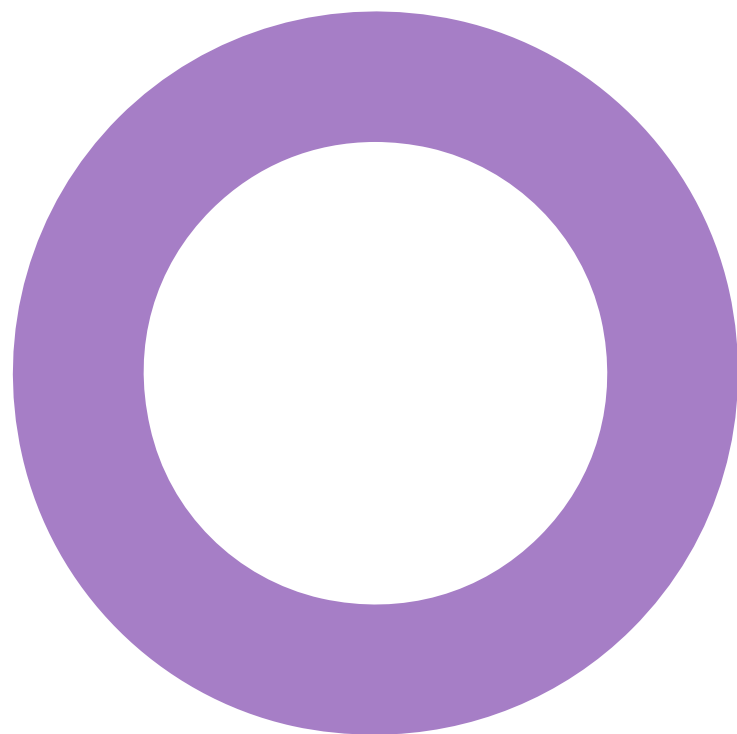


**Richmond Royal Hospital.
London.**
UKI Richmond Ltd.

SUSTAINABILITY

BREEAM 2014 DOMESTIC REFURBISHMENT
PRE-ASSESSMENT REPORT
REVISION D - 23 NOVEMBER 2018



Audit sheet.

Rev.	Date	Description	Prepared	Verified
A	25/07/2018	Draft BREEAM pre-assessment for comment by design team.	A. Ravindran	S. Carlsson
B	17/08/2018	Draft BREEAM pre-assessment, updated following BREEAM Workshop 09/08/2018.	A. Ravindran	S. Carlsson
C	29/08/2018	BREEAM pre-assessment for planning	S. Carlsson	S. Revie
D	23/11/2018	Updated for planning	S. Carlsson	S. Revie

This document has been prepared for UKI Richmond Ltd only and solely for the purposes expressly defined herein. We owe no duty of care to any third parties in respect of its content. Therefore, unless expressly agreed by us in signed writing, we hereby exclude all liability to third parties, including liability for negligence, save only for liabilities that cannot be so excluded by operation of applicable law. The consequences of climate change and the effects of future changes in climatic conditions cannot be accurately predicted. This report has been based solely on the specific design assumptions and criteria stated herein.

Document reference: REP-2323114-SC-20180626-BREEAM 2014 DR Pre-assessment-Rev D

BREEAM Audit box

BRE registration number	-
Licensed assessor	S. Carlsson
Assessor support	A. Ravindran
BREEAM scheme	BREEAM 2014 Domestic Refurbishment
BREEAM scheme version	2.2
Assessment stage	Pre-Assessment
Technical manual version	SD 5077 Issue 2.2
Tier code (internal use only)	T3

Contents.

Audit sheet.	2
BREEAM Audit box	3
1. Executive summary	5
2. BREEAM Pre-Assessment	6
2.1 Introduction	6
2.2 Initial Pre-Assessment	6
2.3 Revised Pre-Assessment	6
3. Summary Score Sheet	7
4. Project Team Members	8
5. Conclusion	9
6. Appendix A: Detailed Credit Assessment	10
Appendix B: Overview of BREEAM	25
Introduction	25
BREEAM Process	25
Appendix C: Credit Weightings BREEAM 2014	25
Appendix D: Minimum Requirements	25
Appendix E: Hea 03 Volatile Organic Compounds	26

1. Executive summary

This report provides the BREEAM 2014 Domestic Refurbishment pre-assessment for the proposed Richmond Royal Hospital scheme.

The proposed development is a mixed-use scheme of affordable and private apartments, with lower ground healthcare facility and car park. This report focuses solely on the change of use healthcare to residential dwellings, referred to as the refurbished dwellings. This relates to the dwellings within Buildings A to E. The proposed development is in the Kew Foot Road Conservation Area 36, including a Grade II listed building (Building C) and buildings of townscape merit. Therefore the dwellings can be treated using the 'historic dwellings' criteria.

The proposed development is targeting a BREEAM 'Excellent' rating for the BREEAM 2014 DR assessment described in this report, in line with London Borough Richmond (LBR) Local Plan (LP) planning policy 22, which requires *proposals for change of use to residential will be required to meet BREEAM Domestic Refurbishment 'Excellent' standard (where feasible).*

It is recommended that the design team should aim to meet all the minimum requirements. As the Proposed Development is in a conservation area with Building C Grade II listed building and the remaining buildings noted as buildings with townscape merit, where it is demonstrable that the minimum requirements are not feasible, these should be outlined and agreed exempt with consultation with LBR.

The dwellings in the Grade II listed building are not anticipated to achieve a BREEAM 'Excellent' rating. This is as a result of limited fabric upgrades.

For the remaining refurbished dwellings, the current target score is 73.48%, which is equivalent to an 'Excellent' rating with a 3.48% margin. Additional potential credits have also been identified, which will be reviewed at detailed design.

A margin of at least 3% – 5% of contingency is recommended, above the minimum required score to ensure that the targeted rating is achieved at the post construction stage.

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

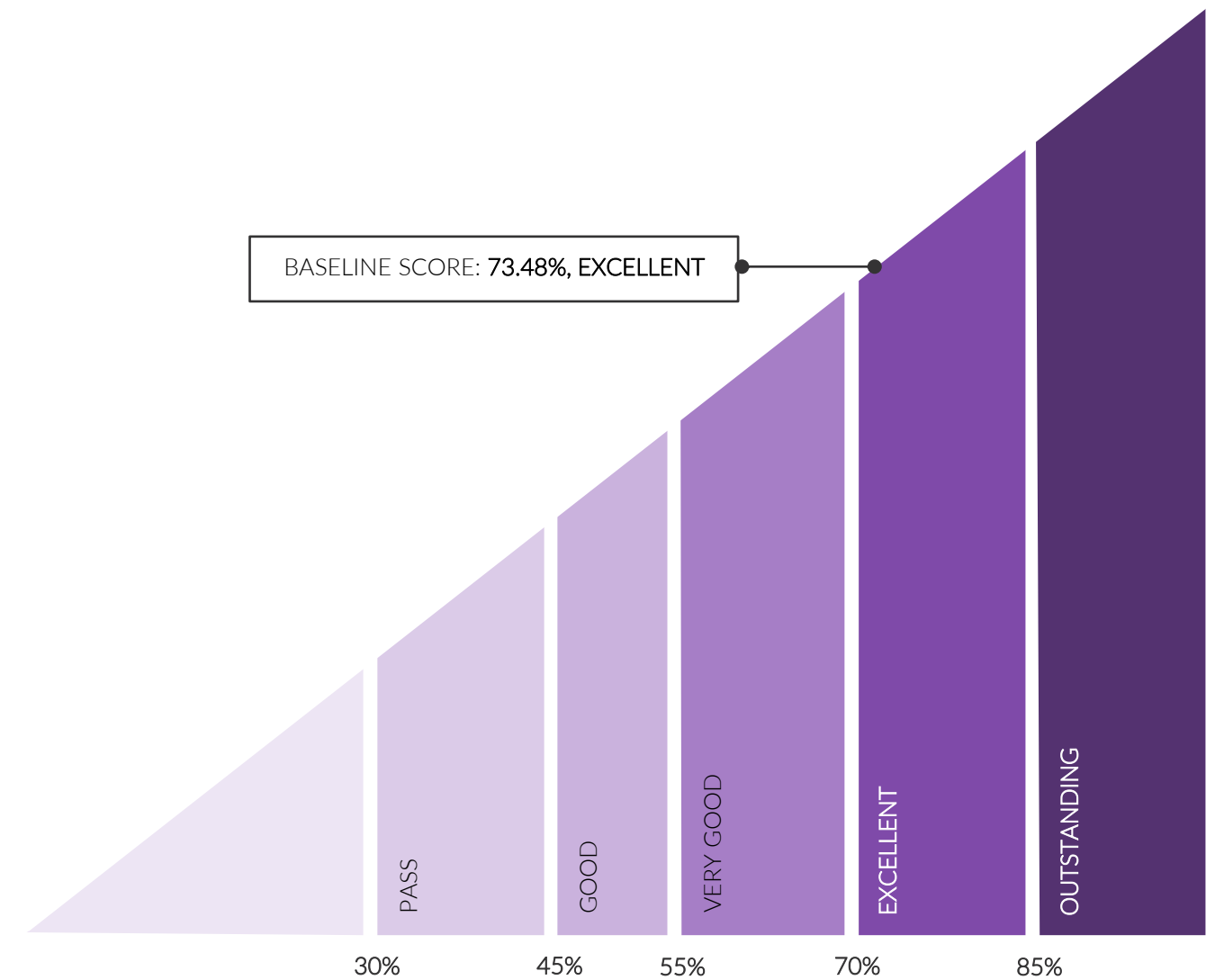


Figure 1: BREEAM 2014 Pre-Assessment Score – buildings with townscape merit.

