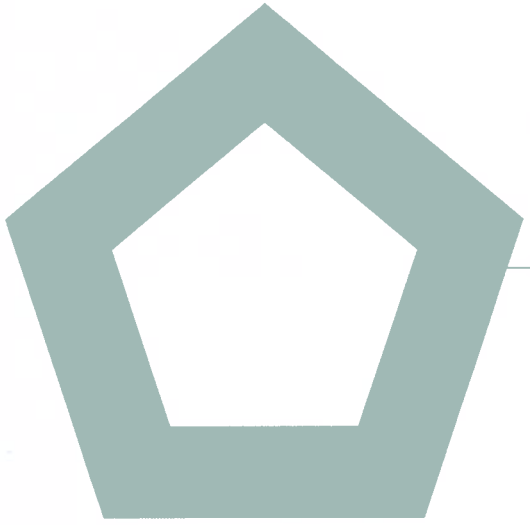
HOARE LEA

Ysgol Bro Morgannwg.
Barry.
Vale of Glamorgan Council.

SUSTAINABILITY
STAGE 3 REPORT - BREEAM 2014 PRE-ASSESSMENT

REVISION A - 04 DECEMBER 2018



STAGE 3

Audit sheet.

Rev.	Date	Description	Prepared	Verified
A	04/12/2018	Draft issue for comment	AG	TA

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BREEAM Audit box

BRE registration number	BREEAM-0073-6256
Licensed assessor	Tunde Agoro
Assessor support	Alberto Gallotta
BREEAM scheme	Education
BREEAM scheme version	BREEAM New Construction 2014 "Fully fitted"
Assessment stage	Pre-Assessment
Technical manual version	V 5.0
Tier code (internal use only)	Tier 3

BREEAM Credit filtering box

Building type and sub-group	Education - Secondary school
Building floor area	5000 m^2
Building services (heating)	Wet system
Building services (cooling)	Air-conditioning
Building services (DHW system)	Centralised supply and distribution
Building services (controls)	Standard controls
Commercial cold storage systems	N/A
Transportation systems	N/A
Laboratory (type, area and size)	No laboratories
Laboratory containment level	N/A
Fume cupboards / containment devices	N/A
Unregulated water uses	Yes

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1. Executive summary

This report provides a BREEAM 2014 New Construction pre-assessment for the proposed Ysgol Bro Morgannwg development.

The development falls under the BREEAM Education Buildings category and a fully fitted assessment has been conducted. The proposed development is targeting a BREEAM 'Excellent' rating as a minimum with the potential to achieve BREEAM 'Outstanding' rating.

The BREEAM assessment will be undertaken for the new sports and classroom block extension identified as Phase F on the ISG construction plan, the accommodation consists of sports hall, changing facilities with showers, teaching block and ancillary spaces.

The current anticipated baseline score is 77.15%, is equivalent to a BREEAM 'Excellent' rating, exceeding the minimum required score for a BREEAM 'Excellent' rating of 70% by 7.15%. A number of potential credits have also been identified that if included within the assessment strategy could result in the building achieving a potential score of 90.85% equivalent to a BREEAM 'Outstanding' rating with a margin of 5.85%. The targeted score has been updated following the BREEAM workshop with the current design team and the previous assessor held the 12 November 2018 in Cardiff.

The following potential credits have been identified in order for the BREEAM Outstanding rating to be achieved and these include:

- Hea 02: Indoor air quality
- Hea 06: Safety and security
- Ene 01: Reduction of CO_2 emissions
- Mat 01: Life cycle impacts
- Mat 03: Responsible sourcing of materials
- Wst 01: Construction waste management
- LE 03: Minimising impact on existing site ecology
- LE 04: Enhancing site ecology
- Pol 03: Surface water run-off

A margin of at least 3% - 5% is recommended above the minimum required score at this stage to secure the target rating taking into account contingency for design changes and potential constraints identified during the construction stage.

Figure 1 summarises the current anticipated 'baseline' and 'potential scores relative to the minimum required score for each BREEAM rating threshold.

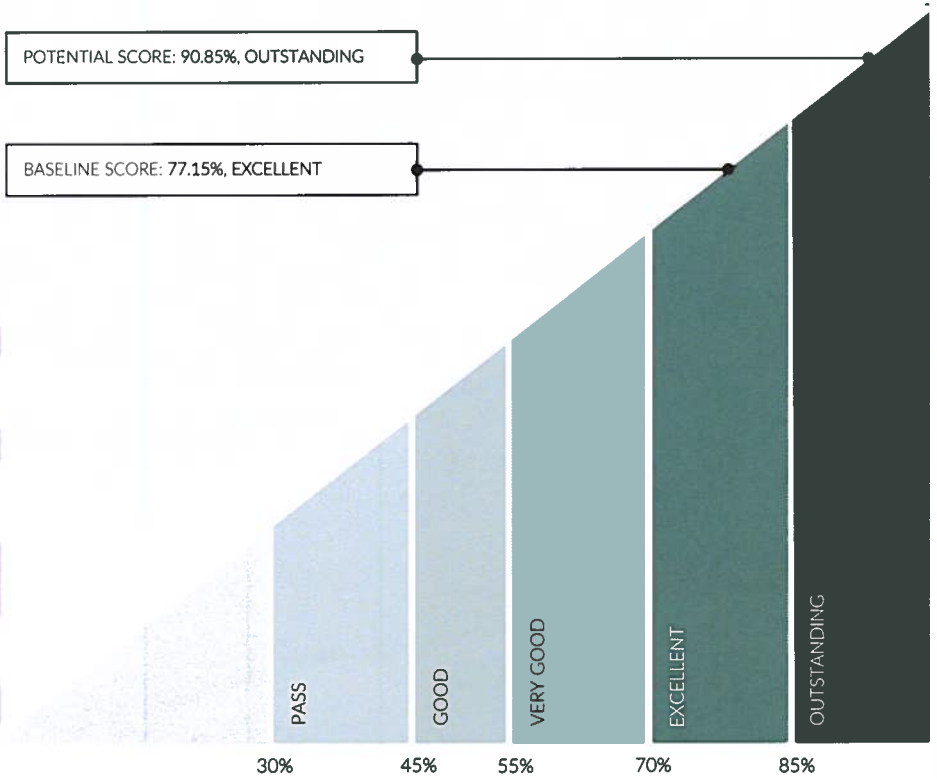

Figure 1: BREEAM 2014 Scale and Anticipated Performance Scores.

2. BREEAM Pre-Assessment

2.1 Introduction

This report relates to the remodelling and extension of the existing Welsh Medium Secondary School Ysgol Bro Morgannwg. It is our understanding that the building has been registered under the BREEAM 2014 new construction scheme and assessed using the education criteria. To continue the assessment under this scheme, it is imperative that an assessment transfer is carried out from the previous assessor organisation to the Hoare Lea assessors. The assessment will be targeting a BREEAM Excellent rating as a minimum with the potential to achieve BREEAM Outstanding if the potential credits are targeted.

2.2 Initial Pre-Assessment

This draft pre-assessment has been carried out by an AECOM BREEAM assessor. The same pre-assessment has been also reviewed by the Hoare Lea BREEAM assessor at the 12/11/2018 BREEAM workshop with the presence of the AECOM assessor and a ISG representative. This report sets out a route to achieving the target rating, and highlights the design team members responsible for each credit issue. Credits currently included in the credit score should be reviewed by the design team, and each team member is expected to provide feedback regarding credits under their responsibility, identifying any relevant issues. Once comments have been raised by the project team, the report and the predicted scores will be updated.

The following predicted scores have been calculated for the proposed development:

- Baseline score / rating: 77.15% equivalent to a BREEAM Excellent
- Potential score / rating: 90.85% equivalent to a BREEAM Outstanding

All mandatory and minimum standards for the BREEAM Excellent rating have been included within the assessment strategy for the target baseline score.

The following potential credits have been identified in order for the BREEAM Outstanding rating to be achieved and these include:

- Hea 02: Indoor air quality
- Hea 06: Safety and security
- Ene 01: Reduction of CO_2 emissions
- Mat 01: Life cycle impacts
- Mat 03: Responsible sourcing of materials
- Wst 01: Construction waste management
- LE 03: Minimising impact on existing site ecology
- LE 04: Enhancing site ecology
- Pol 03: Surface water run-off

Refer to Appendix B for detailed credit requirements.

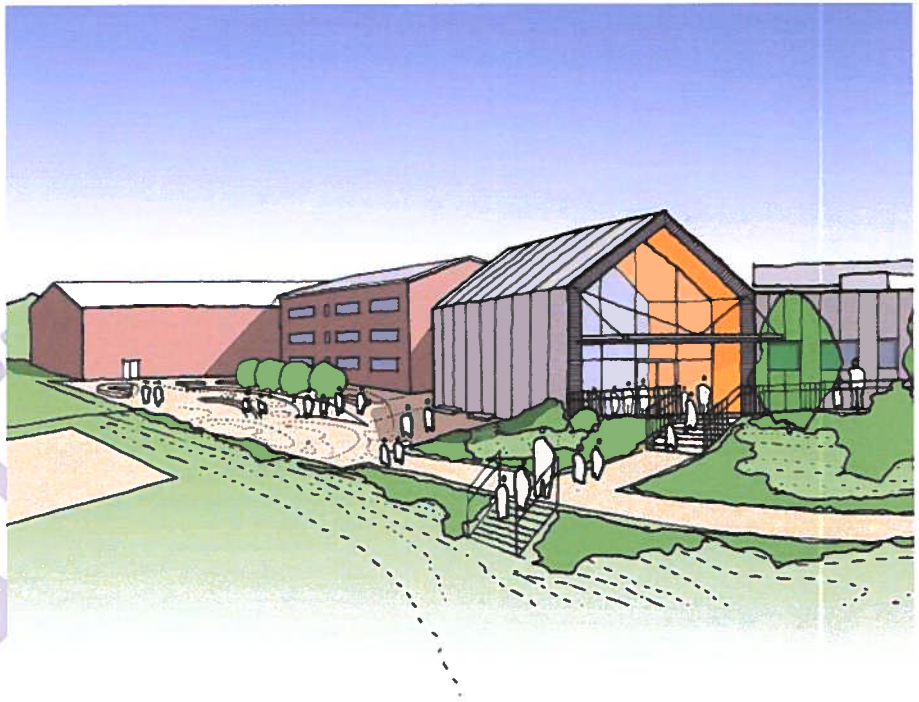

Figure 2: Architects' impression of the proposed Ysgol Bro Morgannwg.

