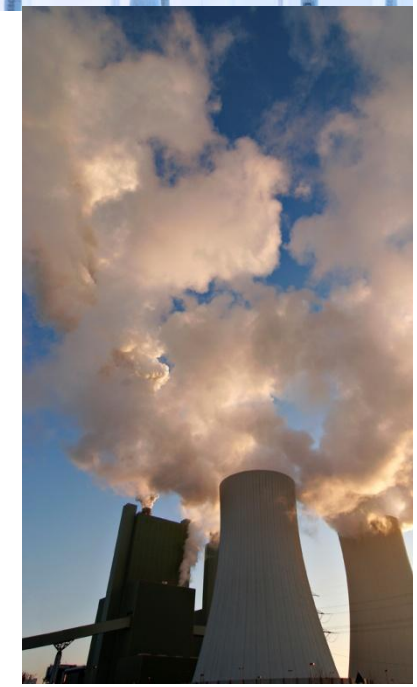
(filtered out where no fume cupboards / MSC are specified)

To ensure fume cupboards and safety cabinets in laboratories are designed in accordance with best practice guidance in terms of Health and Safety of users, people and property:

- Design, manufacturing and installation in accordance with British Standards:
  - Fume cupboards: BS EN 14175
  - Microbiological cabinets: BS EN 12469

Energy

- Ene 1 Reduction of CO_2 emissions
- Ene 2 Sub-metering of substantial energy sources
- Ene 3 Sub-metering of high energy loads and tenancy areas
- Ene 4 External lighting
- Ene 5 Low or zero carbon technologies
- Ene 6 Building fabric performance and avoidance of air infiltration *(HE only)*
- Ene 7 Cold storage *(HE only)*
- Ene 8 Lifts
- Ene 10 Free Cooling
- Ene 11 Energy efficient fume cupboards *(Schools and FE only)*
- Ene 12 Swimming pool ventilation and heat loss
- Ene 19 Energy efficient laboratories *(HE only)*
- Ene 20 Energy efficient IT solutions *(HE only)*



Ene 11 : Energy Efficient Fume Cupboards

- Does NOT apply to Higher Education buildings

Ene 19: Energy Efficient Laboratories *(Higher Education Only)*

- Minimising the CO_2 emissions associated with laboratories

- At present, energy tools to calculate annual CO_2 emissions (e.g. SBEM) do not take adequately into account the fine differences between different types of HE laboratories.

- Additional credits have been introduced to encourage energy efficiency in HE laboratories.

<u>How to get the credits</u>

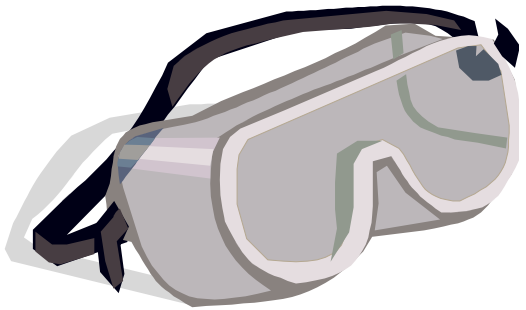
- Where the **laboratory plant and systems** are designed, specified and installed in compliance with…
  - 12 different criteria (a to l) in table 11

Additional Items			
Item	**Category**	**Item Description**	**Credits**
b.	**Fan power**	Specification and achievement of best practice fan power figures *(as per Table 12 Best Practice Specific Fan Power)* for all air handling units, laboratory extract systems, local extract ventilation, containment area extracts (where applicable) and fume cupboard extracts (where applicable).	1
c.	**Fume cupboard volume flow rates (further reduction)**	An average design air flow rate of <0.12 m^3/s per linear metre of sash opening.	½
d.	**Grouping and/or isolation of high filtration/ventilation activities**	Minimisation of room air change rates and overall facility ventilation flows by grouping together or isolating activities and equipment with high filtration or ventilation requirements.	½
e.	**Energy recovery – heat**	Heat recovery from exhaust air (where there is no risk of cross-contamination) or via refrigerant or water cooling systems.	½
f.	**Energy recovery – Cooling**	Cooling recovery via exhaust air heat exchangers (where there is no risk of cross-contamination) or via refrigerant or water cooling systems.	½
g.	**Grouping of cooling loads**	Grouping of cooling loads to enable supply efficiencies and thermal transfer.	½
h.	**Free cooling**	Specification of free cooling coils in chillers or dry air coolers related to laboratory-specific activities.	½
i.	**Load responsiveness**	Effective matching of supply with demand through modularity, variable speed drives and pumps, and other mechanisms.	½
j.	**Clean rooms**	Specification of particle monitoring systems, linked to airflow controls.	½
k.	**Diversity**	Achievement of high levels of diversity in central plant sizing and laboratory duct sizing, where compatible with safety.	½
l.	**Room air changes rates**	Reducing air change rates by matching ventilation airflows to environmental needs and demands of containment devices.	½