2. BREEAM Pre-Assessment

2.1 Introduction

This report relates to the proposed non-new build residential elements of the Richmond Royal Hospital scheme. It is recommended the building should be registered and assessed under the BREEAM 2014 Domestic Refurbishment (DR) scheme.

The proposed development is a residential development consisting of affordable and private apartments. There is an area of healthcare facility that is not included within the BREEAM DR assessment. The proposed development is targeting a BREEAM 'Excellent' rating for the BREEAM 2014 DR assessment described in this report.

2.2 Initial Pre-Assessment

A draft pre-assessment has been carried out independently by a qualified BREEAM assessor prior to a review by the project design team. This report set out a route to achieving the target rating, and highlights the design team members responsible for each credit issue. All mandatory and minimum standards for the 'Excellent' rating have been targeted within the baseline score.

Given that Building C is a Grade II listed building, it is anticipated that this will be exempt from the minimum standards for an 'Excellent' rating. The remaining buildings are also in a conservation area and can be treated following the 'historic building' criteria. As such, these buildings may also be exempt from some of the minimum requirements for 'Excellent', provided the reasons for not achieving these are easily demonstrable and agreed with the council.

2.3 Revised Pre-Assessment

This pre-assessment has been reviewed with the architect and client at a BREEAM workshop (09/08/2018). This report sets out a route to achieving the target rating, and highlights the design team members responsible for each credit issue.

The initial strategy targets the following baseline and potential percentage values:

- Baseline score / rating: 73.48% equivalent to an 'Excellent' rating

Note: All mandatory and minimum standards for the 'Excellent' rating have been targeted within the baseline score.

Currently the dwellings in the Grade II listed building are not anticipated to achieve a BREEAM 'Excellent' rating. This is as a result of limited fabric upgrades.

The remaining buildings are also in a conservation area and have been identified as buildings with townscape merit. They therefore are assessed following the 'historic building' criteria. As such, these buildings may also be exempt from some of the minimum requirements for 'Excellent', though no exceptions are currently sought at this stage. Should these be identified as the design develops, the design team is to provide the reasons for not achieving these and agree the approach with the council.

3. Summary Score Sheet

The summary table below highlights the list of targeted credits for the current BREEAM Domestic Refurbishment 2014 pre-assessment. Mandatory credits to achieve a 'Excellent' rating and above are highlighted by (M). For further detail on the mandatory credits refer to Appendix D.

Table 3.1: BREEAM Target Summary.

Category	Issue	Credits		
		Available	Targeted	Potential
Management	Man01: Home User Guide	3	3	-
	Man02 Responsible Construction Practices	2	2	-
	Man03 Construction Site Impacts	1	1	-
	Man04 Security	2	2	-
	Man05 Protection and Enhancement of Ecological Features	1	1	-
	Man06 Project Management	2	1	-
Health & Wellbeing	Hea01 Daylighting	2	0	-
	Hea02 Sound Insulation	4	2	-
	Hea03 Volatile Organic Compounds	1	1	-
	Hea04 Inclusive Design	2	1	-
	Hea05 Ventilation (M)	2	1	-
	Hea06 Safety (M)	1	1	-
Energy	Ene01 Improvement in Energy Efficiency Rating	6	3	-
	Ene02 Energy Efficiency Rating Post Refurbishment (M)	4	3	-
	Ene03 Primary Energy Demand	7	4.5	-
	Ene04 Renewable Technologies	2	2	-
	Ene05 Energy Labelled White Goods	2	2	-
	Ene06 Drying Space	1	0	-
	Ene07 Lighting	2	2	-
	Ene08 Energy Display Devices	2	2	-
	Ene09 Cycle Storage	2	2	-
	Ene10 Home Office	1	1	-
Water	Wat01 Internal Water Consumption (M)	3	2.5	-
	Wat02 External Water Use	1	1	-
	Wat03 Water Meter	1	0	-
Materials	Mat01 Environmental Impact of Materials (M)	25	13	-
	Mat02 Responsible Sourcing of Materials	15	9	-

Category	Issue	Credits		
		Available	Targeted	Potential
	Mat03 Insulation	8	8	-
Waste	Was01 Household Waste	2	2	-
	Was02 Refurbishment Site Waste Management	3	3	-
Pollution	Pol01 Impact of Refrigerants	3	3	-
	Pol02 Surface Water Runoff	3	1	-
	Pol03 Flooding (M)	2	2	-
Innovation	Man02 Responsible Construction Practices	1	0	-
	Man05 Protection and Enhancement of Ecological Value	1	0	-
	Man06 Project Management	2	0	-
	Hea04 Inclusive Design	1	0	-
	Ene02 Energy Efficiency Rating	1	0	-
	Ene08 Display Energy Devices	1	1	-
	Wat01 Internal Water Use	1	0	-
	Was02 Refurbishment Site Waste Management	1	0	-
	Pol02 Surface Water Run-off	1	0	-
	Score	Targeted weighted score rating:	73.48% 'Excellent' rating	

4. Project Team Members

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

Discipline	Organisation	Abbreviation
Client	UKI Richmond Ltd.	UKIR
Project Manager	RER	RER
Architect	Rolfe Judd	RJ
Building Cost Consultant	Gleeds	-
Building Control	MLM	MLM
Fire Consultant	Zeta	-
Heritage Consultant	KM Heritage	KMH
Interior Designers	AJC Designs	AJC
M&E	Hoare Lea	HL
Planning Consultant	DP9 Ltd	DP9
Public Relations Consultant	Snapdragon Consulting	SC
Structural Engineer	Walsh Associates	WA
Transport	Royal Haskoning	RH
Ecologist	Halpin Robbins	HP

Table 2: Project Team Members.

5. Conclusion

Based on a review of the outline design proposal against the BREEAM criteria, targeted credits have been set in order to develop a strategy to meet a BREEAM 'Excellent' rating. All minimum standards are targeted to achieve the 'Excellent' rating, however there is currently only a minimal margin.

- Baseline score / rating: 73.48% equivalent to an 'Excellent' rating

Through detailed design, the design team will continue to review their respective credits and confirm where the potential credits highlighted can be incorporated into the design, in order to ensure that an 'Excellent' rating can be achieved post construction.

Currently the dwellings in the Grade II listed building are not anticipated to achieve a BREEAM 'Excellent' rating. This is as a result of limited fabric upgrades. Should the dwellings in the Grade II listed building need to comply with BREEAM 'Excellent' additional credits would need to be sought. This also accounts for these dwellings being exempt from the minimum requirements for energy and ventilation.

The remaining buildings of townscape merit, are treated following the 'historic building' criteria. As such, these buildings may also be exempt from some of the minimum requirements for 'Excellent', provided the reasons for not achieving these are easily demonstrable and agreed with LBR's conservation officer.

Figure 2 outlines how the proposed development scores in each category.

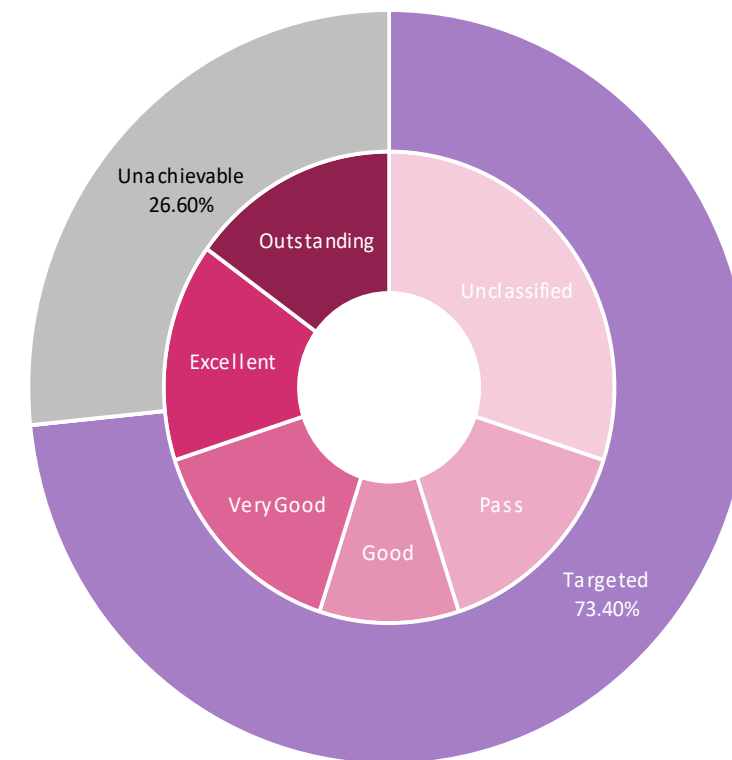
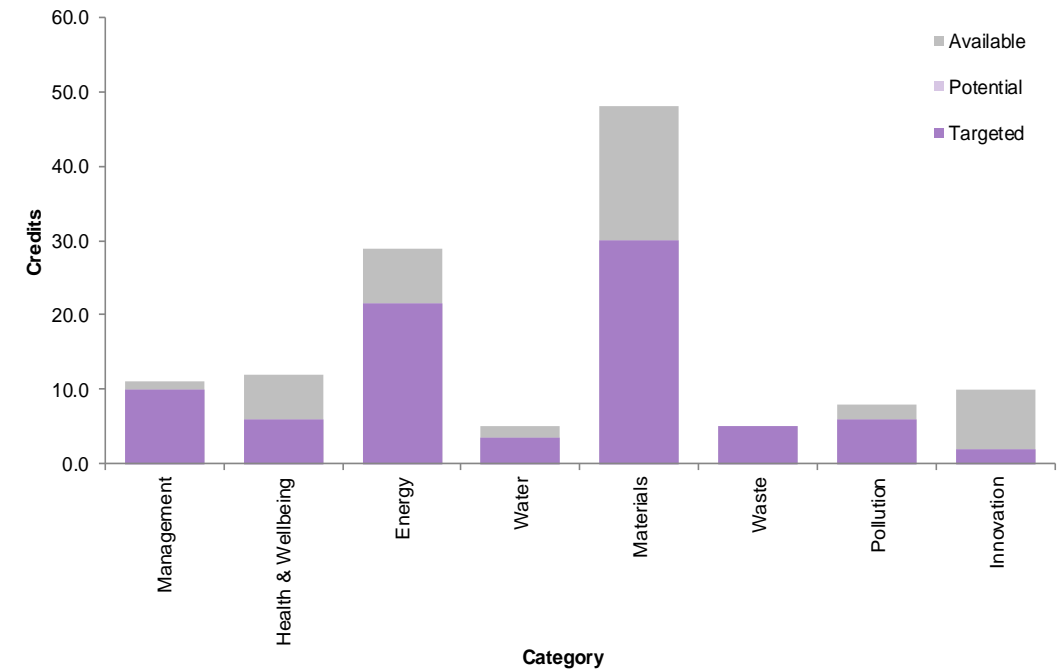


Figure 2: BREEAM Performance Summary and Targeted Credits.



