

**BREEAM New Construction 2014
Retail Pre-Assessment
(Shell & Core)
&
Sustainability Checklists**

29- 35 Station Road, Reading

Titan Property Developments

August 2016

Prepared by



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<i>Revision</i>	<i>Note</i>	<i>Issue Date</i>
-	N/A	15.08.16
1	Include Sustainability Checklists	21.09.16

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1 Introduction

Project:	3430 - 29-35 Station Road, Reading
Client:	Titan Property Developments
BREEAM Manual:	BREEAM New Construction 2014 v4.0 Retail (Shop) - Shell & Core
BRE Registration:	TBC
Report:	Pre-Assessment Stage
Required Rating:	Very Good - 55.0%
Target Rating:	Very Good - 56.8%
Potential Rating:	Very Good - 76.3%

AES Sustainability Consultants have been instructed to complete a BREEAM Pre-assessment in order to outline a strategy to achieve BREEAM Very Good for the proposed retail units at 29-35 Station Road, Reading. The assessment has been undertaken using BREEAM New Construction 2014 (version 4.0), the current criteria for Retail assessments. In addition, the assessment has been based on the credits and criteria specific to Shell and Core.

It should be noted that with only limited information being available at this stage of the development many assumptions have been made. Some based on a worst case scenario, others based on experience and a need to achieve a particular number of credits in order to achieve the target.

There are a number of requirements that must be fulfilled in the early stages. These have been identified within this assessment. The project team will need to ensure these requirements have been fulfilled for targeted credits to prevent detriment to the achieved score.

It should be noted that the current targeted score lies at 56.8%. This score exceeds the required Very Good benchmark of 55%. However, a contingency of 3-5% above this benchmark is recommended and therefore a number of potential credits must be targeted in order to secure the BREEAM target.

2 Assessment Process

In order to achieve BREEAM certification the following process will be undertaken:

- BREEAM Design Stage Assessment: The project team will have to provide evidence to prove that the targeted credits have been incorporated into design. This will be verified by the BREEAM assessor. A submission will be made to the BRE for Interim Certification.
- BREEAM Post-Construction Stage Assessment: As built information will have to be provided in order to confirm commitments made, to achieve the targeted credits, have been met. The BREEAM assessor will also undertake a site inspection. A submission will be made to the BRE for Final Certification.

A number of credit issues refer to the RIBA stages, as outlined below.

RIBA Stage 0 – Strategic Definition

RIBA Stage 1 – Preparation & Brief

RIBA Stage 2 – Concept Design

RIBA Stage 3 – Developed Design

RIBA Stage 4 – Technical Design

RIBA Stage 5 – Construction

RIBA Stage 6 – Handover and Close Out

RIBA Stage 7 – In Use

Further details on credit issues and criteria impacted by actions taken at particular RIBA Stages are highlighted within section 6 Criteria Summary.

3 Immediate Actions

The following items detailed are time relevant actions or relate to appointments currently underway. These items must be addressed immediately. Please refer to the BREEAM technical manual referred to, or contact AES Sustainability Consultants for further detail on compliance, where required. Requirements are specific therefore delivery of these items without reference to the criteria, may not comply.

RIBA Stage 1	
Credit	Action
Man 01.2: Sustainability Champion	Appointment of BREEAM AP.
Tra 05: Travel plan	Suitably qualified transport specialist must carry out a transport assessment/statement and BREEAM compliant travel plan
Mat 06: Material efficiency	Records of opportunities identified, investigated and implemented to optimise material use. Recorded at each RIBA Stage.
LE 04: Enhancing site ecology	Appointment of suitability qualified ecologist to provide a BREEAM compliant ecology report within RIBA Stage 2
RIBA Stage 2	
Credit	Action
Man 01.1: Stakeholder consultation	Project delivery stakeholders must meet to define roles, responsibilities and contributions Third party consultation with all relevant stakeholders
Man 01.2: Project brief and design: Sustainability Champion	Contractual agreement of BREEAM performance target
Hea 06: Safety and security	Security Needs Assessment complete by a suitably qualified security specialist (e.g. ALO or CPDA)
Ene 04.1: Passive design	Passive Design Analysis to influence design decisions relating to implementation of passive measures
Ene 04.2: Low or zero carbon technologies	Low or Zero Carbon Energy Source Feasibility study by an energy specialist
Wst 05: Adaptation to climate change	Climate change adaptation strategy for structural and fabric resilience
Wst 06: Functional adaptability	Functional adaptation strategy, recommending measures to be incorporated for future adaptation