Caveats

Each item chosen must

- Have a ‘reasonably significant’ effect on the total energy consumption of the laboratory ie reduce it by 2% or more
- NOT compromise the health and safety of building occupants



Rules to determine how many credits available

- How big the laboratory is
  - At least 25% or 10% of total building floor area

- Is there a fume cupboard?
  - 1 further credit available if present

Laboratory floor area / Total building floor area	Credits available *(without fume cupboards / MSC)*	Credits available *(with fume cupboards / MSC)*
≥ 10%	**2**	**3**
≥ 25%	**4**	**5**

If you have a fume cupboard

(First) 1 credit must be obtained by:

(Laboratories with fume cupboards and/or other containment devices)

1. Hea 17 *Specification of Laboratory Fume Cupboards*
2. Comply with best practice energy measure Table 11, item a:
   - ***Fume cupboard reduced volume flow rates***

     An average design air flow rate in the fume cupboards specified between 0.12-0.16 m^3/s per linear metre of sash opening
3. The measurement of volume flow rates in the exhaust duct (at the boundary of the laboratory) take account of reductions in (inward) fume cupboard leakage
4. A reduction in air flow does not compromise the health and safety of the building occupants.

Laboratory floor area

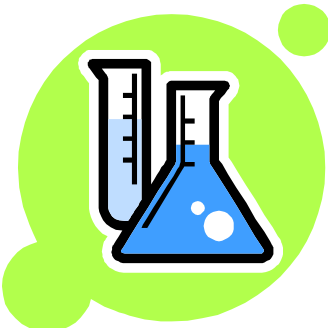
- Excludes any **laboratory support areas** such as:
  - Write up/offices
  - Meeting rooms
  - Storage
  - Ancillary and other support areas with lower servicing requirements.

- Excludes **teaching and other laboratories / workshops** with limited amount of fume cupboards or other containment devices and/or no energy intensive process equipment specified
  - Unless it is demonstrated that energy consumption **≥** 50% of that of a typical office due to the laboratory process related activities.

Ene 19 - Energy Efficient Laboratories

Example

- A university commissions a new mixed use building.
- The building has a total area of 2100m^2, with 700m^2 of laboratory related areas.

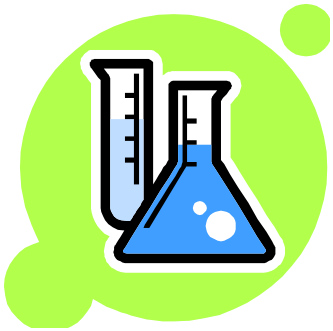


- These include:
  - 150m^2 open plan write-up space
  - 250m^2 chemistry labs with 20 x fume cupboards
  - 60m^2 support lab areas
  - 6 academic offices (15m^2 each)
  - Corridor, toilets and break-out

Ene 19 - Energy Efficient Laboratories

“Laboratory areas”

- 150m^2 open plan write up
- **250m^2 chemistry labs with 20 x fume cupboards**
- 60m^2 support lab areas
- 6 academic offices (15m^2 each)
- Dirty corridor, toilets and break-out



Ene 19 - Energy Efficient Laboratories

- 250m^2 of laboratory area / 2100m^2 total building area = 11.9%
- **How many credits can you pursue?**
- First credit (fume cupboard related)
- Up to 2 credits from ‘pick and choose’ list in Table 11, items b. to l.
- **Total 3 credits**

Exercise

- Complete the exercise for Ene 19 in your workbook
- Work in groups
- Copy of the Ene 19 criteria included in the workbook for reference