6. Appendix A: Detailed Credit Assessment


Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
Management					
Man 01 Home User Guide	Three credits - Home User Guide Provision of a home user guide: Where a home user guide containing the information listed in the 'user guide contents list' has been produced and supplied to all homes. Refer to the User Guide Contents List and ensure the Home User Guide that is produced covers all listed items.	3	3	TO BE INCLUDED IN PROJECT PRELIMINARIES Home user guide can be produced/ requirement for the contractor to produce including all required contents. BREEAM Workshop (09/08/2018) RER confirmed achievable.	Cost Consultant/ Project Manager
Man 02 Responsible Construction Practices (Large Scale Projects)	Two credits - Large-Scale Projects Option 1 - Where the principal contractor has used the Considerate Constructors Scheme (CCS). Credits are awarded depending on the CCS Code of Considerate Practice score achieved One Credit: 25-34 with score of 5 in each section Two Credits: 35-39 with a score of 7 in each section	2	2	TO BE INCLUDED IN PROJECT PRELIMINARIES Include requirement to achieve a CCS score of 40 in the preliminaries documentation. BREEAM Workshop (09/08/2018) RER confirmed 2 credits to be targeted with 'exemplary' level credit (achieving CCS of 40 or more) to be identified as a potential.	Cost Consultant/ Project Manager
	Innovation Credit 40 or more with a score of 7 in each section	1	0	BREEAM Workshop (09/08/2018) Confirmed this would be a potential credit to be reviewed with contractor.	Cost Consultant
Man 03 Construction Site Impacts (Large Scale Projects)	One credit: Large-Scale Projects Where there is evidence to demonstrate that 2 or more of the sections a-e in Checklist A-4; Large Scale Refurbishments are completed: Monitor, report and set targets for CO2 production of energy use arising from site activities Monitor, report and set targets for water consumption arising from site activities A main contractor with an environmental materials policy A main contractor that operates an Environmental Management System 80% of site timber is reclaimed, re-used or responsibly sourced	1	1	TO BE INCLUDED IN PROJECT PRELIMINARIES Include requirement to achieve construction site monitoring elements. Monthly progress reports to be required in order to demonstrate compliance. BREEAM Workshop (09/08/2018) RER confirmed achievable.	Cost Consultant/ Project Manager
Man 04 Security	Secure windows and doors Where retained external doors and accessible windows comply with the minimum security requirements as set out in CN6 Where the following newly added features are appropriately certified: External door sets (PAS 24:2007 or LPS 1175 Issue 7 Security Rating 1) Windows (BS 7950:1997 or LPS 1175 Issue 7 Security Rating 1)	1	1	To be included in architect's specification. BREEAM Workshop (09/08/2018) RJ confirmed achievable.	Architect
	Secured by design Where the principles and guidance of Secured by Design Section 2 - Physical Security are complied with.	1	1	Security specialist is appointed for scheme and principles of Secured by Design followed.	Architect

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	A suitably qualified security consultant such as the Police Architectural Liaison Officer (ALO) or Crime prevention design advisor (CPDA) is consulted at the design stage and their recommendations are incorporated into the refurbishment specification.			BREEAM Workshop (09/08/2018) RJ confirmed achievable – to send over consultation with ALO / CPDA.	
Man 05 Protection and Enhancement of Ecological Features	<p>Protecting ecological features Where a site survey is carried out by a member of the project team or a Suitably Qualified Ecologist (SQE) to determine the presence of ecological features.</p> <p>Where protected species have been identified as present on site, the relevant Statutory Nature Conservation Organisation (SNCO) has been notified and protected species have been adequately protected</p> <p>Where all existing features of ecological value (including any of those listed in CN1) on the refurbishment site potentially affected by the works, are maintained and adequately protected during refurbishment works</p>	1	1	<p>If no ecologist appointed, member of project team to determine the presence of ecological features.</p> <p>BREEAM Workshop (09/08/2018) RER confirmed 1 credit achievable, 'exemplary' level credit identified as potential. Halpin Robbins appointed as ecologist. HL have issued BREEAM DR Ecology checklist for inclusion in ecologist's report.</p>	Project Manager/ Ecologist
	<p>Innovation Credit Where a Suitably Qualified Ecologist has been appointed to recommend appropriate ecological features that will positively enhance the ecology of the site and where the developer adopts all general ecological recommendations and 30% of additional recommendations.</p>	1	0 (1)	<p>Credit pursued as a potential.</p> <p>BREEAM Workshop (09/08/2018) Confirmed this would be a potential credit pending confirmation from ecologist.</p>	Ecologist
Man 06 Project Management	<p>Project Roles and Responsibilities Where all of the project team are involved in the project decision making and individual and shared roles and responsibilities are assigned in accordance with CN1 and CN2 as follows: For small scale projects, the project manager writes a project implementation plan and holds an initiation meeting to assign individual and shared responsibilities amongst the project team including all trades on site: For large scale projects, the project manager assigns individual and shared responsibilities across the following key design and refurbishment stages: – Planning and Building control notification – Design – Refurbishment – Commissioning and handover – Occupation</p>	1	1	<p>Roles & responsibility matrix to be provided / Project Execution Plan (PEP).</p> <p>BREEAM Workshop (09/08/2018) RER confirmed achievable and will send over PEP / briefing document / responsibility matrix.</p>	Client / Project Manager
	<p>Handover and Aftercare Where a handover meeting is arranged Where 2 or more of items a-c have been committed to determine project success: 1. site inspection within 3 months of occupation. 2. Conduct post occupancy interviews with building occupants or a survey via phone or posted information within 3 months of occupation. 3. Longer term after care e.g. a helpline, nominated individual or other appropriate system to support building users for at least the first 12 months of occupation.</p>	1	1	<p>A site inspection and post occupancy evaluation can be provided, although will incur additional cost.</p> <p>BREEAM Workshop (09/08/2018) RER confirmed achievable.</p>	Project Manager/ Client
	<p>Innovation Credit: Early Design Input Where a BREEAM Accredited Professional (AP) has been appointed to oversee key stages within the project at an early stage, prior to the production of a refurbishment specification.</p>	1	0	<p>Potential to include BREEAM AP services in appointment.</p> <p>N/A</p>	-

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	For small scale projects where a BREEAM Accredited Professional (AP) or BREEAM Domestic Refurbishment Assessor has been appointed to oversee key stages within the project at an early stage, prior to the production of a refurbishment specification.				
	Innovation Credit: Thermographic Surveying and Airtightness Testing Where Thermographic surveying and Airtightness testing have been carried out at both pre and post refurbishment stages. Where an improved air tightness target has been set at design stage and testing demonstrates that this has been achieved post refurbishment.	1	0	Potential to commission airtightness and thermographic testing, although this will incur additional cost in order to collect baseline data. Not currently identified as a potential.	Project Manager/ Cost Consultant
Health and Wellbeing					
Hea 01 Daylighting	Maintaining good daylighting For existing dwellings and change of use projects (e.g. conversions) The refurbishment results in a neutral impact on the dwellings daylighting levels in the kitchen, living room, dining room and study with "no" answered for all questions in Appendix A: Hea 01, parts 1 and 2 (for existing dwellings) or parts 3 and 4 (for change of use e.g. conversions). Where the property is being extended: new spaces achieve minimum daylighting levels See Criteria CN1 the extension does not significantly reduce daylighting levels in the kitchen, living room, dining room or study of neighbouring properties. See CN4	1	0 (1)	BREEAM Workshop (09/08/2018) RER confirmed daylight consultant appointed. Daylight checklist issued with this report to be sent to Point 2 Surveyor to identify whether one credit is achievable. Currently targeted as potential.	-
	Minimum daylighting Up to two credits - Daylighting (building type dependent) Daylighting criteria have been met using either of the following options: The relevant building areas meet good practice daylight factor(s) and other criterion as outlined in Table - 10 and Table - 11. OR The relevant building areas meet good practice average and minimum point daylight illuminance criteria as outlined in Table - 12.	1	0	Not currently targeted.	-
Hea 02 Sound Insulation	Option 1: Properties where sound testing has been carried out: Where sound testing has been carried out and where the dwelling meets or goes beyond Regulations, up to four credits may be awarded according to the sound insulation credit requirements as shown -below: <ul style="list-style-type: none"> - 2 credits where compliance with Building Regulations Part E is achieved - 3 credits where airborne sound insulation is 3dB higher than Part E and impact sound insulation is 3dB lower than Part E - 4 credits where airborne sound insulation is 5dB higher than Part E and impact sound insulation is 5dB lower than Part E 	4	2	BREEAM Workshop (09/08/2018) Whilst the dwellings are considered historic, they can comply with either option. Given that no pre-testing will be carried out, option 1 is pursued. Design is currently aiming for compliance with Building Regs Part E, therefore 2 credits are targeted.	Project Manager/ Acoustician
	Option 2: Historic Buildings Where the dwelling is a Historic Building and sound testing results demonstrate existing separating walls and floor meet the Historic Building credit requirements, up to four credits may be awarded as shown below: <ul style="list-style-type: none"> - 1 credit where no worse than the values determined pre-refurbishment (via pre testing) - 2 credits where airborne sound insulation is 3dB higher than before refurbishment and impact sound insulation is 3dB lower than before refurbishment - 3 credits where airborne sound insulation is 5dB higher than before refurbishment and impact sound insulation is 5dB lower than before refurbishment 				-