3. Summary Score Sheet

The summary table below highlights the list of targeted credits for the current BREEAM 2014 pre-assessment. Mandatory credits to achieve a 'Very Good' rating and above are highlighted by (M). Additional mandatory credits for an 'Excellent' or 'Outstanding' rating are highlighted by (M_e) and (M_o) respectively. Exemplary (innovation) credits are written in brackets; e.g. (+1).

Table 1: BREEAM Target Summary.

Category	Issue	Credits		
		Available	Targeted	Potential
Management	Man 01: Project brief and design	4	3	-
	Man 02: Lifecycle cost and service life planning	4	4	-
	Man 03: Responsible construction practices (M_e), (M_o)	6	6	-
	Man 04: Commissioning and handover (M_e), (M_o)	4	4	-
	Man 05: Aftercare (M_e), (M_o)	3	3	-
Health & Wellbeing	Hea 01: Visual comfort	5	3	+2
	Hea 02: Indoor air quality	5	3	+2
	Hea 04: Thermal comfort	3	3	-
	Hea 05: Acoustic performance	3	3	-
	Hea 06: Safety and security	2	1	+1
Energy	Ene 01: Reduction of CO_2 emissions (M_e) (M_o)	12	5	+1
	Ene 02: Energy monitoring (M_v) (M_e) (M_o)	2	2	-
	Ene 03: External lighting	1	1	-
	Ene 04: Low carbon design	3	1	-
	Ene 08: Energy efficient equipment	2	2	-
Transport	Tra 01: Public transport accessibility	3	2	-
	Tra 02: Proximity to amenities	1	1	-
	Tra 03: Cyclist facilities	2	2	-
	Tra 05: Travel plan	1	1	-
Water	Wat 01: Water consumption (M_v) (M_e) (M_o)	5	3	-
	Wat 02: Water monitoring (M_v) (M_e) (M_o)	1	1	-
	Wat 03: Water leak detection and prevention	2	2	-
	Wat 04: Water efficient equipment	1	1	-
Materials	Mat 01: Life cycle impacts	6	3	+2
	Mat 02: Hard landscaping and boundary protection	1	1	-
	Mat 03: Responsible sourcing of materials (M_v) (M_e) (M_o)	4	3	+1
	Mat 04: Insulation	1	1	-
	Mat 05: Designing for durability and resilience	1	1	-
	Mat 06: Material efficiency	1	1	-
Waste	Wst 01: Construction waste management (M_o)	4	3	+1
	Wst 02: Recycled aggregates	1	0	-
	Wst 03: Operational waste (M_e), (M_o)	1	1	-
	Wst 05: Adaptation to climate change	1	1	-
	Wst 06: Functional adaptability	1	1	-
Land Use and Ecology	LE 01: Site selection	2	1	-
	LE 02: Ecological value of site and protection of ecological features	2	2	-
	LE 03: Minimising impact on existing site ecology (M_v) (M_e) (M_o)	2	1	+1
	LE 04: Enhancing site ecology	2	1	+1
	LE 05: Long Term impact on biodiversity	2	2	-
Pollution	Pol 01: Impact of refrigerants	3	3	-
	Pol 02: NOx emissions	3	3	-
	Pol 03: Surface water run-off	5	3	+2
	Pol 04: Reduction of night-time light pollution	1	1	-
	Pol 05: Reduction of noise pollution	1	1	-
Innovation	Inn 01: Approved innovation and exemplary level credits	10	2	-
	Targeted weighted score rating:	77.15% 'Excellent'		
	Potential weighted score rating:	90.00% 'Outstanding'		

4. Project Team Members

The following are members of the design team responsible for the delivery of the proposed development.

Discipline	Organisation	Abbreviation
Client / Developer	Vale of Glamorgan Council	VoG
Project Manager	AECOM	AE
Architect	Austin Smith Lord	ASL
Building Services Consultant	Hoare Lea	HL
Civils / Structural Consultant	Shear Design	SD
Cost Consultant	AECOM	AE
Transport Consultant	TBC	-
Ecologist	TBC	-
Planning Consultant	TBC	-

Table 2: Project Team Members.

5. Conclusion

Based upon an initial credit review independent of the project design team, it is anticipated that the Proposed Development could achieve a score of 77.15%, equivalent to a BREEAM Excellent rating.

Additional potential credits have also been identified which, if targeted, could result in a higher BREEAM performance score and rating: 90.85%, equivalent to a BREEAM Outstanding. The potential credits include the following credit issues:

- Hea 02: Indoor air quality
- Hea 06: Safety and security
- Ene 01: Reduction of CO_2 emissions
- Mat 01: Life cycle impacts
- Mat 03: Responsible sourcing of materials
- Wst 01: Construction waste management
- LE 03: Minimising impact on existing site ecology
- LE 04: Enhancing site ecology
- Pol 03: Surface water run-off

Figure 2 outlines the Proposed Development scores in each category. It also outlines where potential credits could be targeted to increase the assessment score and rating.

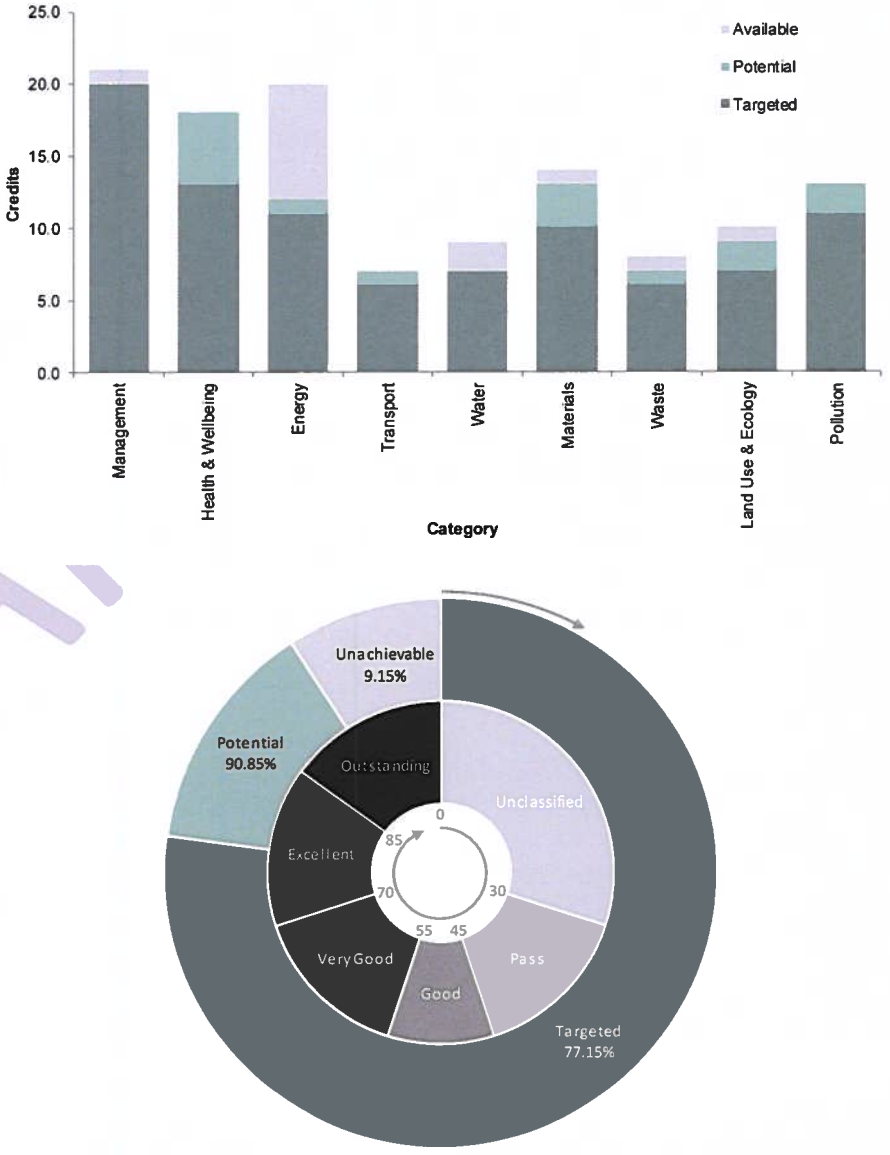

Figure 3: BREEAM Performance Summary and Targeted Credits.