Transport

- Tra 1 Provision of public transport
- Tra 2 Proximity to amenities
- Tra 3 Cyclist facilities
- Tra 4 Pedestrian and cyclist safety
- Tra 5 Travel plan
- Tra 6 Maximum car parking capacity *(HE only)*
- Tra 7 Travel information point *(HE only)*
- Tra 8 Deliveries and manoeuvring

Tra 2 : Proximity to amenities

Higher Education buildings

Where at **least five** of the following amenities:

- Are within 500m of the assessed building
  OR
- The amenities are located on campus

  - Grocery shop and/or food outlet
  - Post box
  - Cash machine
  - *Leisure / sport centre*
  - *Library*
  - *Student union*
  - *Medical facility / GP surgery*

Water

- Wat 1 Water Consumption
- Wat 2 Water Meter
- Wat 3 Major leak detection
- Wat 4 Sanitary supply shut-off
- Wat 5 Water recycling
- Wat 6 Irrigation systems

Materials

- Mat 1 Materials specification
- Mat 2 Hard landscaping & boundary protection
- Mat 3 Re-use of building facade
- Mat 4 Re-use of building structure
- Mat 5 Responsible sourcing of materials
- Mat 6 Insulation
- Mat 7 Designing for robustness

Waste

- Wst 1 Construction Site Waste Management
- Wst 2 Recycled Aggregates
- Wst 3 Recyclable Waste Storage
- Wst 4 Compactor and baler
- Wst 5 Composting

Wst 4 : Compactor/Baler

Wst 5 : Composting

- The Waste section of the guidance remains unchanged, except:

- For assessed building located on a new or existing campus, compliant centralised compactor / baler or composting facilities **common to other buildings** on campus can be used towards the achievement of this credit.

Land Use and Ecology

- LE1 Re-use of land
- LE2 Contaminated land
- LE3 Ecological value & protection of features
- LE4 Impact on site ecology
- LE 5 Enhancing Site Ecology
- LE6 Long term impact on biodiversity
- LE7 Consultation with students and staff
- LE8 Local wildlife partnerships

Pollution

- Pol 1 Refrigerant GWP
- Pol 2 Preventing refrigerant leaks
- Pol 4 NOx Emissions from heating source
- Pol 5 Flood risk
- Pol 6 Minimising watercourse pollution
- Pol 7 Reduction of night time light pollution
- Pol 8 Noise attenuation

Main changes in BREEAM HE

- **Campus-wide approach**
  - Common use facilities, e.g.:
    - *waste recycling,*
    - *shared facilities and*
    - *cycling facilities*

      can be counted towards the achievement of credits for any building assessed on site (compliance requirements apply)
  - Public transport is recognised to be a more important issue where students are not living on campus or nearby
- **Confidentiality agreements**
  - Filtering of issues where not applicable

Main changes in BREEAM HE

- **Laboratories and other high energy use facilities**
  - Up to 7 credits are now available for laboratories - compensation for poor EPC ratings.
  - The 5 Energy credits are based on specification of HVAC / fume cupboard air flow reducing strategies; free cooling; heat / cooling recovery; design integration; correct-sizing and modularity measures.
  - The Health and Wellbeing credit is based on BS EN 14175 *Fume cupboards - Safety and performance requirements*.
  - The Management credit is based on the production of a simple Laboratory User Guide.