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	- 4 credits where airborne sound insulation is 8dB higher than before refurbishment and impact sound insulation is 8dB lower than before refurbishment				
Hea 03 Volatile Organic Compounds	<p>Avoiding the use of VOCs Where all decorative paints and varnishes used in the refurbishment have met the low VOC requirements outlined in Appendix E.</p> <ul style="list-style-type: none"> - Where at least five of the eight remaining product categories listed have met the testing requirements and emission levels for Volatile Organic Compound (VOC) emissions against the relevant standards identified in Appendix E. <ul style="list-style-type: none"> - Wood Panels - Timber Structures - Wood flooring - Resilient, textile and laminated Floor coverings - Suspended ceiling tiles - Flooring adhesives (and if relevant adhesives for rigid wall coverings) - Wall-coverings - Adhesive for hanging flexible wall-coverings (for rigid wall coverings use flooring adhesives criteria) - Where five or fewer products are specified within the refurbishment, all must meet the requirements in order to achieve this credit. 	1	1	<p>TO BE INCLUDED IN ARCHITECTURAL SPECIFICATIONS</p> <p>Architect to review finishes specifications and include suitable project outline specifications, or specific projects that achieve the specification requirements.</p> <p>BREEAM Workshop (09/08/2018) RJ confirmed achievable.</p>	Architect
Hea 04 Inclusive Design	<p>Minimum accessibility An access expert or suitably qualified member of the design team (CN6) has completed section 1 of Checklist A8; Access Statement Template, accessibility template with evidence provided of the measures implemented in the refurbishment a. The access statement demonstrates reasonable provision to provide accessibility to the dwelling covering section 1 of Checklist A8; Access Statement Template in accordance with CN3 and CN4.</p>	1	1	<p>NRAC (National Register of Access Consultants) Access coordinator to complete suitable checklist to advise on access to the dwellings.</p> <p>BREEAM Workshop (09/08/2018) RJ will act as the 'inclusive design champion' - to provide letter that they meet the requirements and complete the checklist issued with this report.</p>	Architect
	<p>Advanced accessibility An access expert or suitably qualified member of the design team (CN6) has completed sections 1 and 2 of Checklist A8; Access Statement Template with evidence provided of the measures implemented in the refurbishment The access statement demonstrates reasonable provision to provide accessibility to the dwelling covering sections 1 and 2 of Checklist A8; Access Statement Template in accordance with CN3 and CN4.</p>	1	0 (1)	<p>NRAC Access coordinator to complete suitable checklist to advise on access to the dwellings. Credit targeted as potential only.</p> <p>BREEAM Workshop (09/08/2018) RJ will act as the 'inclusive design champion' - to provide letter that they meet the requirements and complete the checklist issued with this report. Credit targeted as a potential at this stage, given the different levels in the development.</p>	Architect
	<p>Innovation Credit One innovation credit can be awarded where an access expert suitably qualified member of the design team (CN6) has completed sections 1, 2 and 3 of Appendix A: Hea 04 1, access statement template with evidence provided of the measures implemented in the refurbishment The access statement demonstrates reasonable provision to meet sections 1, 2 and 3 of Appendix A: Hea 04 1 in accordance with CN3 and CN4.</p>	1	0	Not currently targeted	


Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
<p>Hea 05 Ventilation</p>  <p>Mandatory: 1 credit for Excellent</p>	<p>Minimum ventilation requirements</p> <p>A minimum level of background ventilation is provided (with trickle ventilators or other means of ventilation) for all habitable rooms, kitchens, utility rooms and bathrooms compliant with section 7, Building Regulations Approved Document Part F, 2010. A minimum level of extract ventilation is provided in all wet rooms (e.g. kitchen, utility and bathrooms), compliant with section 5, Building Regulations Approved Document Part F 2010. A minimum level of purge ventilation is provided in all habitable rooms and wet rooms, compliant with section 7, Building Regulations Approved Document Part F, 2010.</p> <p>Historic Buildings:</p> <p>One credit is awarded where an assessment is carried out to establish the current levels of air tightness and structural moisture prior to the specification of fabric measures and heating systems. The assessment should establish the appropriate level of ventilation for the building, based upon:</p> <ul style="list-style-type: none"> - The minimum ventilation requirement to meet that set out in Building Regulations Approved Document Part F - Ventilation rates in all habitable and inhabitable spaces are sufficient to allow structural moisture to be dealt with effectively. This may be required by Building Regulations Approved Document Part F where the structure or fixtures needs higher levels of ventilation in order to deal with moisture levels. 	1	1	<p>MINIMUM STANDARDS All Ratings Levels: 1 credit</p> <p>TO BE INCLUDED IN MEP SPECIFICATION</p> <p>Historic Building criteria apply: Air Tightness testing and structural moisture assessments to be carried out pre-refurbishment.</p> <p>Suitable Ventilation to be provided and included in MEP Specification</p> <p>BREEAM Workshop (09/08/2018) RER raised concern over carrying out air tightness test and structural moisture assessment. However, this is a mandatory requirement and will need to be carried out pre-refurbishment. HL have issued RER additional information.</p>	M&E M&E M&E -
	<p>Advanced ventilation</p> <p>Ventilation is provided for the dwelling that meets the requirements of Section 5 of Building Regulations Part F in full</p> <p>Historic Buildings:</p> <p>The first credit is achieved and where the following testing was also carried out in order to develop the ventilation and air tightness strategy for the building:</p> <ul style="list-style-type: none"> - Pressure testing was carried out before and after refurbishment in accordance with the appropriate standard - Temperature and humidity is monitored before and after refurbishment. 	1	0	<p>Not currently targeted.</p> <p>BREEAM Workshop (09/08/2018) RER confirmed that pressure testing, temp and humidity will not be carried out pre and post refurbishment, therefore this credit is not targeted.</p>	M&E -
<p>Hea 06 Safety</p>  <p>Mandatory: 1 credit for Excellent</p>	<p>Fire & carbon monoxide detection and alarm systems</p> <p>Where the dwelling is provided with a compliant fire detection and alarm system. Fire detection and alarm systems should be in accordance with BS 5839-6:2013 and to at least a Grade D Category LD3 standard. The positioning of smoke and heat alarms should be in accordance with building Regulations Part B Fire Safety Volume 1 – Dwellinghouses 2006. Where the project involves an electrical rewire, Smoke and heat alarms should be mains operated and conform to BS EN 14604:2005 (which has preceded BS 5446-1: 2000) or BS 5446-2:2003 respectively. They should have a standby power supply, such as a battery (either rechargeable or non-rechargeable) or capacitor.</p> <p>Where the dwelling is supplied with mains gas or where any other form of fossil fuel is used within the building (e.g. coal), a compliant carbon monoxide detector and alarm system is provided. Carbon monoxide detector and alarm system should be in accordance with and positioned in accordance to BS EN 50291-1:2010+A1:2012 and BS EN 50292:2013 and should carry a British or European approval mark</p> <p>Where the project involves electrical re-wiring the power supply for the smoke alarm and compliant carbon monoxide alarm systems are derived from the dwellings main electricity supply in accordance with CN5. Please see CN9 for compliance where properties are undertaking electrical rewiring.</p>	1	1	<p>MINIMUM STANDARDS: All Rating Levels: 1 credit</p> <p>TO BE INCLUDED IN MEP SPECIFICATION Specification of Fire Detection and Alarm services to be provided and included in MEP Specification.</p> <p>Specification of Detection and Alarm services to be provided and included in MEP Specification. Where central gas / CHP are included, carbon monoxide meter needs to be included in plant room.</p> <p>BREEAM Workshop (09/08/2018) HL confirmed will be in specifications.</p>	M&E


Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member																										
		Available	Targeted (Potential)																												
	Where the project does not involve electrical re-wiring the power supply for the smoke alarm and carbon monoxide alarm systems are derived from a battery supply.																														
Energy																															
<p>Ene 01 Improvement in Energy Efficiency Rating</p>	<p>Up to 6 credits - Improving the Dwelling's Energy Efficiency Rating (EER) Where the refurbishment results in an improvement to the dwelling's Energy Efficiency Rating, in accordance with CN2.</p> <table border="1"> <thead> <tr> <th>BREEAM credits</th> <th>EPR_{NC}</th> </tr> </thead> <tbody> <tr><td>0.5</td><td>≥5</td></tr> <tr><td>1</td><td>≥9</td></tr> <tr><td>1.5</td><td>≥13</td></tr> <tr><td>2</td><td>≥17</td></tr> <tr><td>2.5</td><td>≥21</td></tr> <tr style="border: 2px solid red;"><td>3</td><td>≥26</td></tr> <tr><td>3.5</td><td>≥31</td></tr> <tr><td>4</td><td>≥36</td></tr> <tr><td>4.5</td><td>≥42</td></tr> <tr><td>5</td><td>≥48</td></tr> <tr><td>5.5</td><td>≥54</td></tr> <tr><td>6</td><td>≥60</td></tr> </tbody> </table>	BREEAM credits	EPR _{NC}	0.5	≥5	1	≥9	1.5	≥13	2	≥17	2.5	≥21	3	≥26	3.5	≥31	4	≥36	4.5	≥42	5	≥48	5.5	≥54	6	≥60	6	3	<p>The targeted credits are based on a sample of indicative SAP assessments carried out pre-planning.</p> <p>To be updated during detailed design.</p> <p>August 2018 RJ has confirmed areas being treated as new build / refurb. Refurbished dwellings / extensions have been modelled using SAP RD to inform the number of energy credits that should be targeted.</p> <p>Note these credits are not awarded for the listed building - fewer credits are anticipated.</p>	M&E
BREEAM credits	EPR _{NC}																														
0.5	≥5																														
1	≥9																														
1.5	≥13																														
2	≥17																														
2.5	≥21																														
3	≥26																														
3.5	≥31																														
4	≥36																														
4.5	≥42																														
5	≥48																														
5.5	≥54																														
6	≥60																														
<p>Ene 02 Energy Efficiency Rating Post Refurbishment</p>  <p>Mandatory: 2.5 credits for Excellent</p>	<p>Up to 4 credits - EER Post-Refurbishment Where as a result of refurbishment, the dwelling meets a minimum Energy Efficiency Rating, credits can be awarded:</p>	4	3	<p>Current SAP assessments anticipated to achieve the identified credits.</p> <p>The targeted credits are based on a sample of indicative SAP assessments carried out pre-planning.</p> <p>To be updated during detailed design.</p> <p>Building C is exempt from this minimum standard.</p> <p>August 2018 RJ has confirmed areas being treated as new build / refurb. Refurbished dwellings / extensions have been modelled using SAP RD to inform the number of energy credits that should be targeted.</p>	M&E																										

Issue	Credit Requirements			Credits		Comments / Actions	Responsible Team Member																														
				Available	Targeted (Potential)																																
	BREEAM credits	EPR _{NC}	Minimum Requirements			Note these credits are not awarded for the listed building – fewer credits are anticipated.																															
	0.5	50	BREEAM Pass level requires a minimum EER of 50																																		
	1	55	BREEAM Good level requires a minimum EER of 58																																		
	1.5	60																																			
	2.	65	BREEAM Very Good level requires a minimum EER of 65																																		
	2.5	70	BREEAM Excellent level requires a minimum EER of 70																																		
	3	75																																			
	3.5	80	BREEAM Outstanding level requires a minimum EER of 81																																		
	4	85																																			
	<p>Innovation Credit One innovation credit can be awarded where the assessed dwellings achieve an EER post refurbishment of ≥ 90, equivalent to an Energy Performance Certificate b and A</p>			1	0	Not currently targeted																															
Ene 03 Primary Energy Demand	<p>Primary Energy Demand Targets Where as a result of refurbishment the dwelling meets the Primary Energy Demand targets, up to 7 credits may be awarded</p> <table border="1"> <thead> <tr> <th>Innovation credits</th> <th>Equivalent % Criteria</th> </tr> </thead> <tbody> <tr><td>0.5</td><td>400 kWh/m2/year</td></tr> <tr><td>1</td><td>370 kWh/m2/year</td></tr> <tr><td>1.5</td><td>340 kWh/m2/year</td></tr> <tr><td>2</td><td>320 kWh/m2/year</td></tr> <tr><td>2.5</td><td>300 kWh/m2/year</td></tr> <tr><td>3</td><td>280 kWh/m2/year</td></tr> <tr><td>3.5</td><td>260 kWh/m2/year</td></tr> <tr><td>4</td><td>240 kWh/m2/year</td></tr> <tr><td>4.5</td><td>220 kWh/m2/year</td></tr> <tr><td>5</td><td>200 kWh/m2/year</td></tr> <tr><td>5.5</td><td>180 kWh/m2/year</td></tr> <tr><td>6</td><td>160 kWh/m2/year</td></tr> <tr><td>6.5</td><td>140 kWh/m2/year</td></tr> <tr><td>7</td><td>120 kWh/m2/year</td></tr> </tbody> </table>			Innovation credits	Equivalent % Criteria	0.5	400 kWh/m2/year	1	370 kWh/m2/year	1.5	340 kWh/m2/year	2	320 kWh/m2/year	2.5	300 kWh/m2/year	3	280 kWh/m2/year	3.5	260 kWh/m2/year	4	240 kWh/m2/year	4.5	220 kWh/m2/year	5	200 kWh/m2/year	5.5	180 kWh/m2/year	6	160 kWh/m2/year	6.5	140 kWh/m2/year	7	120 kWh/m2/year	7	4.5 (5.5)	<p>The targeted credits are based on a sample of indicative SAP assessments carried out pre-planning.</p> <p>To be updated during detailed design.</p> <p>August 2018 RJ has confirmed areas being treated as new build / refurb. Refurbished dwellings / extensions have been modelled using SAP RD to inform the number of energy credits that should be targeted.</p> <p>Note these credits are not awarded for the listed building.</p>	M&E
Innovation credits	Equivalent % Criteria																																				
0.5	400 kWh/m2/year																																				
1	370 kWh/m2/year																																				
1.5	340 kWh/m2/year																																				
2	320 kWh/m2/year																																				
2.5	300 kWh/m2/year																																				
3	280 kWh/m2/year																																				
3.5	260 kWh/m2/year																																				
4	240 kWh/m2/year																																				
4.5	220 kWh/m2/year																																				
5	200 kWh/m2/year																																				
5.5	180 kWh/m2/year																																				
6	160 kWh/m2/year																																				
6.5	140 kWh/m2/year																																				
7	120 kWh/m2/year																																				

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
Ene 04 Renewable Technologies	<p>One credit – Renewable Technologies Where at least 10% of the dwellings Primary Energy Demand per annum is supplied by low or zero carbon technologies AND</p> <p>Where the dwelling has reduced energy demand prior to the specification of renewable technologies with a maximum Primary Energy Demand as follows: For detached, semi-detached, bungalows and end terraces: 250 kWh/m2/year Mid terraces and flats: 220 kWh/m2/year</p>	1	1	<p>August 2018 Comments as above. Ene 04 credit reliant on 4.5 credits being achieved for Ene 03. Indicative SAPs show this can currently be targeted due to inclusion of CHP, however SAP calculations to be updated at detailed design.</p> <p>Note these credits are not awarded for the listed building.</p>	M&E
	<p>Two credits – Renewable Technologies Where for mid to high rise flats at least 15% of each dwellings Primary Energy Demand per annum is supplied by low or zero carbon technologies. Where for dwellings other than mid to high rise flats at least 20% of each dwellings Primary Energy Demand per annum is supplied by low or zero carbon technologies AND</p> <p>Where the dwelling has reduced energy demand prior to the specification of renewable technologies with a maximum Primary Energy Demand as follows: For detached, semi-detached, bungalows and end terraces: 250 kWh/m2/year Mid terraces and flats: 220 kWh/m2/year</p>	1	1	<p>August 2018 Comments as above.</p>	M&E
Ene 05 Energy Labelled White Goods	<p>Fridges, freezers and fridge-freezers: Fridges and freezers or fridge-freezers are recognised by the Energy Saving Trust Recommended labelling scheme, carrying the Energy Saving Trust Recommended Label OR</p> <p>Where no white goods are provided to the dwelling(s) but the EU Energy Efficiency Labelling Scheme Information Leaflet is provided to each dwelling</p>	1	1	<p>Suitable appliances to be selected.</p> <p>Documentation to be provided within the Home User Guide.</p> <p>BREEAM Workshop (09/08/2018) RJ confirmed achievable.</p>	<p>Architect</p> <p>Cost Consultant/ Project Manager</p>
	<p>Washing machines, dishwashers, tumble dryers and washer dryers Washing machines and dishwashers are recognised by the Energy Saving Trust Recommended labelling scheme, carrying the Energy Saving Trust Recommended Label AND EITHER Washer dryers and tumble dryers have a B rating under the EU Energy Efficiency Labelling Scheme (where a washer dryer is provided, it is not necessary to also provide a washing machine) OR</p> <p>Where a washer dryer or tumble dryer is not provided, the EU Energy Efficiency Labelling Scheme Information Leaflet is provided to each dwelling.</p>	1	1	<p>Suitable appliances to be selected.</p> <p>Documentation to be provided within the Home User Guide.</p> <p>BREEAM Workshop (09/08/2018) RJ confirmed achievable.</p>	<p>Architect</p> <p>Cost Consultant/ Project Manager</p>
Ene 06 Drying Space	<p>One credit – Drying Space An adequate, secure internal or external space with posts and footings, or fixings holding: 1-2 bedrooms: 4m+ of drying line 3+ bedrooms: 6m+ of drying line</p>	1	0	<p>Credit not targeted. Architect to advise if drying lines are likely to be installed.</p> <p>BREEAM Workshop (09/08/2018) RJ/RER confirmed would only be pursued if short for credits.</p>	Architect / Client
Ene 07 Lighting	<p>External lighting</p>	1	1	<p>TO BE INCLUDED IN MEP SPECIFICATIONS Lighting requirements to be included in the electrical specifications.</p>	M&E