6. Appendix A: Early Action Credits

Under the BREEAM, there are a number of credits that are time critical and require early action by the design team in order for the credits to be achieved. For these credits, the actions required prior to end of RIBA Stages 1 and 2; and the members of the design team responsible for these are listed below*:

Credit Issues	RIBA Stage 1 Actions	Owner
Man 01 Project brief and design	- First credit: Stakeholder consultation: By the end of Stage 1 - definition and engagement of key stakeholders (incl. team member with significant construction experience) and their roles and responsibilities. - Third Credit: Sustainability champion to be appointed to facilitate the setting and achievement of BREEAM performance targets for the project by Stage 2.	Project Manager BREEAM AP
Mat 06 Material efficiency	Consult with relevant design team members to identify and implement measures for efficient use of materials throughout all key stages. Suggested actions include: - Provide details outlining activities relating to material efficiency - Provide drawings or building integrated model (BIM), calculations showing reduction of material use through design - Collate meeting notes, construction programme, and responsibilities schedule (indicating parties consulted).	Planning Consultant
LE 04 Enhancing site ecology LE 05 Long term impact on biodiversity	The ecologist must be appointed by RIBA Stage 1 to carry out initial surveys, and subsequently provide recommendations in a report at RIBA Stage 2.	Ecologist

Table 3: BREEAM 2014 Early Action Credits (RIBA Stage 1)

*A set of information have been received the 03/12/2018 from the AECOM assessor. The tables and the achieved score will be updated after reviewing the received evidences.

Credit Issues	RIBA Stages 2 Actions	Owner
Man 01 Project brief and design	- Second Credit: Stakeholder consultation by completion of Concept Design - 4th Credit: Sustainability Champion: BREEAM performance targets to be formally agreed between the client and design/project team no later than Concept Design stage (RIBA Stage 2)	Planning Consultant BREEAM AP
Man 02 Life cycle costing and service life planning	- An elemental level Life Cycle Cost (LCC) analysis has been carried out based on the proposals developed during RIBA Work Stage 2	Cost Consultant
Hea 06 Safety and security	- Appoint security specialist to conduct a Security Needs Assessment (SNA) and/or consult with an Architectural Liaison Officer (ALO)	Architect
Ene 04 Low carbon design	- Carry out a passive design analysis and a renewables feasibility study	MEP
Wst 05 Adaptation to climate change	- Conduct a climate change adaption strategy appraisal for structural and fabric resistance	Architect + Structural Engineer
Wst 06 Functional adaptability	- Undertake a Building-specific functional adaptation strategy study. - Subsequently incorporate adaption measures into the design where practical and cost effective at RIBA Stage 4	Architect
LE 04 Enhancing site ecology LE 05 Long term impact on biodiversity	- The Ecology report must be available at Stage 2 (following the appointment of an ecologist at Stage 1)	Ecologist

Table 4: BREEAM 2014 Early Action Credits (RIBA Stage 2)

7. Appendix B: Detailed Credit Assessment

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
Management					
Man 01 Project brief and design	First credit - Stakeholder consultation (project delivery): Where evidence provided demonstrated that from RIBA stage 2 (Design Brief) or equivalent the client, building occupier, design team and contractor have met and are involved in contributing to the decision-making process for the project. As a minimum, this includes meeting to identify and define their roles, responsibilities and contributions during the following phases; 1) Design, 2) Construction, 3) Commissioning and handover and 4) Occupation i.e. up to and including Stage L (Post practical completion). Evidence also needs to be provided which demonstrates that there is a schedule of training identified for relevant building occupiers/premises manager (based appropriately around handover and proposed occupation plans).	1	1	One credit targeted.	Project Manager
	Second credit - Stakeholder consultation (third party): Where evidence provided demonstrates that prior to the 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 (including but not limited to functionality, impacts on local community, inclusive and accessible design). The impact this consultation has had on the Project Brief and Concept Design must be demonstrated and consultation feedback has been given to all relevant parties. This consultation would need to be carried out by an independent third party.	1	0	12/11/2018 Discussion confirmed this credit is unachievable.	Project Manager
	Third credit - Sustainability champion (design): Where evidence provided demonstrates that a Sustainability Champion has been appointed to facilitate the setting and achievement of BREEAM performance target(s) for the project and evidence shows that the designed BREEAM performance target(s) has been contractually agreed and demonstrably achieved by project design.	1	1	One credit targeted.	Project Manager
	Fourth credit - Sustainability champion (monitoring progress): Where evidence provided demonstrates that the Third credit is achieved and a Sustainability Champion is appointed to monitor progress against the agreed BREEAM performance target(s). This is done by attending key project/design team meetings during the Concept Design, Developed Design and Technical Design stages, reporting to the client during, and prior to, completion of each stage.	1	1	One credit targeted.	Project Manager
Man 02 Life cycle impacts	First and second credit - Elemental life cycle cost (LCC): Where evidence provided demonstrates that an elemental Life Cycle Cost (LCC) analysis has been carried out based on the proposals developed during Process Stage 2 (concept design/RIBA Stage 2) or equivalent. The LCC analysis shows an outline LCC plan for the project, appraising a range of options based on multiple cash flow scenarios e.g. 20, 30, 50+ years and a fabric and servicing strategy for the project outlining services component and fit-out options over a 15-year period	2	2	ISG to appoint Cost Consultant (HRS)	Client + Cost Consultant
	Third credit - Component level LCC option appraisal: Where evidence provided demonstrates that a component level LCC plan has been developed by end of Process Stage 4 (RIBA Stage 4) including the following component types: - Envelope: e.g. cladding, windows, and/or roofing - Services: e.g. heat source cooling source, and/or controls	1	1	ISG to appoint Cost Consultant (HRS)	Client + Cost Consultant

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	- Finishes: e.g. walls, floors and/or ceilings - External spaces Demonstrate using appropriate examples provided by the design team, how the component level LCC plan has been used to influence building and systems design/specification to minimise life cycle costs and maximise critical value.				
	Fourth credit - Capital cost reporting: Where evidence provided demonstrates reporting of the capital cost for the building in pounds per square metre (£/m²) via the BREEAM Assessment Scoring and Reporting tool, Assessment Issue Scoring tab, Management section.	1	1	Cost consultant to disclose capital cost in pounds per square metre (£/m²)	Client + Cost Consultant
Man 03 (M_e) (M_o) Responsible construction practices ⚠ Mandatory: - One credit (considerate construction) for Excellent - Two credits (considerate construction) for Outstanding	Pre-requisite All timber and timber based products used on the project is 'legally' harvested and traded timber First credit - Environmental management: Evidence which demonstrates that the principle contractor operates an environmental management system (EMS) covering main operations e.g. third party certified to ISO 14001/EMAS or equivalent standard or have a structure that is in compliance with BS 8555-2003 and has reached stage 4 of implemented stage. Evidence that the principle contractor implements best practice pollution policies and procedures on-site in accordance with Pollution Prevention Guidelines.	1	1	ISG to provide evidence	Client + Contractor
	Second credit - Sustainability champion (construction): Evidence which demonstrates that a Sustainability Champion is appointed to monitor the project to ensure ongoing compliance with relevant sustainability performance/process criteria. The defined BREEAM performance target forms a requirement of the principal contractor's contract and to achieve this credit in final post construction phase of assessment, the BREEAM-related performance target must be demonstrably achieved by the project.	1	1	ISG to provide evidence	Client + Contractor
	Third and fourth credit - Considerate construction: Where evidence provided demonstrates the contractor achieves 'compliance' with the criteria of a compliant considerate construction scheme (CCS score of at least 25). Where evidence provided demonstrates the contractor significantly exceeds 'compliance' with the criteria of the scheme (CCS score of at least 35). Where evidence provided demonstrates the contractor achieves 'compliance' with the criteria of a compliant considerate construction scheme (CCS score of at least 40).	2	2	ISG to provide evidence	Client + Contractor
	Fifth and sixth credit - Monitoring of construction-site impacts: Where evidence provided demonstrates the responsibility has been assigned to an individual for monitoring, recording and reporting energy use, water consumption and transport data from all on-site construction processes throughout the build programme.	2	2	ISG to provide evidence	Client + Contractor
Man 04 Commissioning and handover	First credit - Commissioning and testing schedule and responsibilities: Where evidence provided demonstrates a schedule of commissioning and testing that identifies and includes a suitable timescale for commissioning and re-commissioning of all complex and non-complex building services and control systems and testing and inspecting building fabric, and that all commissioning is done in accordance with current Building Regulations, BSRIA and CIBSE guidelines. An appropriate project team member(s) is appointed to monitor and programme pre-commissioning, testing, and where necessary, re-commissioning on behalf of the client	1	1	One credit targeted.	Contractor

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	The principal contractor accounts for the commissioning and testing programmes, responsibilities and criteria within their budget and main programme of works, allowing for sufficient time to complete commissioning and testing prior to handover.				
	Second credit - Commissioning building services: Where evidence provided demonstrates a specialist commissioning manager is appointed during the design stage.	1	1	One credit targeted.	Contractor
	Third credit - Testing and inspecting building fabric: Where credit 1 is achieved and evidence provided demonstrates that the integrity of the building fabric is quality assured through compliant post construction testing and inspection. Any defects identified in the thermographic survey or airtightness testing reports are rectified prior to building handover and close out.	1	1	Thermographic investigation evidence required.	Contractor
	Fourth credit - Handover: Where evidence provided demonstrates that Building User Guides are provided and are appropriate to all users of the building (general users including staff and if applicable residents, as well as the non-technical facilities management team/building manager) and that a training schedule is prepared for building occupiers/premises mangers, timed appropriately around handover and proposed occupation plans.	1	1	One credit targeted.	Contractor
Man 05 Aftercare	First credit - Aftercare support There is (or will be) operational infrastructure and resources in place to provide aftercare support to the building occupier(s), which includes the following as a minimum: a. A meeting programmed to occur between the aftercare team/individual and the building occupier/management (prior to initial occupation, or as soon as possible thereafter) to: i. Introduce the aftercare team or individual to the aftercare support available, including the Building User Guide (where existing) and training schedule/content. ii. Present key information about the building including the design intent and how to use the building to ensure it operates as efficiently and effectively as possible. iii. On-site facilities management training, to include a walkabout of the building and introduction to and familiarisation with the building systems, their controls and how to operate them in accordance with the design intent and operational demands. b. Initial aftercare support provision for at least the first month of building occupation, e.g. on-site attendance on a weekly basis to support building users and management (this could be more or less frequent depending on the complexity of the building and building operations). c. Longer term aftercare support provision for occupants for at least the first 12 months from occupation, e.g. a helpline, nominated individual or other appropriate system to support building users/management. There is (or will be) operational infrastructure and resources in place to coordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months, once the building is occupied. This is done to facilitate analysis of discrepancies between actual and predicted performance, with a view to adjusting systems and/or user behaviours accordingly.	1	1	One credit targeted.	Client Occupant Contractor
	Second credit - Seasonal commissioning The following seasonal commissioning activities will be completed over a minimum 12-month period, once the building becomes substantially occupied: a. Complex systems - Specialist Commissioning Manager: i. Testing of all building services under full load conditions, i.e. heating equipment in mid-winter, cooling/ventilation equipment in mid-summer, and under part load conditions (spring/autumn). ii. Where applicable, testing should also be carried out during period of extreme (high or low) occupancy. iii. Interviews with building occupants (where they are affected by the complex services) to identify problems or concerns regarding the effectiveness of the systems.	1	1	One credit targeted.	Client Occupant Contractor MEP