Questions

BREEAM In-Use

Basic Attributes

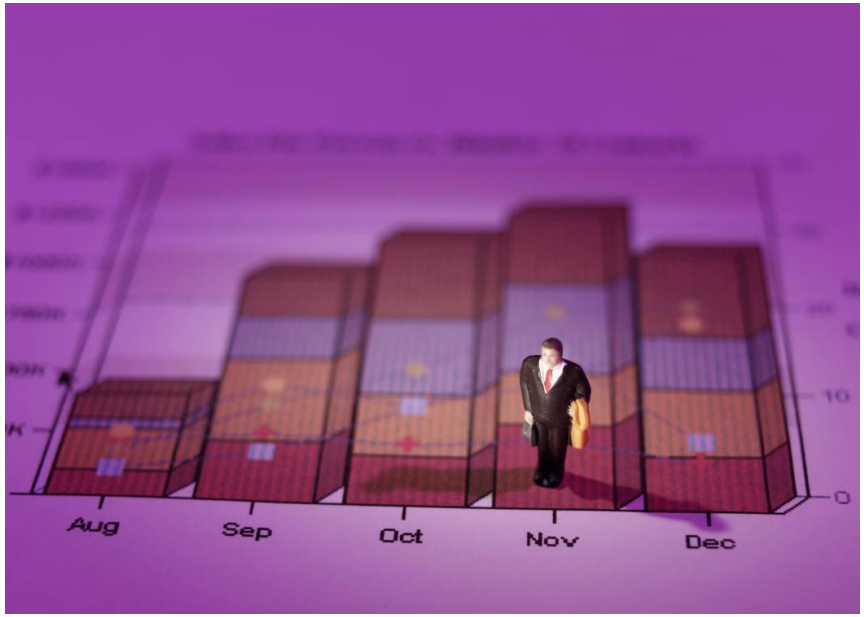
- Allow assessments of portfolios and / or individual buildings
- Self assessment
- Independent certification
- Holistic approach
  - Sustainability
    - *Climate change*
    - *Resources*
    - *Energy*
    - *…other*
  - Fire and security
- Any age of building

Outputs – Certificates

- Asset Rating
  - the building's characteristics
- Building Management Rating
  - How the building is run (from a facilities point of view)
  - Eg ventilation, heating etc
- Organisational Rating
  - How the building is run at a company level
  - Eg use of energy saving flat screens or only recycled paper

Outputs – KPIs

- Performance against each question
- Performance against each question category
- Energy consumption
- Water consumption
- Waste arisings
- Bespoke KPI reporting



Outputs – Rating Boundaries

- <10% **UNCLASSIFIED**
- >10% **ACCEPTABLE** ★☆☆☆☆☆
- >25% **PASS** ★★☆☆☆☆
- >40% **GOOD** ★★★☆☆☆
- >55% **VERY GOOD** ★★★★☆☆
- >70% **EXCELLENT** ★★★★★☆
- >85% **OUTSTANDING** ★★★★★★

BREEAM In-Use not like BREEAM!

BREEAM	BREEAM In-Use
• Assessor	• Client
• BRE QA	• Auditor
• UKAS	• BRE QA

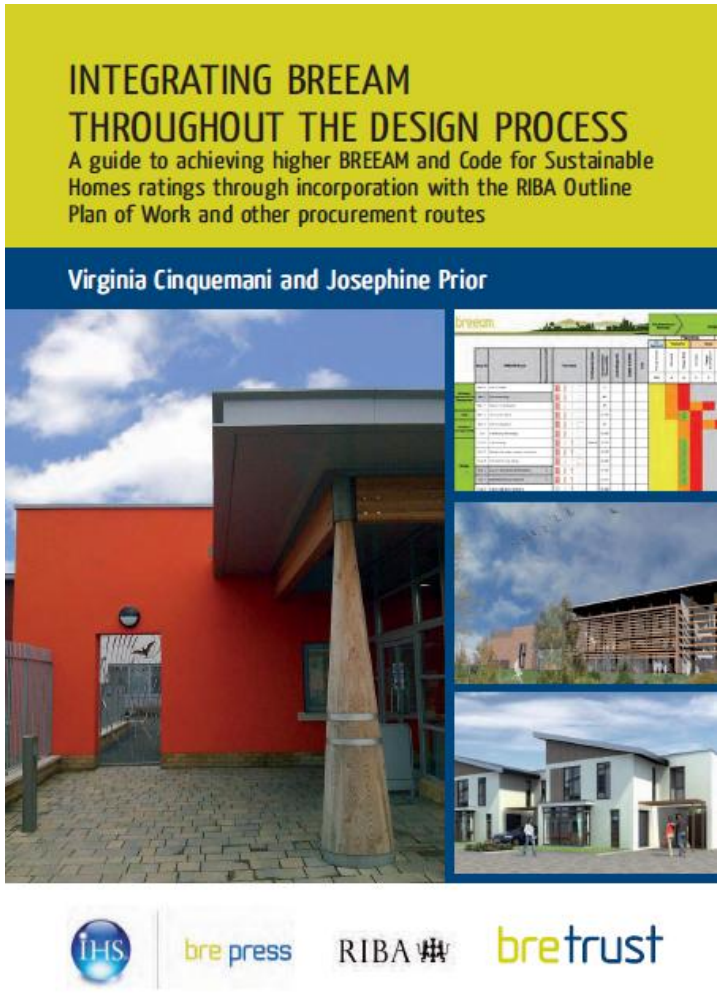
For more information: www.breeam.org/inuse