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	Where Energy Efficient Space lighting (including lighting in communal areas) and Energy Efficient Security lighting is provided OR where Energy Efficient Space lighting (including lighting in communal areas) and no Security Lighting is provided			BREEAM Workshop (09/08/2018) HL confirmed will be in specifications.	
	Internal Lighting One credit is awarded where the energy required for internal lighting is minimised through the provision of a maximum average wattage across the total floor area of the dwelling of 9 watts/m2	1	1	TO BE INCLUDED IN MEP SPECIFICATIONS Lighting requirements to be included in the electrical specifications. BREEAM Workshop (09/08/2018) HL confirmed will be in specifications.	M&E
Ene 08 Energy Display Devices	One credit - Energy Display Devices Where current electricity consumption data is displayed to occupants by a compliant energy display devices OR Where current primary heating fuel consumption data is displayed to occupants by a compliant Energy Display Devices	1	1	TO BE INCLUDED IN MEP SPECIFICATIONS Include compliant energy metering devices in a suitable location BREEAM Workshop (09/08/2018) RER confirmed will be installed, as done on previous projects.	M&E
	Two credits - Energy Display Devices Where current electricity AND primary heating fuel consumption data are displayed to occupants by a compliant correctly specified Energy Display Devices OR Where electricity is the primary heating fuel and current electricity consumption data are displayed to occupants by a compliant Energy Display Devices.	1	1	TO BE INCLUDED IN MEP SPECIFICATIONS Include compliant energy metering devices in a suitable location. BREEAM Workshop (09/08/2018) RER confirmed will be installed, as done on previous projects.	M&E -
	Innovation Credits Where criterion 3 or 4 have been achieved (above) Where any specified Energy Display Devices is capable of recording consumption data	1	1	TO BE INCLUDED IN MEP SPECIFICATIONS Include compliant energy metering devices in a suitable location BREEAM Workshop (09/08/2018) HL to include in specifications.	M&E
Ene 09 Cycle Storage	One credit - Cycle Storage Where individual or communal compliant cycle storage is provided for the following number of cycles: Studios or 1 bedroom dwellings – storage for 1 cycle for every two dwellings 2 and 3 bedroom dwellings – storage for 1 cycle per dwelling 4 bedrooms and above – storage for 2 cycles per dwelling	1	1	For one credit to be awarded, 59 storage spaces would need to be provided. BREEAM Workshop (09/08/2018) RJ confirmed 130 spaces have been allowed for. Architect to confirm.	Architect
	Two credits – Cycle Storage Where individual or communal compliant cycle storage is provided for the following number of cycles: Studios or 1 bedroom dwellings – storage for 1 cycle per dwelling 2 and 3 bedroom dwellings – storage for 2 cycles per dwelling 4 bedrooms and above – storage for 4 cycles per dwelling	1	1	For two credits to be awarded, 118 storage spaces would need to be provided. BREEAM Workshop (09/08/2018) RJ confirmed 130 spaces have been allowed for. Architect to confirm.	Architect


Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member																
		Available	Targeted (Potential)																		
Ene 10 Home Office	One credit - Home Office Where sufficient space and services have been provided which allow the occupants to set up a home office in a suitable room with adequate ventilation.	1	1	BREEAM Workshop (09/08/2018) RJ confirmed achievable in all flats, apart from studios. Minimum 1.8m wall length to be identified on floor plans – RJ to confirm regarding studios. Architect and MEP engineer to liaise on appropriate locations for data/power connections.	Architect/ M&E																
Water																					
Wat 01 Internal Water Consumption  Mandatory: 2 credits for Excellent	Up to three credits – Internal Water Use Where terminal fittings meet the equivalent terminal fitting consumption standards as detailed opposite, OR Where the BREEAM Domestic Refurbishment Wat 01 calculator is used to determine the dwellings water consumption, credits may be awarded depending on the calculated whole house water consumption as detailed in the table below: <table border="1" data-bbox="498 865 1270 1270"> <thead> <tr> <th>% Improvement</th> <th>No. of BREEAM Credits</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>> 150 litres per person per day</td> </tr> <tr> <td>0.5</td> <td>from 140 to ≤ 150 litres per person per day</td> </tr> <tr> <td>1</td> <td>from 129 to < 140 litres per person per day</td> </tr> <tr> <td>1.5</td> <td>from 118 to < 129 litres per person per day</td> </tr> <tr> <td>2</td> <td>from 107 to < 118 litres per person per day</td> </tr> <tr> <td>2.5</td> <td>from 96 to < 107 litres per person per day</td> </tr> <tr> <td>3</td> <td>< 96 litres per person per day</td> </tr> </tbody> </table> Innovation Credit Where the BREEAM Domestic Refurbishment Wat 01 calculator is used to determine the dwellings water consumption and where through a combination of low water use fittings and the use of greywater and/or rainwater the dwelling achieves a whole house consumption of less than 80 litres per person per day	% Improvement	No. of BREEAM Credits	0	> 150 litres per person per day	0.5	from 140 to ≤ 150 litres per person per day	1	from 129 to < 140 litres per person per day	1.5	from 118 to < 129 litres per person per day	2	from 107 to < 118 litres per person per day	2.5	from 96 to < 107 litres per person per day	3	< 96 litres per person per day	3	2.5	BREEAM Workshop (09/08/2018) Targeted level of performance is in line with Building Regs Part G. RJ confirmed achievable. Typical flow rates are outlined in table below: – Showers ≤8 litres /min – Baths ≤140 litres – WCs ≤4 litre effective flush volume (dual flush) – Taps ≤5 litres / min – Dishwasher 13 litres / cycle – Washing machine 60 litres / cycle	Architect
% Improvement	No. of BREEAM Credits																				
0	> 150 litres per person per day																				
0.5	from 140 to ≤ 150 litres per person per day																				
1	from 129 to < 140 litres per person per day																				
1.5	from 118 to < 129 litres per person per day																				
2	from 107 to < 118 litres per person per day																				
2.5	from 96 to < 107 litres per person per day																				
3	< 96 litres per person per day																				
Wat 02 External Water Use	One credit – External Water Use Where a compliant rainwater collection system for external/internal irrigation use has been provided to dwellings OR where dwellings have no individual or communal garden space. Compliant rainwater collection as follows: – No open access at the top of the collector (a childproof lid is allowed) – Provision of a tap or other arrangement for drawing off water at a height suitable for filling a standard watering can – Connection to the rainwater downpipes with an automatic overflow into the conventional rainwater drainage system – A means of detaching the rainwater downpipe and access provision to enable cleaning of the interior – Where the collection system is to be sited outside, and not buried, it must be stable and adequately supported; the material used for the container shall be durable and opaque to sunlight – 1 litre/m ² of land allocated to the dwelling with a minimum of 200 litres per communal garden. Where the communal garden is allocated to more than 6 dwellings, a maximum of 30 litres per dwelling can be applied. The	1	1	BREEAM Workshop (09/08/2018) Given the communal garden space, a compliant rainwater collection system will need to be incorporated. RER confirmed should be achievable – remains targeted. Landscape architect to confirm rainwater butt can be provided.	Landscape Architect																

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	allocated land can either be planted (including grass) or left as unplanted soil and can be either split into plots or communally maintained				
	<p>Innovation Credit Projects less than £100k Where a compliant Level 1 Site Waste Management Plan (SWMP) is in place in accordance with CN3 Projects up to £300k- Where a compliant Level 2 SWMP is in place in accordance with CN4- Where Non-hazardous construction waste generated by the dwellings refurbishment meets or exceeds the resource efficiency benchmarks in accordance withCN7- The percentage of non-hazardous construction waste and demolition waste (where applicable) generated by the project has been diverted from landfill and meets or exceeds the refurbishment & demolition waste diversion benchmarks in accordance withCN8</p> <p>Projects over £300k - Where non-hazardous construction waste generated by the dwellings refurbishment meets or exceeds the exemplary level resource efficiency benchmark in accordance with CN11 Where Non-hazardous demolition waste generated by the dwellings refurbishment meets or exceeds the exemplary level diversion benchmarks in accordance with CN12</p>	1	0	N/A Potential to achieve but dependent on feasibility/cost of diverting waste.	
Wat 03 Water meter	<p>One credit – Water Meter Where an appropriate water meter for measuring usage of mains potable water has been provided to dwelling/s in accordance with CN1 or CN2.</p>	1	0	Not currently targeted. BREEAM Workshop (09/08/2018) HL confirmed that whilst water meters will be provided, these are in the landlord areas, not dwellings, and therefore credit cannot be targeted.	M&E
Materials					
Mat 01 Environmental impact of materials	<p>Up to 25 credits – Environmental impact of materials The BREEAM Domestic Refurbishment Mat 01 calculator is used to determine the number of credits awarded. Credits are awarded according to the impact of new materials according to their Green Guide Rating and their impact on improving the thermal performance of the dwelling for the following elements: - Roof - External walls - Internal walls (including separating walls) - Upper and ground floors - Windows</p> <p>Up to a maximum of 25 credits can be awarded through achieving a combination of the credits available for each element.</p>	25	13	Mat01 credit calculator to be completed. Schedule to be provided identifying the area extents and Green Guide Ratings for the major building elements Calculator to be completed to assess how credits can be achieved. BREEAM Workshop (09/08/2018) HL confirmed no. of credits targeted is absed on previous assessment. HL to send proforma to RJ for RJ to complete.	Architect
Mat 02 Responsible Sourcing of Materials	<p>Pre-requisite: All timber and timber-based products used on the project is 'legally harvested and traded timber'</p>	-	-	Must be achieved before any credits or rating awarded.	Contractor
	<p>Up to 3 credits - Sustainable procurement plan The principal contractor sources materials in accordance with a documented sustainable procurement plan.</p>	3	3	BREEAM Workshop (09/08/2018) RER confirmed this would be incorproated into contractor requirements.	