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	b. Re-commissioning of systems (following any work needed to serve revised loads), and incorporating any revisions in operating procedures into the operations and maintenance (O&M) manuals. c. Simple systems (naturally ventilated) - external consultant/aftercare team/facilities manager: i. Review thermal comfort, ventilation, and lighting, at three, six and nine month intervals after initial occupation, either by measurement or occupant feedback. ii. Take all reasonable steps to re-commission systems following the review to take account of deficiencies identified and incorporate any relevant revisions in operating procedures into the O&M manuals.				
	Third credit - Post occupancy evaluation The client or building occupier makes a commitment to carry out a post occupancy evaluation (POE) exercise one year after initial building occupation. The POE is carried out by an independent third party and needs to cover: 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. Other relevant issues vi. Sustainability performance (energy/water consumption, performance of any sustainable features or technologies e.g. materials, renewable energy, rainwater harvesting etc.) The client or building occupier makes a commitment to carry out the appropriate dissemination of information on the building's post occupancy performance. This is done to share good practice and lessons learned and inform changes in user behaviour, building operational processes and procedures, and system controls.	1	1	POE survey required. ISG to provide evidence.	Client Occupant Contractor
Health and Wellbeing					
Hea 01 Visual comfort	First credit - Glare control: Where evidence provided demonstrates that the potential for disabling glare has been designed out of all relevant building areas either through building layout and/or building design. In additional, a glare control strategy should be developed in tandem with the lighting strategy to ensure that glare is minimised whilst avoiding potential conflict with the lighting control systems, therefore avoiding higher than expected energy consumption.	1	1	ASL to provide evidence of the developed glare control strategy.	Architect + Occupant
	Second and third credits - Average daylighting: - Where evidence provided demonstrates that the relevant building areas meet good practice daylighting criteria as outlined below, in addition to room depth criterion, daylight uniformity or annual illuminance levels. Education buildings - Pre-schools, schools, further education occupied spaces: two credits 2.0%, 80% area - Higher education occupied spaces: one credit 2.0%, 60% area - Higher education occupied spaces: two credits 2.0%, 80% area	2	0 (+2)	Two potential credits targeted. HL to be appointed to produce a daylighting study.	Architect + Daylight Consultant
	Fourth credit - View out: Where evidence provided demonstrates that 95% of floor areas in relevant building areas are within 7m of a wall which has a window or permanent opening that provides an adequate view out. The window/opening must be ≥20% of the surrounding wall area.	1	1	One credit targeted.	Architect

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	Fifth credit - Lighting levels and controls: Where evidence provided demonstrates that internal and external lighting is designed in accordance with the required standard. - All fluorescent and compact fluorescent lamps are fitted with high frequency ballasts. - Internal lighting in all relevant areas of the building is designed to provide an illuminance (lux) level appropriate to the tasks undertaken. This can be demonstrated through a lighting design strategy that provides illuminance levels in accordance with the SLL Code for Lighting 2012 and any other relevant industry standard. - For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 7 sections 3.3, 4.6, 4.7, 4.8 and 4.9. - For external areas, lighting provided is specified in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas 3BS 5489-1:2013 Lighting of roads and public amenity areas. Code of Practice for the design of road lighting, BSI, 2013 and BS EN 12464-2:2014. Lighting should be zoned as follows: - Workstations adjacent to windows/atria and other building areas separately zoned and controlled - Teaching space or demonstration area - Whiteboard or display screen - Treatment areas, dayrooms, waiting areas: zoning of seating and activity areas and circulation space with controls accessible to staff. - Areas used for teaching, seminar or lecture purposes have lighting controls provided in accordance with CIBSE Lighting Guide 5 **Education buildings:** Manual lighting controls are easily accessible for the teacher while teaching and on entering/leaving the teaching space	1	1	One credit targeted.	MEP
	Exemplary credit: Where evidence is provided which demonstrates that the exemplary level daylight requirements are achieved, as outlined below, in addition to the exemplary level daylight illuminance levels: **All building types (excluding retail): one credit** - Functions as identified in the standard criteria (multi storey buildings) All building types (single storey buildings): 3.0%, 80% area - Functions as identified in the standard criteria (single storey buildings): 4.0%, 80% area - Prisons and court cells: 2.0%, 80% area - Prison internal association/atrium area: 5.0%, 80% area	1	0	No credit targeted.	Architect + Daylight Consultant
Hea 02 Indoor air quality	First credit - Indoor air quality (IAQ) plan: Where evidence provided demonstrates that an indoor air quality plan has been produced with the objective of facilitating a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during occupation of the building.	1	1	One credit targeted.	Architect + MEP + IAQ specialist
	Second credit - Ventilation: For air-conditioned and mixed-mode buildings: the building's air intakes and exhausts are over 10m apart to minimise recirculation and intakes are over 20m from sources of external pollution or designed in accordance with BS EN 13779:2007 Annex A2. In addition, the building must be designed to provide fresh air and minimise internal pollutants (and ingress of external polluted air into the building) in accordance with the criteria of the relevant standard for ventilation. If naturally ventilated the openable windows/ventilators must be over 10m from sources of external pollution.	1	0 (+1)	No credit targeted. A potential credit could be achieved.	Architect + MEP

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	Areas of the building subject to large and unpredictable or variable occupancy patterns have CO_2 or air quality sensors specified and: - In mechanically ventilated spaces, the sensor(s) are linked to the mechanical ventilation system and provide demand-controlled ventilation to the space. - In naturally ventilated spaces, the sensors either have the ability to alert the building owner/manager when CO_2 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/roof vents.				
	Third credit - Volatile organic compound (VOC) emission levels (products): Where evidence provided demonstrates that the indoor air quality plan has been developed and all decorative paints and varnishes meet the emission requirements with regards to VOCs.	1	1	One credit targeted.	Architect + Contractor
	Fourth credit - Volatile organic compound (VOC) emission levels (post construction): Where evidence provided demonstrates that the indoor air quality plan has been developed and that formaldehyde concentration level is measured post construction (but pre-occupancy) and is found to be less than or equal to 100µg/m^3. The total volatile organic compound (TVOC) concentration is measured post construction (but pre-occupancy) and found to be less than 300µg/m^3 over 8 hours, in line with the Building Regulation requirements. 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 the TVOC and formaldehyde levels to within the above limits.	1	1	One credit targeted.	Contractor
	Fifth credit - Potential for natural ventilation: Where evidence provided demonstrates the building ventilation strategy is designed to be flexible and adaptable to potential building occupant needs and climatic scenarios through designs capable of providing fresh air entirely via a natural ventilation strategy, demonstrated via either of the following: - The openable window area in each occupied space is equivalent to 5% of the gross internal floor area of that room/floor plate, OR - The design demonstrates that the natural ventilation strategy provides adequate cross flow of air to maintain required thermal comfort conditions and ventilation rates. This is demonstrated using ventilation design tool types recommended by CIBSE AM10 For a strategy which does not rely on openable windows, or which has occupied spaces with a plan depth greater than 15m, the design must demonstrate that the ventilation strategy can provide adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates. The natural ventilation strategy must be capable of providing at least two levels of user-control on the supply of fresh air to the occupied space, as follows; - Higher level: higher rates of ventilation achievable to remove short-term odours and/or prevent summertime overheating. - Lower level: adequate levels of draught-free fresh air to meet the need for good indoor air quality throughout the year, sufficient for the occupancy load and the internal pollution loads of the space. Any opening mechanisms must be easily accessible and provide adequate user-control over air flow rates to avoid draughts.	1	0 (+1)	No credit targeted. A potential credit could be achieved.	Architect + MEP

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	Exemplary credits: One credit - All product categories listed meet the testing requirements and emission levels criteria for Volatile Organic Compound (VOC) emissions (listed in the table). - For products B - F listed the formaldehyde emission levels have been measured and found to be less than or equal to 0.06mg/m³ air in accordance with the approved testing standards in Table 18. Two credits - All products categories listed meet the testing requirements and emissions levels criteria for Volatile Organic Compound (VOC) emissions (listed in the table). - For products B to F listed in Table 18, the formaldehyde emission levels have been measured and found to be less than or equal to 0.16mg/m³ air, in accordance with the approved testing standards in Table 18.	2	0	No credit targeted.	
Hea 04 Thermal comfort	First credit: Where evidence provided demonstrates that thermal modelling has been carried out using software in accordance with CIBSE AM11. The modelling demonstrates that the building design and services strategy can deliver thermal comfort levels in occupied spaces in accordance with the criteria set out in CIBSE Guide A Environmental Design.	1	1	One credit targeted.	MEP
	Second credit: Where credit 1 is achieved and evidence provided outlines that the thermal modelling demonstrates that the building design and services strategy can deliver thermal comfort levels in occupied spaces in accordance with the criteria set out in CIBSE Guide A Environmental Design for a projected climate change environment. Where these levels are not met the project team demonstrates how the building has been adapted or designed to be easily adapted in future using passive design solutions. Additionally evidence is provided for air conditioned buildings, the PMV and PPD indices based on the modelling are reported via the BREEAM assessment scoring and reporting tool.	1	1	One credit targeted.	MEP