Integrating BREEAM Successfully

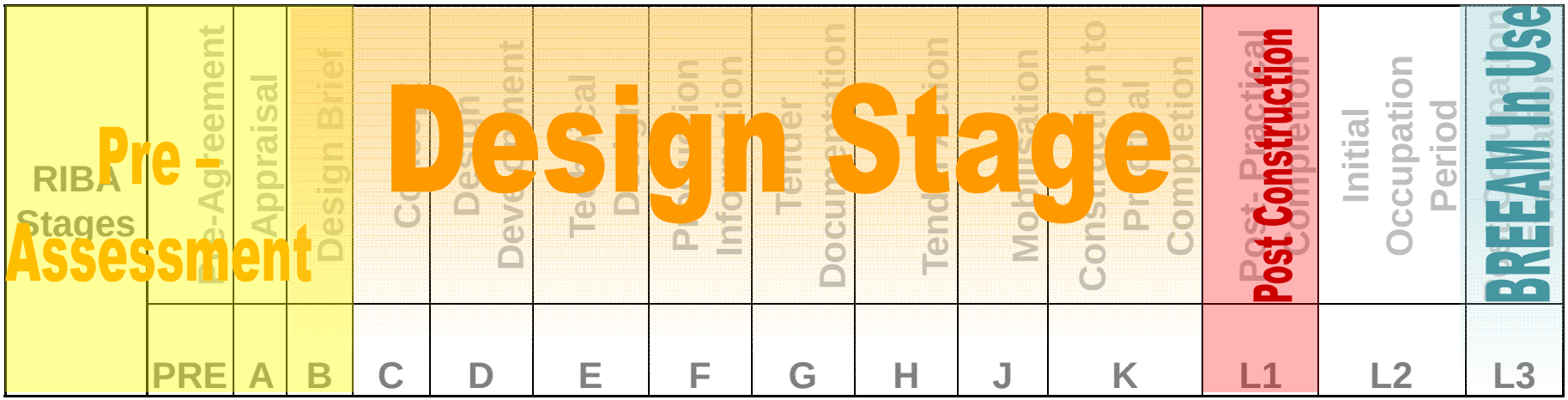
Integrating BREEAM Throughout the Design Process