Additional Appointments	
Credit	Action
Man 04.2: Commissioning building services	Appointment of specialist commissioning manager for complex building services and systems during the design stage
Hea 04: Thermal Comfort	Full dynamic thermal analysis at detailed design stage
Wst 01.1: Construction resource efficiency	Pre-demolition audit, prior to demolition
Le 01: Contamination	Contaminated land professional site investigation, risk assessment and appraisal
Pol 03: Flood Resilience	Flood risk assessment, accounting for all current and future sources of flooding
Hea 05: Acoustic Performance	Appointment of a suitably qualified acoustician, aware of the required performance standards
Pol 05: Reduction of noise pollution	Noise impact assessment carried out by a suitably qualified acoustician

4 Minimum Standards

In addition to the BREEAM benchmark there are a number of minimum standards that must be met in order to achieve the required Very Good rating. These minimum standards are summarised in the table below, further details on the applicable criteria associated with them can be found in Section 3 Criteria Summary of this report.

BREEAM Issue	Very Good Minimum Standards
Ene 02: Energy Monitoring	One Credit (First sub-metering credit)
Wat 01: Water Consumption	One Credit
Wat 02: Water Monitoring	Criterion 1 Only
Mat 03: Responsible Sourcing of Materials	Criterion 1 Only
Le 03: Minimising Impact on Existing Site Ecology	One Credit

5 Pre-Assessment Summary

The assessment has detailed:

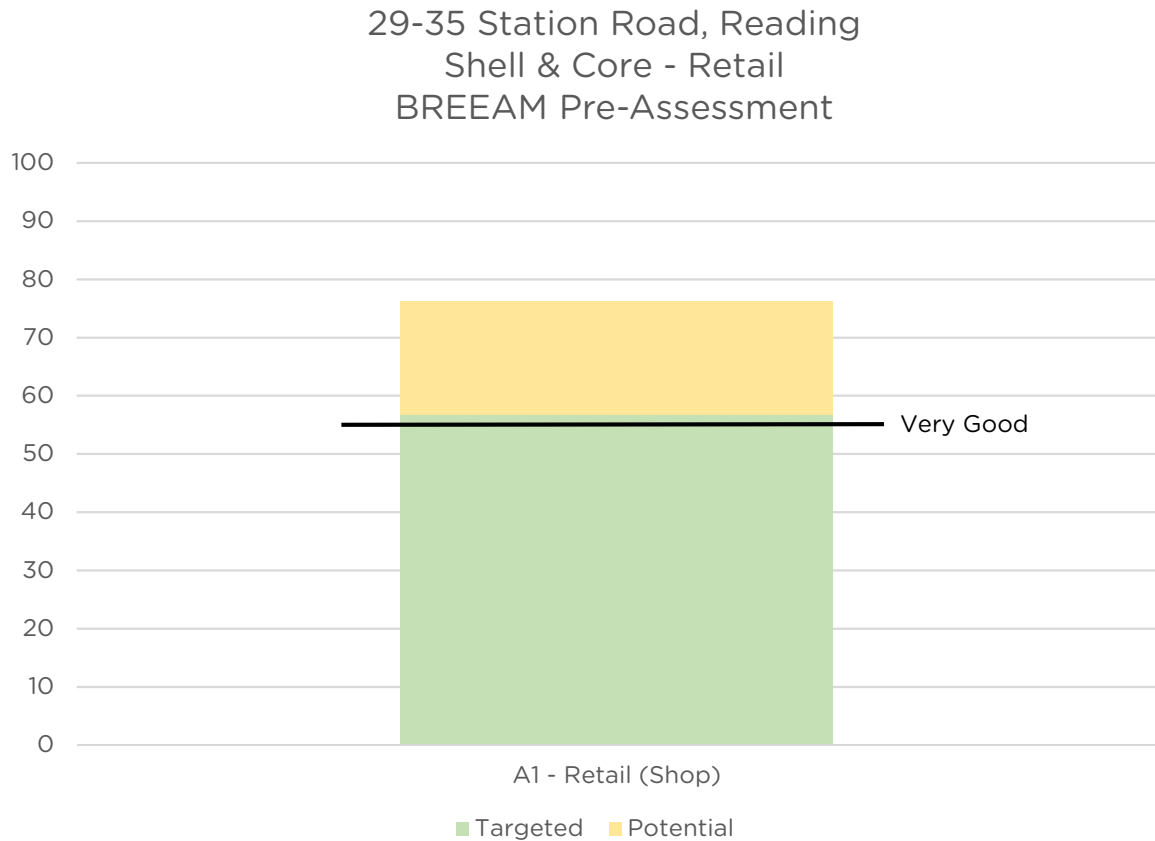
- **Available Credits:** Credits that are available to the building type
- **Targeted Credits:** Credits that will have to be targeted in order to achieve the required rating
- **Potential Credits:** Credits that should be targeted where they are considered feasible