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
Mandatory: Criterion 1 for Excellent	<p>Up to 12 credits - Responsible sourcing of materials (RSM) Where the applicable new materials for refurbished building elements are assigned a responsible sourcing tier level</p> <p>The number of credits achieved is determined as follows using the BREEAM Domestic Refurbishment</p> <p>Where all new timber used in the project is sourced in accordance with the UK Government's Timber Procurement Policy. Copies of Environmental Product Declarations A link/reference to the EPD's Product Category Rules Online Green Guide calculator output Environmental Profile certificate(s) (or certificate number)</p>	12	6	<p>Responsible Sourcing requirements to be included within Architectural/ Preliminaries documentation.</p> <p>Mat02 Credit calculator to be completed.</p> <p>Responsible Sourcing requirements to be included within Architectural/Preliminaries documentation.</p> <p>BREEAM Workshop (09/08/2018) RJ to enquire with manufacturers once materials specified.</p>	Cost Consultant/ Architect
Mat 03 (M) Insulation	<p>Pre-requisite Any new insulation specified for use within the following building elements must be assessed:</p> <ul style="list-style-type: none"> - External walls - Ground floor - Roof - Building services 	-	-	<p>BREEAM Workshop (09/08/2018) All new insulation must be assessed.</p>	M&E/ Architect
	<p>Embodied Impact Where the Insulation Index for new insulation used in the buildings is ≥ 2 and is calculated using the BREEAM Domestic Refurbishment Mat 03 Calculator with reference to CN1, CN2 and CN3.</p> <p>Where Green Guide ratings, required by the BREEAM Domestic Refurbishment Mat 03 Calculator are determined using the Green Guide to specification tool.</p>	4	4	<p>Requirements for suitable materials to be provided within both the MEP and Architectural Specifications.</p> <p>Materials to be scheduled to include volume calculations at PCR stage.</p> <p>BREEAM Workshop (09/08/2018) RJ to enquire with manufacturers once materials specified or include in specifications. HL to include in specifications.</p>	M&E/ Architect
	<p>Responsible Sourcing Where $\geq 80\%$ of the new thermal insulation used in the building elements is responsibly sourced.</p>	4	4	<p>BREEAM Workshop (09/08/2018) As above.</p>	M&E/ Architect
Waste					
Was 01 Household Waste	<p>Recycling facilities One credit can be awarded where the dwelling complies with one of the scenarios detailed in below:</p> <p>Option 1:</p> <ul style="list-style-type: none"> - Compliant collection scheme in place - Three internal recycling containers provided where recycling is not sorted post collection - One internal recycling container provided where recycling is sorted post collection - Minimum thirty litre total capacity, no single container less than seven litre capacity 	1	1	<p>Anticipated to be collection scheme in operation. Suitable waste storage to be provided.</p> <p>Option 1 pursued.</p> <p>BREEAM Workshop (09/08/2018)</p>	

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	<ul style="list-style-type: none"> - Dedicated position in accordance with CN1 (below). <p>Option 2:</p> <ul style="list-style-type: none"> - No compliant collection scheme in place AND No adequate external storage - Three internal recycling containers provided - Minimum sixty litre total capacity - Dedicated position in accordance with CN1 <p>Option 3:</p> <ul style="list-style-type: none"> - No compliant collection scheme in place AND No adequate external storage - Three internal recycling containers provided - Minimum thirty litre total capacity, no single container smaller than seven litre capacity - Dedicated position in accordance with CN1 <p>CN1</p> <ul style="list-style-type: none"> - In a dedicated, unobtrusive position located in a cupboard in the kitchen, close to the non-recyclable waste bin, or located adjacent (within 10m) to the kitchen in a utility room, storage room or connected garage - The storage containers for recycling are provided in addition to non-recyclable waste storage - The storage containers are a fixture of the dwelling 			RJ confirmed achievable – to show on marked up drawings.	
	<p>Composting Facilities</p> <p>Dwellings without significant external private space all of following are met:</p> <ul style="list-style-type: none"> - Where a composting service or facility is provided for kitchen waste - Where an interior container is provided for kitchen composting waste of at least seven litres 	1	1	Composting facilities to be included in architect's specification – e.g. food caddy. BREEAM Workshop (09/08/2018) RJ confirmed achievable – to show on marked up drawings.	Architect
Was 02 Refurbishment Site Waste Management (Projects over £300k)	<p>Management plan</p> <p>Where a compliant Level 2 SWMP is in place in accordance with CN4</p>	1	1	TO BE INCLUDED IN PRELIMINARIES Include requirement to prepare suitable SWMP and meet project targets. BREEAM Workshop (09/08/2018) RER confirmed will be included in contract.	Project Manager/ Cost Consultant
	<p>Good practice waste benchmarks</p> <p>Where the first credit has been achieved Where Non-hazardous construction waste generated by the dwellings refurbishment meets or exceeds the resource efficiency benchmark in accordance with CN7 Where the amount of waste generated against £100,000 of project value is recorded in the SWMP</p> <p>Where a pre-refurbishment audit of the existing building is completed in accordance with CN10 Where the demolition is included as part of the refurbishment programme, then the audit should also cover demolition materials</p>	1	1	TO BE INCLUDED IN PRELIMINARIES Include requirement to prepare suitable SWMP and meet project targets. Pre-Refurbishment Audit to be undertaken prior to design being frozen. BREEAM Workshop (09/08/2018) RER confirmed will be included in contract.	Project Manager/ Cost Consultant Project Manager
	<p>Best practice waste benchmarks</p> <p>Where the first two credits have been achieved Where Non-hazardous demolition waste generated by the dwellings refurbishment meets or exceeds the refurbishment & demolition waste diversion benchmarks in accordance with CN8</p>	1	1	TO BE INCLUDED IN PRELIMINARIES Include requirement to prepare suitable SWMP and meet project targets. BREEAM Workshop (09/08/2018) RER confirmed will be included in contract.	Project Manager/ Cost Consultant

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
Pollution					
Pol 01 NOx Emissions	<p>Up to 3 credits – Low NOx space heating and hot water systems Low NOx space heating and hot water systems Credits are awarded on the basis of NOx emissions arising from the operation of space heating and hot water systems for each refurbished dwelling as follows: One credit where the dry NOx emissions of space heating and hot water systems are ≤ 100 mg/kWh (NOx class 4 boiler). Two credits where the dry NOx emissions of space heating and hot water systems are ≤ 70 mg/kWh (NOx class 5 boiler). Three credits where the dry NOx emissions of space heating and hot water systems are ≤ 40 mg/kWh.</p>	3	3	<p>Overall Calculation to determine NOX emissions from relevant plant. 3 credits likely to be achieved.</p> <p>MEP to specify low NOx boilers.</p> <p>BREEAM Workshop (09/08/2018) HL confirmed low NOx boilers will be included in specs.</p>	M&E
Pol 02 Surface Water Runoff	<p>Neutral impact on surface water Where any new hard standing areas are permeable, this must include all new pavements, driveways and where applicable public rights of way, car parks and non-adoptable roads (e.g. community scale refurbishment projects).</p> <p>Where the building is being extended onto any previously permeable surfaces, or an impermeable surface that drains onto a permeable surface (e.g. paving slabs set on concrete that drained onto soft landscaped areas) the additional run-off for rainfall depths up to 5 mm caused by the area of the extension must be managed on site using appropriate Sustainable Drainage Systems (SuDS) such as Soakaways.</p> <p>Any calculations necessary to demonstrate that criterion 2 will be achieved should be carried out by an Appropriately Qualified Professional (AQP) see CN6.</p>	1	1	<p>One credit anticipated to be achieved as no change in impermeable area – architect to confirm.</p> <p>Dependent on change in permeable area (if any) and conclusions of drainage engineer.</p> <p>BREEAM Workshop (09/08/2018) HL awaiting update from Walsh.</p> <p>Drainage Workshop (19/09/2018) Walsh confirmed there will be a reduction to the existing peak runoff rates.</p>	Below Ground Drainage Engineer/ Civil Engineer
	<p>Reducing run-off from site: basic OR TWO CREDITS Where criteria 1, 2 and 3 have been achieved. Where all run-off from the roof for rainfall depths up to 5 mm, have been managed on site using source control methods (e.g. through infiltration, soakaways etc.). This should include runoff from all existing and new parts of the roof. Where required, an appropriately qualified professional should be used to design an appropriate drainage strategy for the site, ensuring criterion 1 is achieved</p>	1	0	<p>Drainage consultant to confirm.</p> <p>BREEAM Workshop (09/08/2018) HL awaiting update from Walsh.</p> <p>Drainage Workshop (19/09/2018) Walsh confirmed credit not achievable.</p>	-
	<p>Reducing run-off from site: advanced OR THREE CREDITS An appropriately qualified Where run-off as a result of the refurbishment is managed on site using source control achieving the following requirements: a. The peak rate of run-off as a result of the refurbishment for the 1 in 100 year event has been reduced by 75% from the existing site. b. The total volume of run-off discharged into the watercourses and sewers as a result of the refurbishment, for a 1 in 100 year event of 6 hour duration has been reduced by 75%. c. An allowance for climate change must be included for all of the above calculations, in accordance with the current best practice (PPS25, 2010)</p>	1	0	<p>Drainage consultant to confirm.</p> <p>BREEAM Workshop (09/08/2018) HL awaiting update from Walsh.</p> <p>Drainage Workshop (19/09/2018) Walsh confirmed credit not achievable. Criteria is met for peak run off but not total volume runoff.</p>	-
	<p>Innovation Credit Where all run-off from the developed site is managed on site using source control. The following must be achieved to confirm compliance: The peak rate of run-off as a result of the refurbishment for the 1 in 1 year event is reduced to zero.</p>	1	0	Not currently targeted	