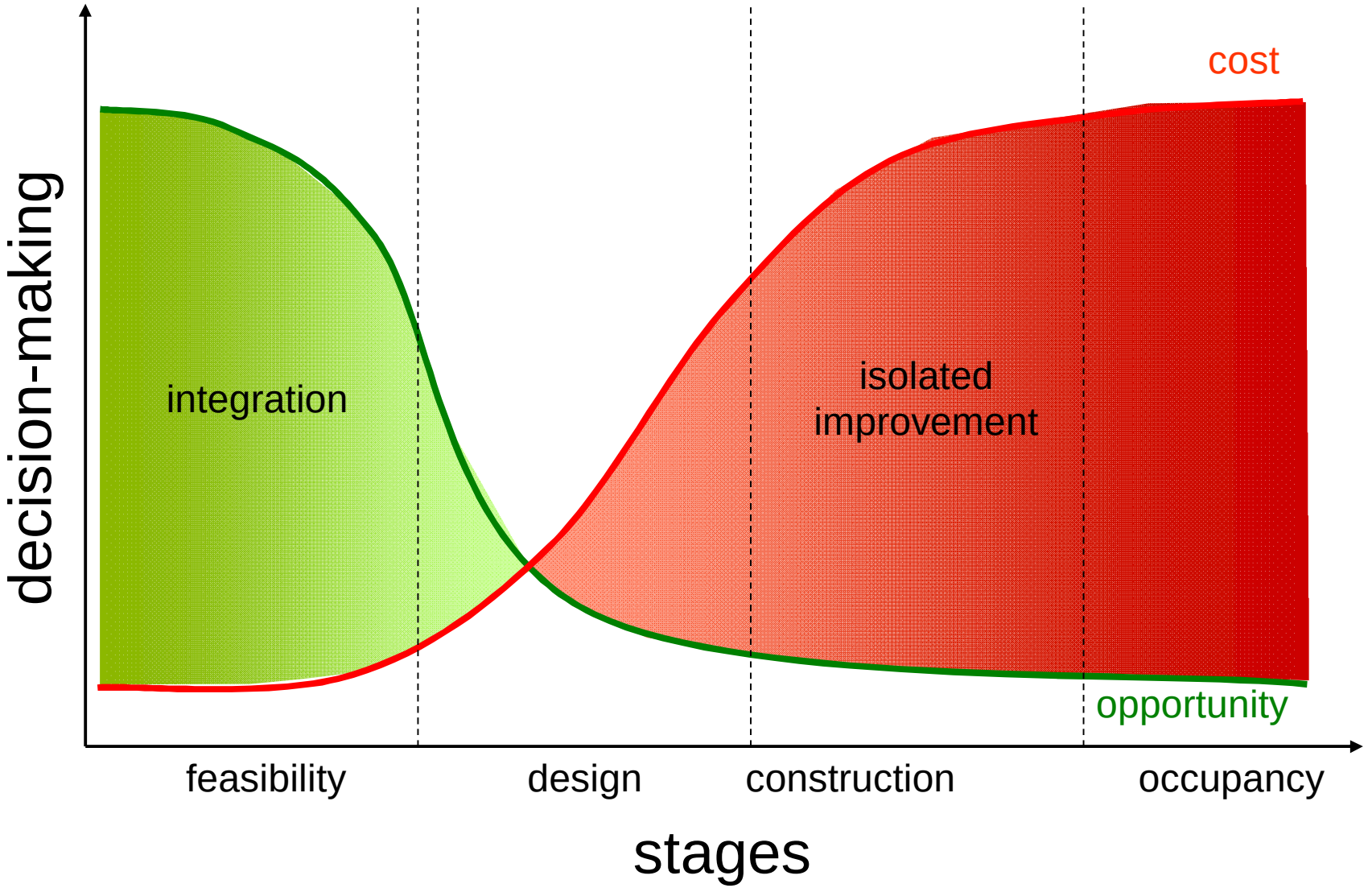
BRE Trust and RIBA, 2010

- Gives recommendations on the smooth implementation of BREEAM throughout the entire design process
- Gives guidance on where the BREEAM stages sit with regards to the RIBA Plan of Work



The stages of the BREEAM assessment




decision-making
integration
isolated
improvement
cost
opportunity
feasibility
design
construction
occupancy
stages

Early involvement

Issues In BREEAM That Need To Be Achieved At Certain RIBA Stages

Issue ID	Title	RIBA Stage	Schemes
Man 5	Site Investigation	C	Education
Man 6	Consultation	B	Education/Prisons/Courts/Healthcare/ Bespoke/Multi-Residential
Man 8	Security	C	All Schemes
Man 12	Life Cycle Costing (evidence)	C	Education/Prisons/Courts/Healthcare/ Bespoke
Man 14	Inclusivity	C	Bespoke
Ene 1	Reduction of CO_2 Emissions	C	All Schemes
Ene 5	Low Zero Carbon Technologies	C	All Schemes

Man 6 : Consultation

1st credit:

- Must be achieved at RIBA Stage B
- Provide list of community members & appropriate stakeholders who were consulted.
- Collate knowledge & experience from existing, similar buildings
- Prepare consultation plan with timescales
- The consultation process must address certain issues – in manual
- Feedback must be given to the consultation group

Man 6 : Consultation

2nd credit

- The first credit must be achieved
- The consultation process must use an independent method, carried out by a third party

Issues Affected By Man 6

Issue ID	Title	Credits	Affect	Schemes
Man 7	Shared Facilities	2	Can not be achieved	Education/ Healthcare
Man 9	Publication of Building Information	1	Becomes harder to achieve	Education/ Bespoke
Man 10	Development as Learning Resource	1	Can not be achieved	Education/ Bespoke

The credits lost in this issue are in addition to the ones lost by not achieving Man 6

Top Tips from Assessors

- To score high start early!
- Be prepared for information gathering
- Identify opportunities for gaining multiple credits with one solution
- Devise a strategy
- Develop knowledge of solutions

Questions

Uptake – Case studies

- Aberystwyth University
- Lancaster University
- Matthew Hay Building, Edinburgh University
- Leeds Metropolitan University

IBERS Building, University of Aberystwyth

Key Facts

- **BREEAM Rating:** Excellent
- **Score:** 75.27%
- **Size:** 1800m^2
- **Stage:** Interim
- **BREEAM Version:** Higher Education 2008.