	Third credit:
	The thermal modelling analysis has informed the temperature control strategy for the building and its users.
	The strategy for proposed heating/cooling system(s) demonstrates that it has addressed the following:
	- 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.
	- The degree of occupant control required for these zones, based on discussions with the end user (or alternatively building type or use specific design guidance, case studies, feedback) considers:
	  - User knowledge of building services
	  - Occupancy type, patterns and room functions (and therefore appropriate level of control required)
	  - How the user is likely to operate or interact with the system(s), e.g. are they likely to open windows, access thermostatic radiator valves (TRV) on radiators, change air-conditioning settings etc.
	  - 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).
	- 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.
	- The need or otherwise for an accessible building user actuated manual override for any automatic systems.
		1	1	One credit targeted.	MEP

Hea 05 Acoustic performance	Three credits: Up to three credits can be awarded where the following criteria is met:	3	3	Three credits targeted.	Acoustician + Architect

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	The building meets the appropriate acoustic performance standards and testing requirements defined in the checklists and tables section which defines criteria for the acoustic principles of: - Sound insulation - Indoor ambient noise level - Reverberation times.				
Hea 06 Safety and security	First credit - Safe access: Where external site areas form part of the assessed development the following apply: - Dedicated cycle paths provide direct access from site entrance(s) to any cycle storage provided - Footpaths on-site provide direct access from the site entrance(S) to building entrance(s) and connect to public footpaths off-site - Where provided, drop-off areas are designed off/adjoining to the access road and provide direct access to pedestrian footpaths, therefore avoiding the need for the pedestrian to cross vehicle access routes. - Dedicated pedestrian crossings are provided where pedestrian routes cross vehicle access routes, and appropriate traffic calming measures are in place to slow traffic down at these crossing points. - For large developments with a high number of public users or visitors, pedestrian footpaths are signposted to other local amenities and public transport nodes off-site - The lighting for access roads, pedestrian routes and cycle lanes is compliant with the external lighting criteria define in Hea 1. Where dedicated delivery access and drop-off areas form part of the assessed development the following apply: - Delivery areas are not directly accessed through general parking areas and - Do not cross or share pedestrian and cyclist routes and other outside amenity areas - There is a separate parking/waiting area for goods vehicles away from / adjacent to the manoeuvring area and staff/visitor car parking. - Parking and turning areas are designed for simple manoeuvring according to the type of delivery vehicle likely to access the site - There is a dedicated space for the storage of refuse skips and pallets away from the delivery vehicle manoeuvring area and staff/visitor car parking	1	0 (+1)	No credit targeted. A potential credit could be achieved.	Architect
	Second credit - Security of site and building: Where evidence provided demonstrates that a suitably qualified security specialist (SQSS) conducts an evidence-based Security Needs Assessment during or prior to Concept Design (RIBA Stage 2). The recommendations from the SQSS must be implemented into the design.	1	1	One credit targeted.	Architect
Energy					
Ene 01 (M_c) (M_o) Reduction of CO_2 emissions ⚠ Mandatory:	One – twelve credits: Where evidence provided demonstrates an improvement in the energy efficiency of the building's fabric and services and therefore achieves lower building operational related CO_2 emissions. The number of credits achieved is determined by comparing the Energy Performance Ratio for New Construction (EPR_{NC}) with the benchmarks in the table below.	12	5 (+1)	Five credits targeted with the potential of an additional extra credit. Achieved score is subject to output from thermal modelling.	MEP

<table>
<tr><th>Issue</th><th>Credit Requirements</th><th colspan="2">Credits</th><th>Comments / Actions</th><th>Responsible Team Member</th></tr>
<tr><th></th><th></th><th>Available</th><th>Targeted (Potential)</th><th></th><th></th></tr>
<tr><td>- Five credits for Excellent
- Eight credits for Outstanding</td><td>
<table>
<tr><th colspan="2"></th><th colspan="2">Minimum Standards</th></tr>
<tr><th>BREEAM credits</th><th>EPR_{NC}</th><th>Rating</th><th>Minimum Requirements</th></tr>
<tr><td>1</td><td>0.075</td><td rowspan="4">-</td><td rowspan="4">Requires performance improvement progressively better than relevant national building regulations compliant standards</td></tr>
<tr><td>2</td><td>0.150</td></tr>
<tr><td>3</td><td>0.225</td></tr>
<tr><td>4</td><td>0.300</td></tr>
<tr><td>5</td><td>0.375</td><td rowspan="3">Excellent</td><td rowspan="3">Requires five credits to be achieved.</td></tr>
<tr><td>6</td><td>0.450</td></tr>
<tr><td>7</td><td>0.525</td></tr>
<tr><td>8</td><td>0.600</td><td rowspan="5">Outstanding</td><td rowspan="5">Requires eight credits to be achieved.</td></tr>
<tr><td>9</td><td>0.675</td></tr>
<tr><td>10</td><td>0.750</td></tr>
<tr><td>11</td><td>0.825</td></tr>
<tr><td>12</td><td>0.900 AND zero net regulated CO_2 emissions</td></tr>
</table>
Exemplary credits available - Five credits
<table>
<tr><th>Innovation credits</th><th>Equivalent % Criteria</th></tr>
<tr><td>1</td><td>10%</td></tr>
<tr><td>2</td><td>20%</td></tr>
<tr><td>3</td><td>50%</td></tr>
<tr><td>4</td><td>80%</td></tr>
<tr><td>9</td><td>>100%</td></tr>
</table>
The building is 'carbon negative' in terms of its total modelled operational energy consumption

Exemplary credits Available- up to four credits
The building achieves an EPRNC ≥0.9 and zero net CO_2 emissions, and an equivalent percentage of the buildings modelled 'regulated' operational energy consumption, as stipulated in the table below, is generated by carbon neutral on-site, near-site or 'accredited external' sources and used to meet energy demand from 'unregulated' building systems or processes.</td><td>5</td><td>0</td><td>No credit targeted.</td><td>MEP</td></tr>
</table>

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
Ene 02 (M_w) (M_e) (M_o) Energy monitoring ⚠ Mandatory: One credit for Very Good and above.	First credit: Sub-metering of major energy consuming systems Where evidence provided demonstrates that the energy metering systems are installed that enable 90% of the estimated annual energy consumption of each fuel to be assigned to the various end-use categories of energy consuming systems. For buildings with a total useful floor area > 1000m² are metered using an appropriate energy monitoring and management system and systems in smaller buildings are metered either with an energy monitoring and management system or separate assessable energy sub-meters with pulsed or other open protocol communication outputs, to enable future connection to an energy monitoring and management system. The end energy consuming use is identifiable to the building user through labelling or data outputs. Large-scale medical equipment/systems can be excluded when assessing compliance with this issue (although it is recommended that sub-metering is considered in such instances).	1	1	One credit targeted.	MEP
	Second credit: Sub – metering of high energy load and tenancy areas An accessible energy monitoring and management system or separate accessible energy sub-meters with pulsed or other open protocol communication outputs to enable future connection to an energy monitoring and management system are provided, covering a significant majority of the energy supply to tenanted areas or, in the case of single occupancy buildings, relevant function areas or departments within the building/unit.	1	1	One credit targeted.	MEP
Ene 03 External Lighting	One credit: Where evidence provided demonstrates that the external lighting has an average initial luminous efficacy of the external light fittings within the construction zone is not less than 60 luminaire lumens per circuit watt and that all external light fittings are automatically controlled for prevention of operation during daylight hours and presence detection in areas of intermittent pedestrian traffic.	1	1	One credit targeted.	MEP
Ene 04 Low carbon design	First credit - Passive design analysis: Where the first credit of Hea 04 (Thermal comfort) is achieved and the project team carries out an analysis of the design to identify opportunities for the implementation of passive design solutions that reduce demands for energy consuming building services, and that these solutions are implemented meaningfully into the design.	1	0	No credit targeted	MEP
	Second credit - Free cooling: Where the first credit is achieved, the passive design analysis includes an analysis of free cooling and identifies opportunities for the implementation of free cooling solutions. Free cooling solutions might include night time cooling, ground coupled air cooling or surface water cooling; i.e. does not use active cooling.	1	0	No credit targeted	MEP
	Third credit - Low zero carbon feasibility study: Where evidence provided demonstrates that a feasibility study has been carried out by the completion of the Concept Design stage (RIBA Stage 2) by an energy specialist to establish the most appropriate recognised local (on- or near-site) low or zero carbon energy source(s) for the development. A local LZC technology/ies has been specified for the building in line with the recommendations of this feasibility study and this method of supply results in a meaningful reduction in regulated CO_2 emissions.	1	1	Evidence required that an LZC study has been undertaken.	AE
Ene 08 Energy efficient equipment	Two credits: - Identify the building's unregulated energy consuming loads and estimate their contribution to the total annual unregulated energy consumption of the building, assuming a typical/standard specification. - Identify the systems and/or processes that use a significant proportion of the total annual unregulated energy consumption of the development and its operation. - Demonstrate a meaningful reduction in the total annual unregulated energy consumption of the building.	2	2	TM54 analysis required. HL to provide fee proposal to perform a TM54 study.	MEP