The following table summarises the available, targeted and potential credits, percentages and totals:

Section	Available		Targeted		Potential	
	Credits	Percent	Credits	Percent	Credits	Percent
Management	18	11.00%	13	7.94%	2	1.22%
Health and Wellbeing	11	10.50%	5	4.77%	3	2.86%
Energy	18	15.00%	11	9.16%	3	2.50%
Transport	9	10.00%	6	6.67%	2	2.22%
Water	9	7.50%	2	1.66%	0	0.00%
Materials	13	14.50%	8	8.92%	3	3.34%
Waste	8	9.50%	4	4.75%	3	3.56%
Land Use and Ecology	10	11.00%	8	8.80%	1	1.10%
Pollution	13	11.00%	5	4.23%	2	1.69%
Innovation	10	10.00%	0	0.00%	1	1.00%
Total	119	110.0%	62	56.8%	20	19.5%

Note: The total percentage if all targeted and potential credits were achieved would be 76.3%.

The following graph indicates the 55% Very Good rating level required, the targeted score and the potential score.



6 Criteria Summary

Management	Available	Targeted	Potential	Responsibility	Critical Early Action	Summary of Requirements & Initial Information Available
	Credits	Credits	Credits	Role		
Man 01.1: Project brief and design: Stakeholder consultation	2	2	0	Client & Architect	Prior to RIBA Stage 2	Requirements: Project Delivery - One Credit (Targeted) • Project delivery stakeholders must meet prior to RIBA Stage 2 to identify roles, responsibilities and contributions for key phases of project delivery • Demonstration that delivery stakeholders have influenced or changed the initial design brief (e.g. project execution plan/quality plan, communication strategy or concept design) Third Party - One Credit (Targeted) • All relevant third party stakeholders have been consulted and demonstration of how their contributions have influenced the brief/concept design. Feedback to consultees
						Initial Information: Initial information confirms Public Affairs Consultants Curtin & Co. were appointed as the 'independent party', with actions including consultation with applicable stakeholders