Overview of Environmental Features

- Ground source heat pump,
- Rainwater harvesting,
- At least 80% of building materials were responsibly sourced,
- Natural ventilation,
- Daylight dimming light controls,
- Optimised use of daylight and thermal gain.

The BREEAM Assessment
Water: 100%
Health & Wellbeing: 93.75%
Management: 90.48%
Materials: 73.33%

Lancaster Institute for the Contemporary Arts, Lancaster University

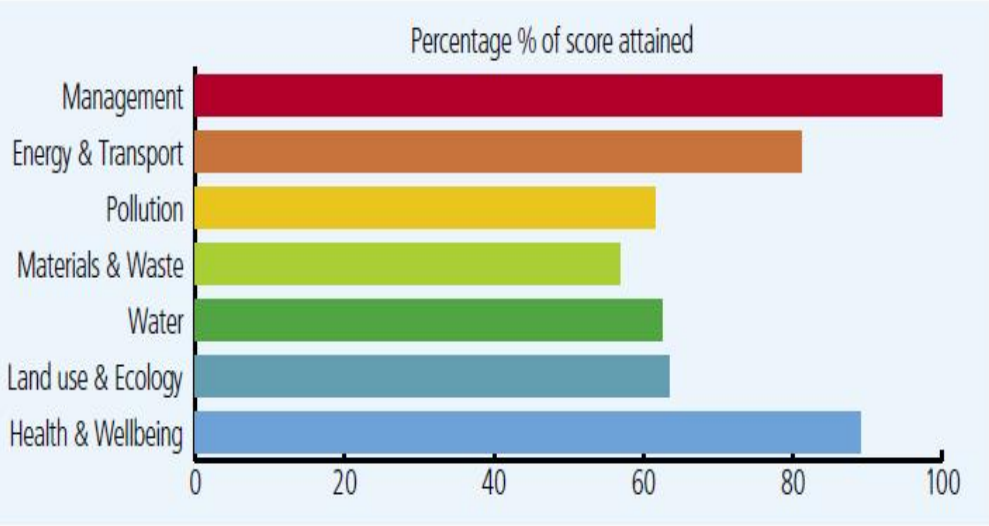
BREEAM Rating: Outstanding
Score: 87.81%
Size: 4840m^2
Stage: Interim
BREEAM Version: Higher Education 2008

Overview of Environmental Features

- Timber framed building
- Translucent polycarbonate rainscreen cladding
- CHP district heating
- Exemplary performance in construction waste management
- Primarily natural ventilation
- Rainwater collection with live data
- 'A' rated EPC
- Low impact responsibly sourced construction materials

Matthew Hay Building, University of Aberdeen BREEAM 2008 Award

- Healthcare teaching and learning facility
- Design stage BREEAM Bespoke 2005 ‘Excellent’ (76.19%)



Carnegie Village, Leeds Metropolitan University BREEAM 2010 Award

- Student residential development, Headingly Campus
- BREEAM Multi-residential 2006
- Design Stage ‘Excellent’ (76.10%)

Looking Ahead

BREEAM 2011

- Incorporates changes to Part L
- House keeping – categories and issues re-structured and simplified
- ‘New Construction’
- New assessment methodologies:
  - Energy
  - Water
- Training courses and registrations begin July/August 2011
- www.breeam.org/2011

Contact details

- Training slides www.bre.co.uk (Home: Events: Presentations)
- Website www.breeam.org
- Certified buildings & BREEAM Assessors www.greenbooklive.com
- BREEAM Office
  breeam@bre.co.uk
- BREEAM Customer Service
  BREEAMTechnicalCS@bre.co.uk
- Phone : +44 (0)1923 664 462
- Post : BRE, Garston, Watford, WD25 9XX, UK