<table>
<tr><th>Issue</th><th>Credit Requirements</th><th>Credits
Available</th><th>Credits
Targeted (Potential)</th><th>Comments / Actions</th><th>Responsible Team Member</th></tr>
<tr><td></td><td>
<table>
<tr><th></th><th>Function / Equipment</th><th>Criteria</th></tr>
<tr><td>A</td><td>Small power, plug-in equipment</td><td>The following equipment has been awarded an Energy Star rating OR has been procured in accordance with the Government Buying Standards:
1. Office Equipment
2. Other small powered equipment
3. Supplementary electric heating</td></tr>
<tr><td>E</td><td>IT-intensive operating areas</td><td>Uses a natural ventilation and cooling strategy as standard, with forced ventilation only to be used when the internal temperature exceeds 20°C and active cooling only when the internal temperature exceeds 22°C</td></tr>
</table>
</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Transport</td></tr>
<tr><td>Tra 01
Public transport accessibility</td><td>Five credits (Pre-School, School, Sixth Form)
Where evidence provided demonstrates the accessibility to the public transport network. This is summarised in the table below.
The accessibility index for each building type is calculated based upon the following information:
<table>
<tr><td>Accessibility Index</td><td>≥ 2</td><td>≥ 4</td><td>≥ 8</td><td>≥ 10</td><td>≥ 12</td><td>≥ 18</td></tr>
<tr><td>Building Type</td><td colspan="6">BREEAM Credits Available</td></tr>
<tr><td>Pre-school, School, Sixth Form</td><td>1</td><td>2</td><td>3</td><td>-</td><td>-</td><td>-</td></tr>
</table>
- The distance (m) from the main building entrance to each compliant public transport node
- The public transport type(s) serving the compliant node e.g. bus or rail
- The average number of services stopping per hour at each compliant node during the standard operating hours of the building for a typical day</td><td>3</td><td>2
(+1)</td><td>Two credits targeted with the potential of an additional credit.</td><td>Transport Consultant + Architect</td></tr>
<tr><td>Tra 02
Proximity to amenities</td><td>One credit (Pre-School, School, Sixth Form)
Where evidence provided demonstrates that the building is located within the 500m distance via safe walking route of at least two of the following amenities:
- Appropriate food outlet
- Cash point
- Leisure facility
And at least one of the following;
- Access to an outdoor open space (public or private, provided suitably sized and accessible to building users)
- Publicly available postal facility
- Community facility
- Over the counter services associated with a pharmacy
- Child care facility or school</td><td>1</td><td>1</td><td>One credit targeted.</td><td>Transport Consultant + Architect</td></tr>
</table>

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
Tra 03 Cyclist facilities	First credit - Cycle storage: One credit is achieved where evidence provided demonstrates that the number of compliant cycle storage spaces provided are in accordance with the following: - 1 per 10 staff & pupil/student total Second credit - Cyclist facilities: The credit is achieved where at least two of the following compliant cyclist facilities are provided for all building users: - Showers - Changing facilities - Lockers - Drying spaces	2	2	Two credits targeted.	Architect
Tra 05 Travel plan	One credit: - Where evidence provided demonstrates that a travel plan has been developed as part of the feasibility and design stages which considers all types of travel relevant to the building type and users. - The travel plan must be structured to the needs of the particular site and takes into consideration the findings of a site-specific transport survey. - The travel plan must include a package of measures that have been used to steer the design of the development in order to meet the travel plan objectives and minimise car-based travel patterns.	1	1	One credit targeted.	Transport Consultant
Water					
Wat 01 (M) Water consumption ⚠ Mandatory: - One credit for Good and above. - Two credits for Outstanding.	Up to five credits: Where evidence provided demonstrates that water consumption has been reduced to the following levels compared against the baseline building model: % Improvement / No. of BREEAM Credits: 12.5% — 1 25% — 2 40% — 3 50% — 4 55% — 5 65% — Exemplary performance	5	3	ASL to provide evidence water consumption has been reduced by the proposed amount (40%).	MEP + Architect
Wat 02 (M) Water monitoring ⚠ Mandatory: Criterion 1 only for Good and above.	One credit: - Where evidence provided demonstrates that a water meter with a pulsed output will be installed on the mains supply to each building/unit. - Water-consuming plant or building areas, consuming 10% or more of the building's total water demand, need to be fitted with either sub meters or have water monitoring equipment integral to the plant or area. (Not applicable to Shell Only Assessments). - Each meter (main and sub) must have a pulsed output to enable connection to a Building Management System (BMS) for the monitoring of water consumption. - If the site on which the building is located has an existing BMS, managed by the same occupier/owner (as the new building), the pulsed water meter(s) for the new building must be connected to the existing BMS.	1	1	HL to provide evidence of the new BMS arrangement.	MEP

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
Wat 03 Water leak detection	First credit - Leak detection system: Where evidence provided demonstrates that a leak detection system which is capable of detecting a major water leak on the mains water supply within the building and between the building and the utilities water meter is provided.	1	1	One credit targeted.	MEP
	Second credit - Flow control devices: Where evidence provided demonstrates that flow control devices that regulate the supply of water to each WC area/facility according to demand are installed (and therefore minimise water leaks and wastage from sanitary fittings)	1	1	One credit targeted.	MEP
Wat 04 Water efficient equipment	First credit The design team has identified all unregulated water demands that could be realistically mitigated or reduced. System(s) or processes have been identified to reduce the unregulated water demand, and demonstrate, through either good practice design or specification, a meaningful reduction in the total water demand of the building.	1	1	One credit targeted.	Landscape Architect
Materials					
Mat 01 Life cycle impacts	One - six credits: Up to five credits are available dependent on the Green Guide to Specification and the environmental product declaration for the major building/finishing elements: - External Walls - Windows - Roof - Upper Floor Slabs - Internal walls - Floor Finishes / Coverings	6	3 (+2)	Three credits targeted with the potential of two additional credits.	Architect
Mat 02 Hard landscaping and boundary protection	One credit: Where evidence provided demonstrates that at least 80% of the combined area of external hard landscaping and boundary protection specifications achieve an A or A+ rating, as defined by the Green Guide to Specification.	1	1	One credit targeted.	Architect
Mat 03 (M) Responsible sourcing ⚠ Mandatory: Criterion 1 sustainable timber sourcing for all ratings	Pre-requisite All timber and timber based products used on the project are 'legally harvested and traded timber' First credit: Sustainable procurement plan (SPP) Where evidence provided demonstrates that the principal contractor sources materials for the project in accordance with a documented sustainable procurement plan.	1	1	SPP to be provided by ISG.	Architect + Contractor
	Up to three credits: Responsible Sourcing of Materials Where evidence provided demonstrates the available responsible sourcing of materials (RSM) can be awarded where the applicable building materials are responsibility sourced in accordance with the BREEAM methodology. RSM credits / % of available RSM points achieved: 3 — ≥ 54% 2 — ≥ 36% 1 — ≥ 18% Exemplary credit: Where evidence provided demonstrates that at least 70% of the available RSM points are achieved.	3	2 (+1)	Two credits targeted with the possibility of one additional credit.	Architect

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
Mat 04 Insulation	One credit: Where evidence provided demonstrates that any new insulation specified for use within the following building elements must be assessed: - External walls - Ground floor - Roof - Building services The Insulation Index for the building fabric and services insulation is the same as or greater than 2.5.	1	1	One credit targeted.	Architect + MEP
Mat 05 Designing for durability and resilience	One credit: PART A: Where evidence provided demonstrates that the building incorporates suitable durability and protection measures or designed features/solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements. This must include, but is not necessarily limited to: - Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc.). - Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas. - Protection against, or prevention from, any potential vehicular collision where vehicular parking and manoeuvring occurs within 1m of the external building façade for all car parking areas and within 2m for all delivery areas. PART B: Additionally the relevant building elements incorporate appropriate design and specification measures to limit material degradation due to environmental factors. - Applicable building elements include foundation, retaining walls, external walls and doors, roof/balconies, glazing, cladding. - Environmental factors to consider include; solar radiation, temperature variation, wind, precipitation, vegetation, air and ground contaminants. - Material degradation effects includes (but not limited to); corrosion, swelling or shrinkage, fading, or rotting.	1	1	One credit targeted.	Architect
Mat 06 Material efficiency	One credit: Where evidence provided demonstrates that opportunities have been identified and appropriate measures investigated and implemented to optimise the use of materials in building design, procurement, construction, maintenance and end of life. This process must be carried out by the design/construction team in consultation with relevant parties at each RIBA stage. - Preparation and Brief - Concept Design - Developed Design - Technical Design - Construction	1	1	One credit targeted.	Architect
Waste					
Wst 01 (M) Construction waste management	Up to Three credits - Construction resource efficiency: Where a Resource Management Plan (RMP) has been developed covering the non-hazardous waste related to on-site construction and dedicated off-site manufacture or fabrication. In addition, evidence provided demonstrates that non-hazardous construction waste (excluding demolition and excavation waste) generated by the building's design and construction meets or exceeds the following resource efficiency benchmarks:	3	2 (+1)	Two credits targeted with the potential of an additional credit.	Contractor