Issue	Credit Requirements	Credits		Comments / Actions	Responsible Team Member
		Available	Targeted (Potential)		
	<p>The peak rate of run-off as a result of the refurbishment for the 1 in 100 year event is reduced to zero. There is no volume of run-off discharged into the watercourses and sewers as a result of the refurbishment, for a 1 in 100 year event of 6 hour duration.</p> <p>d. An allowance for climate change must be included for all of the above calculations, in accordance with current best practice (PPS25, 2010).</p> <p>Where an appropriately qualified professional has been employed to provide the above calculations and design an appropriate drainage strategy for the site, ensuring all above criteria are achieved.</p>				
<p>Pol 03 Flooding</p>  <p>Mandatory: 2 credits for Excellent</p>	<p>Minimum standards A minimum of two credits must be achieved for this issue at the Excellent and Outstanding levels</p>	2	2	<p>MINIMUM STANDARDS Excellent: 2 credits Outstanding: 2 credits</p>	-
	<p>Option 1 - Low flood risk Where a Flood Risk Assessment (FRA) has been carried out and the assessed dwellings are defined as having a low annual probability of flooding.</p>			<p>FLOOD RISK ASSESSMENT TO BE COMMISSIONED.</p> <p>FRA will likely identify the Flood Risk as Low.</p> <p>BREEAM Workshop (09/08/2018) Walsh to provide drainage strategy including section on flood risk.</p> <p>Drainage Workshop (19/09/2018) RER confirmed FRA will be commissioned.</p>	Project Manager/ Drainage Engineer
	<p>Option 2 - Medium/High Flood Risk Where a Flood Risk Assessment (FRA) has been carried out and the assessed dwellings are defined as having a medium or high annual probability of flooding. Two credits are awarded where as a result of the dwellings floor level or measures to keep water away the dwelling is defined as achieving avoidance from flooding by following Checklist A-10; Pol 03 Where avoidance is not possible, two credits are achieved where a full flood resilience/resistance strategy is implemented for the dwellings in accordance with recommendations made by a Suitably Qualified Building Professional</p>			N/A	-

Appendix B: Overview of BREEAM

Introduction

The 'Building Research Establishment Environmental Assessment Method' (BREEAM) Domestic Refurbishment is being used as a benchmarking tool in the design of refurbished domestic developments. The aim is to estimate the sustainability of buildings and to promote a programme of design improvement.

Background

BREEAM Domestic Refurbishment criteria is published by the BRE. The methodology is based upon the categories identified in the above section.

Mandatory requirements exist within the assessment method for all rating levels, also identified above.

Failure to meet the mandatory criteria would restrict a development to a 'zero-rating', or may limit the assessment to the rating level for which the mandatory criteria are met for, regardless of the overall number of credits (and percentage) achieved.

BREEAM Process

Figure A1 indicates the BREEAM process from appointment of the assessor, through to receipt of a post-construction certificate.

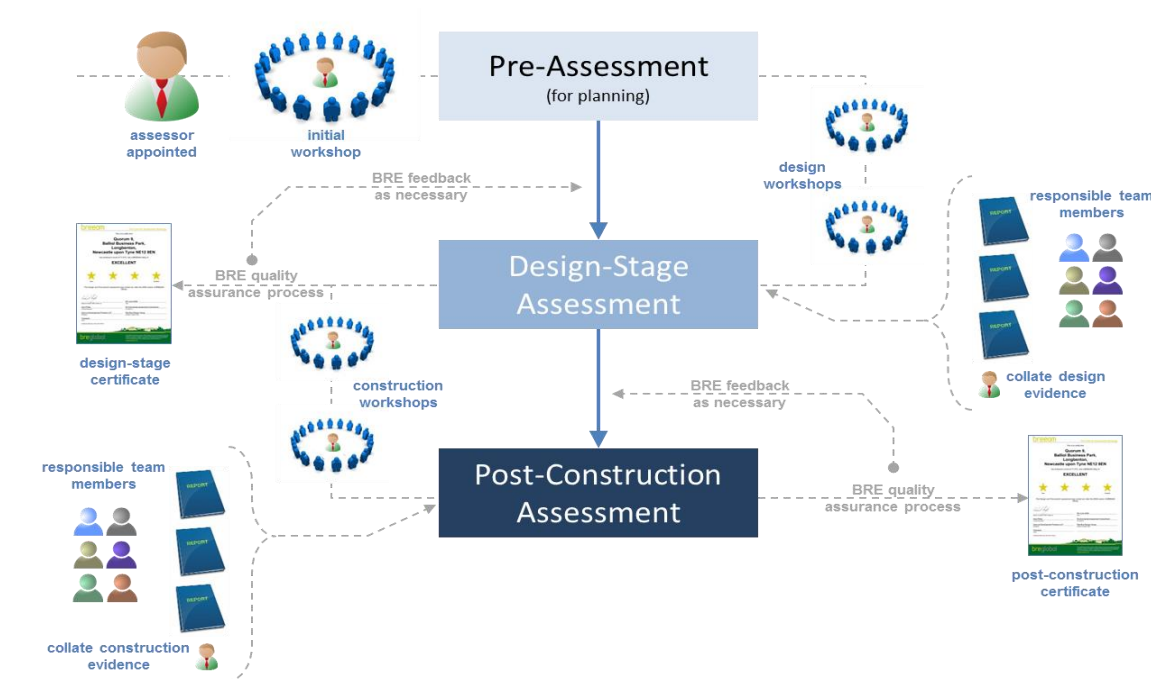


Figure A1: BREEAM Process.

Appendix C: Credit Weightings BREEAM 2014

The weightings for the associated credits depending on the assessment route are shown in Table C1 below.

Table C1: Credit Weighting & Value of Each Credit.

Section Title	Credits Available	Environmental Weighting	Each Credit Value
Management	11	12%	1.1%
Health and Wellbeing	12	17%	1.4%
Energy	29	43%	1.5%
Water	5	11%	2.2%
Materials	48	8%	0.2%
Waste	5	3%	0.6%
Pollution	8	6%	0.8%
Innovation	10	10%	1.0%
Total	128		

Appendix D: Minimum Requirements

Table D1 outlines the minimum standards that need to be required, in addition to the percentage threshold, to achieve a particular BREEAM rating. Recognising the limitations subject to buildings within a conservation area or with a listed status, where building control set limitations on the scope of works due to this status, the project team should work with their local authority conservation officer to deliver the minimum standards as far as practically possible.

Table D2: Minimum Standards.

BREEAM Issues	Pass (30%)	Good (45%)	Very Good (55%)	Excellent (70%)	Outstanding (85%)
Ene 02 Energy Efficiency rating post refurbishment	0.5 credits	1 credit	2 credits	2.5 credits	3.5 credits
Wat 01 Internal Water Use	-	-	1 credit	2 credits	3 credits
Hea 05 Ventilation	1 credit	1 credit	1 credit	1 credit	1 credit
Hea 06 Safety	1 credit	1 credit	1 credit	1 credit	1 credit
Pol 03 Flooding	-	-	-	2 credits	2 credits
Mat 01 Environmental Impact of Materials	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1 only

Appendix E: Hea 03 Volatile Organic Compounds

Table E1: Emission levels for VOC required for different products

Product	Emission Level for VOC Required
Decorative paints and varnishes	Decorative Paint Directive 2004/42/CE. Fungal and algal resistant.
Wood Panels Particleboard Fireboard including medium density fibre board (MDF) Oriented strand board (OSB) Cement-bonded particleboard Plywood Solid wood panel and acoustic board	Formaldehyde E1 in accordance with EN 13986:2004 Annex B (See also Compliance notes) Verify that regulated wood preservatives are absent as defined by the standard.
Timber Structures Glued laminated timber	Formaldehyde E1 (Testing req 1)
Wood flooring e.g. parquet flooring	Formaldehyde E1 (Testing req 1) Verify that regulated wood preservatives are absent as defined by the standard.
Resilient, tectile and laminated floor coverings Vinyl/linoleum Cork and rubber Carpet Laminated wood flooring	Formaldehyde E1(Testing req 1) Verify that regulated preservatives are absent as defined by the standard.
Suspended ceiling tiles	Formaldehyde E1 (Testing req 1) No asbestos.
Flooring adhesives (and if relevant adhesives for rigid wall coverings)	Verify that carcinogenic or sensitising volatile substances are absent (Testing req. 2-4).
Wall-coverings Finished wallpapers Wall vinyl's and plastic wall-coverings Wallpapers for subsequent decoration Heavy duty wall-coverings Textile wall-coverings	Formaldehyde (testing req. 5) and Vinyl chloride monomer (VCM) (testing req. 5) release should be low and within the EN standard for the material. Verify that the migration of heavy metals and other toxic substances are within the EN standard for the material.
Adhesives for hanging flexible wall coverings (for rigid wall coverings use flooring adhesives criteria)	No harmful substances and preservatives used should be of minimum toxicity.
Testing requirement: EN 717-1 ¹⁴ EN 13999-2:2007 ¹⁵ - Volatile Organic Compounds (VOCs) EN 13999-3:2007 ¹⁶ - Volatile aldehydes EN 13999-4:2007 ¹⁷ - Volatile diisocyanates EN 12149:1998 ¹⁸ . BS EN ISO 11890-2:2006 ¹⁹	



SAM CARLSSON
SENIOR SUSTAINABILITY CONSULTANT

+44 20 3668 7248
samcarlsson@hoarelea.com

HOARELEA.COM

Western Transit Shed
12-13 Stable Street
London
N1C 4AB
England