<table>
<tr><th>Issue</th><th>Credit Requirements</th><th colspan="2">Credits</th><th>Comments / Actions</th><th>Responsible Team Member</th></tr>
<tr><th></th><th></th><th>Available</th><th>Targeted (Potential)</th><th></th><th></th></tr>
<tr><td>Mandatory:
One credit for Outstanding</td><td>
<table>
<tr><th>BREEAM Credits</th><th colspan="2">Amount of waste generated per 100m² (gross internal floor area)</th></tr>
<tr><th></th><th>m³</th><th></th></tr>
<tr><td>One credit</td><td>≤ 13.3</td><td>≤ 11.1</td></tr>
<tr><td>Two credits</td><td>≤ 7.5</td><td>≤ 6.5</td></tr>
<tr><td>Three credits</td><td>≤ 3.4</td><td>≤ 3.2</td></tr>
<tr><td>Exemplary level</td><td>≤ 1.6</td><td>≤ 1.9</td></tr>
</table>
</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>Fourth credit - Diversion of resources from landfill:
Where evidence provided demonstrates that the following percentages of non-hazardous construction and demolition waste (where applicable) generated by the project have been diverted from landfill:
<table>
<tr><th>BREEAM credits</th><th>Type of Waste</th><th>Volume</th><th>Tonnage</th></tr>
<tr><td>One credit</td><td>Non-demolition</td><td>70%</td><td>80%</td></tr>
<tr><td></td><td>Demolition</td><td>80%</td><td>90%</td></tr>
<tr><td></td><td>Excavation</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Exemplary level</td><td>Non-demolition</td><td>85%</td><td>90%</td></tr>
<tr><td></td><td>Demolition</td><td>85%</td><td>95%</td></tr>
<tr><td></td><td>Excavation</td><td>95%</td><td>95%</td></tr>
</table>
</td><td>1</td><td>1</td><td>One credit targeted.</td><td>Contractor</td></tr>
<tr><td>Wst 02
Recycled aggregates</td><td>One credit:
Where evidence provided demonstrates the significant use (>25% by weight or volume) of recycled or secondary aggregates in 'high-grade' building aggregate uses.

To contribute to the total amount, the percentage of high-grade aggregate specified per application must meet the following minimum levels (by weight or volume):
<table>
<tr><th>Application</th><th>Min. % One credit</th><th>Min. % Exemplary performance</th></tr>
<tr><td>Structural Frame</td><td>15%</td><td>30%</td></tr>
<tr><td>Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads</td><td>30%</td><td>75%</td></tr>
</table>
</td><td>1</td><td>0</td><td>No credit targeted.</td><td>Civil/ Structural Engineer</td></tr>
</table>

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	Building foundations 20% 35% Concrete road surfaces 15% 45% Pipe bedding 100% 100% Granular fill and capping 100% 100%				
	Exemplary level criteria: Where evidence provided demonstrates that the percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the exemplary minimum levels (by weight or volume) as defined in the table above and the material must not be transported more than 30km by road.	1	0	No credit targeted.	Civil/ Structural Engineer
Wst 03 (M_c) (M_o) Operational waste ⚠ Mandatory: - One credit for Excellent and above	One credit: Where evidence provided demonstrates that there is dedicated space(s) to cater for the segregation and storage of operational recyclable waste volumes generated by the assessed building/unit, its occupant(s) and activities. The dedicated space(s) must be: - Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams - Accessible to building occupants / facilities operators for the deposit of materials and collections by waste management contractors - Of a capacity appropriate to the building type, size, number of units (if relevant) and predicted volumes of waste that will arise from daily/weekly operational activities and occupancy rates. - The specified/installed operational waste facilities are compliant with the relevant NHS guidelines for that part of the UK. Where the consistent generation in volume of the appropriate operational waste streams is likely to exist, e.g. large amounts of packaging or compostable waste generated by the building's use and operation, the following facilities must be provided as part of its waste management strategy: - Static waste compactor(s) or baler(s); situated in a service area or dedicated waste management space. - Vessel(s) for composting suitable organic waste resulting from the building's daily operation and use OR adequate space(s) for storing segregated food waste and compostable organic material prior to collection and delivery to an alternative composting facility. - Where organic waste is to be stored/ composted on site, a water outlet is provided adjacent to or within the facility for cleaning and hygiene purposes.	1	1	One credit targeted.	Architect
Wst 05 Adaptation to climate change	One credit - Structural and fabric resilience: Where evidence provided demonstrates that a climate change adaptation strategy appraisal for structural and fabric resilience has been conducted by the end of Concept design (RIBA Stage 2) covering hazard identification and assessment, risk estimation, evaluation and management. Appraisal to identify & evaluate impact on the building over its life cycle from expected extreme weather conditions arising from climate change and, where feasible, mitigate against these impacts ID hazards taking into account the following: structural stability, robustness, weather proofing and detailing, material durability, health and safety of occupants, impact on building contents and business continuity	1	1	AECOM to provide evidence.	Architect + Structural Engineer
	Exemplary credit: A holistic approach to the design and construction of the current building's life cycle, to mitigate against the impacts of climate change, is represented by the achievement of these criteria. In addition to achieving the first credit above, the following must also be achieved: Hea 04 - Thermal comfort:	1	0	No credit targeted.	Architect + Structural Engineer

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	- Project team demonstrate how the building has been adapted, or designed to be easily adapted in future using passive design solutions Ene 01 - Reduction in energy use and carbon emissions - At least 8 credits in this issue have been achieved Ene 04 - Low carbon design - Passive design analysis credit has been achieved Wat 01 - Water consumption - Minimum of three credits in this issue have been achieved Mat 05 - Designing for durability and resilience - Building elements incorporate appropriate design and specification measures to limit material degradation due to environmental factors Pol 03 Surface water run off - Flood risk- A minimum of one credit has been achieved. - Surface water run off- Two credits have been achieved.				
Wst 06 Functional adaptability	One credit - Functional adaptability: Where evidence provided demonstrates that a building-specific functional adaptation strategy study has been undertaken by the client and design team by Concept Design (RIBA Stage 2) which includes recommendations for measures to be incorporated to facilitate future adaptation. Additionally functional adaptation measures have been implemented by RIBA Stage 4 in accordance with the functional adaptation strategy recommendations, where practical and cost effective.	1	1	AECOM to provide evidence.	Architect
Land Use and Ecology					
LE 01 Site selection	First credit - Previously occupied land: Where evidence is provided to demonstrate that at least 75% of the proposed development's footprint is on an area of land which has previously been developed for use by industrial, commercial or domestic purposes in the last 50 years.	1	1	One credit targeted.	Architect
	Second credit - Contaminated land: Where evidence provided demonstrates that the site is significantly contaminated as confirmed by a contaminated land specialist's site investigation, risk assessment and appraisal. The client or principal contractor must confirm that remediation of the site will be carried out in accordance with the remediation strategy and its implementation plan.	1	0	No credit targeted.	Contamination Specialist
LE 02 Ecological value of site and protection of ecological features.	First credit - Ecological value of site: Where evidence provided demonstrates that the site's construction zone is defined as 'land of low ecological value' using the BREEAM checklist or a Suitably Qualified Ecologist (SQE).	1	1	Ecology report to be provided by AECOM.	Ecologist
	Second credit - Protection of ecological features: Where evidence provided demonstrates that all existing features of ecological value within and surrounding the construction zone and site boundary are adequately protected from damage during clearance, site preparation and construction activities in line with BS42020:2013, and in all cases the principal contractor is required to construct ecological protection recommended by the preliminary site construction or preparation works.	1	1	Ecology report to be provided by AECOM.	Ecologist

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
LE 03 (M) Minimising impact on existing site ecology	Two credits - Change in ecological value 1: Where evidence provided demonstrates that there is no negative change in the site's existing ecological value as a result of development using BREEAM LE03/04 calculator or a Suitably Qualified Ecologist (SQE). OR Where an SQE has been appointed, they confirm that based on site survey that broad habitat types that define the landscape of the assessed site in its existing pre-developed state and proposed state, area of existing and proposed broad habitat plot types and average total taxon (plant species) richness within each habitat type. OR One credit - Change in ecological value 2: Where the change in ecological value is less than zero but equal to or greater than minus 9 plant species i.e. a minimal change.	2	1 (+1)	Ecology report to be provided by AECOM. An additional potential credit could be targeted.	Ecologist
LE 04 Enhancing site ecology	First credit - Ecologist's report and recommendations: Where the design team (or client) has appointed a Suitably Qualified Ecologist to advise and report on enhancing and protecting the ecological value of the site; and implemented the professional's recommendations for general enhancement and protection of site ecology.	1	1	Ecology report to be provided by AECOM.	Ecologist + Contractor
	Second credit: Where credit 1 is achieved and there is a positive increase in the ecological value of the site of six species or greater.	1	0 (+1)	No credit targeted. A potential credit could be achieved.	Ecologist + Contractor
LE 05 Long term impact on biodiversity	Mandatory requirements: Where evidence provided demonstrates that: - A Suitably Qualified Ecologist has been appointed prior to the commencement of activities on-site. - The SQE confirms that all relevant UK and EU legislation relating to the protection and enhancement of ecology has been complied with during the design and construction process. - Where a landscape and habitat management plan, appropriate to the site, is produced, covering at least the first five years after project completion in accordance with BS42020:2013 Section 11.1, this is to be handed over to the building owner/occupier. Additional requirements: Where additional measures to improve the assessed site's long term biodiversity are adopted, according to the table below. Additional measures include: 1. Nominate Biodiversity Champion	2	2	Two credits targeted.	Ecologist + Contractor

Application	Applicable Measures				
	All	4	3	2	1
Credits	Number of additional measures to assess				
1	2	2	2	N/A	N/A
2	4	4	3	2	1

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	2. Contractor trains workforce on how to protect site ecology 3. Principle contractor records actions taken to protect biodiversity and monitors effectiveness 4. New ecologically valuable habitat appropriate to local area is created 5. Where flora/fauna habitats exist on-site, the contractor programmes site works to minimise disturbance to wildlife				
Pollution					
Pol 01 Impact of refrigerants	Pre-requisite: All systems (with electronic compressors) must comply with the requirements of BS EN 378:2008, and where refrigeration systems containing ammonia are installed, they must comply with the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice. Three credits: No refrigerant Where evidence provided demonstrates that the building does not require the use of refrigerant within its building services or plant. Two credits: DELC Where evidence provided demonstrates that the systems specified using refrigerants have Direct Effect Life Cycle CO_2 equivalent emissions (DELC CO_{2e}) of ≤100 $kgCO_{2e}/kW$ cooling/heating capacity. OR Where air-conditioning or refrigeration systems are installed the refrigerants used have a Global Warming Potential (GWP) ≤10. One credit: Where evidence provided demonstrates that the systems using refrigerants have Direct Effect Life Cycle CO_2 equivalent emissions of (DELC CO_{2e}) of ≤1000 $kgCO_{2e}/kW$ cooling/heating capacity.	2	2	Two credits targeted.	MEP
	One credit: Leak detection Where evidence provided demonstrates that the systems using refrigerants have a permanent automated refrigerant leak detection system installed, capable of automatically isolating and containing the remaining refrigerant(s) charge in response to a leak detection incident.	1	1	One credit targeted.	MEP
Pol 02 NO_x emissions	Up to three credits: NO_x emissions levels for heating and hot water (mg/kWh) / Credits ≤ 100mg/kWh — 1 credit ≤ 70mg/kWh — 2 credits ≤ 40mg/kWh — 3 credits Where evidence provided demonstrates where the plant specified to meet the building's delivered heating and cooling demand has, under normal operating conditions, a dry NO_x emission level (measured at 0% excess O_2) as follows for non-industrial buildings)	3	3	Three credits targeted.	MEP

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
Pol 03 Surface water run off	Part 1: Flood resilience (Up to two credits) Two credits - Low flood risk: Where evidence provided demonstrates that the site is of low risk of flooding and a site-specific flood risk assessment has been completed in line with PPS25, taking account of current and future sources of flooding.	2	2	Evidence to be submitted by AECOM.	Drainage Consultant
	One credit - Medium/high flood risk: Where evidence provided demonstrates that the assessed development is located in a zone defined as having a medium or high annual probability of flooding AND the ground level of the building, car parking and access is at least 600mm above the design flood level of the flood zone for the site's location.	-	-	N/A	Drainage Consultant
	Part 2: Surface water run-off Pre-requisite: An appropriate consultant has been appointed. One credit: Where evidence provided demonstrates that the consultant has confirmed that the drainage measures specified ensure that the peak rate of run-off from the site to the watercourses (natural or municipal) is no greater for the developed site than it was for the pre-development site. This should comply at the 1-year and 100-year return period events, taking into account climate change. Additionally, relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SUDs are in place. One credit Where evidence provided demonstrates that the consultant has confirmed that there is no risk of flooding of property in the event of a local drainage system failure (caused either by extreme rainfall or a lack of maintenance), AND EITHER - 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, including an allowance for climate change. - Any additional predicted volume of run-off for the 100-year 6-hour event must be prevented from leaving the site by using infiltration or other Surface Drainage System (SUDs) techniques OR (only where criterion no. 9 or 10 for this credit cannot be achieved) - 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. - The post development peak rate of run-off is reduced to a limiting discharge.	2	1 (+1)	One credit targeted. A potential credit could be achieved.	Drainage Consultant
	Part 3: Minimising watercourse pollution One credit: Where evidence provided demonstrates that the following water course pollution prevention measures are covered: - Appropriate consultant confirms that there will be no discharge from the developed site for rainfall up to 5mm. - Specification of Sustainable Urban Drainage Systems (SUDs) or source control systems such as permeable surfaces or infiltration trenches - Specification of oil/petrol separators (or equivalent system) in surface water drainage systems, where there is a high risk of contamination or spillage of substances - All water pollution prevention systems have been designed and detailed in accordance with the recommendations of Pollution Prevention Guideline 3 (PPG3) - A comprehensive and up-to-date drainage plan of the site will be made available for the building/site occupiers.	1	0 (+1)	No credit targeted. A potential credit could be achieved.	Drainage Consultant

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
Pol 04 Reduction in night time light pollution	One credit: Where evidence provided demonstrates that the lighting system has been designed in accordance with the following requirements: - The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the ILE Guidance notes for the reduction of obtrusive light, 2011. - All external lighting (except for safety and security lighting) can be automatically switched off between 2300hrs and 0700hrs. This can be achieved by providing a timer for all external lighting set to the appropriate hours. - If safety or security lighting is provided and will be used between 2300hrs and 0700hrs, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILE's Guidance notes, for example by using an automatic switch to reduce the lighting levels at 2300 or earlier. - Illuminated advertisements, where specified, must be designed in compliance with ILE Technical Report 5 – The Brightness of Illuminated Advertisements.	1	1	One credit targeted.	MEP
Pol 05 Reduction of noise pollution	One credit: Where evidence provided demonstrates that there is either no noise-sensitive areas or buildings within 800m radius of the assessed development OR 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 7445:1991 has been carried out and the following noise levels measured/determined: - Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development or at a location where background condition can be argued to be similar. - The noise level from the proposed site/building, as measured in the locality of the nearest or most exposed noise-sensitive development is a difference no greater than +5dB during the day (07:00 to 23:00) and +3dB at night (23:00 to 07:00).	1	1	One credit targeted.	Acoustician
Innovation					
Exemplary credits summary	Exemplary credits Up to a maximum of ten credits are available: Where the building demonstrates exemplary performance by meeting defined exemplary level performance criteria in one or more of following BREEAM assessment issues: - Man 03 Responsible construction practices - Man 05 Aftercare - Hea 01 Visual comfort - Hea 02 Indoor air quality - Ene 01 Reduction of CO_2 emissions - Wat 01 Water consumption - Mat 01 Life cycle impacts - Mat 03 Responsible sourcing of materials - Wst 01 Construction site waste management - Wst 02 Recycled aggregates - Wst 05 Adaptation to climate change One innovation credit can be awarded for each individual BREEAM issue exemplary performance level complied with. Approved Innovations One innovation credit can be awarded for each innovation application approved by BRE Global, where the building complies with the criteria defined within an Approved Innovation application form.	10	2	Two credits targeted: - Man 03 Responsible construction practices - Man 05 Aftercare	Contractor + Architect

8. Appendix C: Overview of BREEAM

8.1 Introduction

The 'Building Research Establishment Environmental Assessment Method' (BREEAM) is currently used as a benchmarking tool in the design of new non-domestic developments. The purpose of BREEAM is to assess and rate the sustainability of buildings and to promote programmes of design improvement.

8.2 Background

BREEAM is published by the BRE. The methodology is based upon the categories and issues as set out table C1 below.

Mandatory requirements for ratings of 'Very Good' are identified in the table by annotation with (M_v), while (M_e) and (M_o) represent mandatory further credit requirements for BREEAM 'Excellent' and "Outstanding' ratings respectively.

Failure to meet the mandatory criteria could restrict a development to a threshold rating levels regardless of the overall number of credits achieved.

Table C1: BREEAM Category and Credit Issues

Category	Issue
Management	- Project brief and design - Lifecycle cost and service life planning - Responsible construction practice (M_e), (M_o) - Commissioning and handover (M_e), (M_o) - Aftercare (M_e) (M_o)
Health & Wellbeing	- Visual comfort - Indoor air quality - Safe containment in laboratories - Thermal comfort - Acoustic performance - Safety and security
Energy	- Reduction of CO_2 emissions (M_e) (M_o) - Energy monitoring (M_v) - External lighting - Low carbon design - Energy efficient cold storage
	- Energy efficient transpiration systems - Energy efficient laboratory systems - Energy efficient equipment - Drying space
Transport	- Public transport accessibility - Proximity to amenities - Cyclist facilities - Maximum car parking capacity - Travel plan
Water	- Water consumption (M_v) - Water monitoring (M_v) - Water leak detection and prevention - Water efficient equipment
Materials	- Life cycle impacts - Hard landscaping and boundary protection - Responsible sourcing of materials (M_v) - Insulation - Designing for durability and resilience - Material efficiency
Waste	- Construction waste management (M_o) - Recycled Aggregates - Operational waste (M_e), (M_o) - Speculative ceiling and floor finishes - Adaptation to climate change - Functional adaptability
Land Use & Ecology	- Site selection - Ecological value of site and protraction of ecological features - Minimising the impact of existing site ecology (M_v) - Enhancing site ecology - Long term impact on biodiversity
Pollution	- Impact of refrigerants - NO_x emissions - Surface water run-off - Reduction of night-time light pollution - Noise attenuation

9. Appendix D: Credit Weightings BREEAM 2014

The weightings for the associated credits depending on the assessment route are shown in Table D1 below.

Section	Section Weighting			No. of credits available	Value of Each Credit
	Fully-fitted	Shell only	Shell and core	Fully-fitted	
Management	12.0%	12.5%	11.0%	21	0.57%
Health and Wellbeing	15.0%	10.0%	10.5%	18	0.83%
Energy	15.0%	14.5%	15.0%	20	0.75%
Transport	9.0%	11.5%	10.0%	9	1.00%
Water	7.0%	4.0%	7.5%	9	0.78%
Materials	13.5%	17.5%	14.5%	14	0.96%
Waste	8.5%	11.0%	9.5%	8	1.06%
Land Use and Ecology	10.0%	13.0%	11.0%	10	1.00%
Pollution	10.0%	6.0%	11.0%	13	0.85%
Innovation	10.0%	10.0%	10.0%	10	1.00%

Table D1: BREEAM Credit Weightings

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