Man 01.2: Project brief and design: Sustainability Champion	2	2	0	BREEAM AP	During RIBA Stage 1	Requirements: Design - First Credit (Targeted) • A sustainability champion must be appointed during RIBA Stage 1 (Preparation and Brief Stage) to facilitate the setting and achievement of the BREEAM target • The defined BREEAM performance targets must be formally agreed between client and project team no later than Concept Design (RIBA Stage 2). The targeted rating must be achieved Monitoring Progress - Second Credit (Targeted) • As well as the above, the sustainability champion must be appointed to monitor progress against the target, formally report progress and must attend key project team meetings Initial Information: Initial information confirms some early involvement of BREEAM Accredited Professional (AP)
Man 02: Life cycle cost and service life planning	4	1	0	Quantity Surveyor / Cost Consultant	During RIBA Stage 2	Requirements: Elemental LCC - Two Credits (Not Targeted) • Elemental LCC analysis complete during RIBA stage 2 to include building structure, fabric and servicing Component Level LCC - One Credit (Not Targeted) • Component level LCC plan developed during RIBA stage 4 to include envelope, services, finishes and external spaces. Must be used to influence design/specification to minimise project LCC Capital Cost Reporting - One Credit (Targeted) • Report the capital cost for the building in £k/m2
Man 03.1: Responsible construction practices: Pre-requisite	-	-	-	Contractor	-	Requirements: Pre-requisite (Targeted) • All timber and timber based products must be 'legally harvested and traded timber'
Man 03.1: Responsible construction practices: Environmental management	1	1	0	Contractor	-	Requirements: One Credit (Targeted) • The principal contractor operates an Environmental Management System (e.g. ISO14001)

Man 03.2: Responsible construction practices: Construction stage Sustainability Champion	1	1	0	Contractor & BREEAM AP	-	Requirements: One Credit (Targeted) • A sustainability champion is appointed to monitor compliance with the BREEAM target during construction, handover and close out stages (RIBA 5&6) • The BREEAM target must form a requirement of the principal contractor's contract and the target must be achieved.
Man 03.3: Responsible construction practices: Considerate construction	2	2	0	Contractor	-	Requirements: Two Credits (Targeted) • CCS Score between 35 and 39
Man 03.4: Responsible construction practices: Monitoring of construction site impacts	2	1	1	Contractor	-	Requirements: Energy & Water Consumption - One Credit (Targeted) • Monitoring and reporting of energy and water used for all construction plants, equipment and site accommodation. Reporting of total kgCO2/project value and m3 Transport - One Credit (Potential) • Monitoring and recording data on transport movement and impact resulting from delivery of the majority of construction materials and waste
Man 04.1: Commissioning and handover: Commissioning and testing schedule and responsibilities	1	1	0	Contractor	-	Requirements: One Credit (Targeted) • Production of a commissioning and testing schedule with appropriate BSRIA and CIBSE standards• Appointment of appropriate team member to monitor and programme pre-commissioning, commissioning, testing and re-commissioning• Commissioning and testing programme is accounted for in contractors budget and main programme of works

Man 04.2: Commissioning and handover: Commissioning building services	1	1	0	Contractor	-	Requirements: One Credit (Targeted) • Credit Man04.1 must be achieved • Where a specialist commissioning manager is appointed during the design stage for complex systems to undertake design reviews, have input into programming and manage commissioning, performance testing and handover.
Man 04.3: Commissioning and handover: Testing and inspecting building fabric	1	0	1	Contractor	-	Requirements: One Credit (Potential) • Completion of thermographic survey and airtightness test and inspection, along with any defects remediated
Man 04.4: Commissioning and handover: Handover	1	1	0	Contractor	-	Requirements: One Credit (Targeted) • Distribution of a simple Building User Guide to building occupiers and premises manager/s completed as far as possible and handed over to fit-out contractor
Man 05.1: Aftercare: Aftercare support	N/A	N/A	N/A	N/A	-	Credit Area Not Applicable to Shell and Core Assessments
Man 05.2: Aftercare: Seasonal commissioning	N/A	N/A	N/A	N/A	-	Credit Area Not Applicable to Shell and Core Assessments
Man 05.3: Aftercare: Post occupancy evaluation	N/A	N/A	N/A	N/A	-	Credit Area Not Applicable to Shell and Core Assessments
Man Totals	18	13	2			

Health and Wellbeing	Available	Targeted	Potential	Responsibility	Critical Early Action	Summary of Requirements & Initial Information Available
	Credits	Credits	Credits	Role		
Hea 01.1: Visual comfort: Glare control	N/A	N/A	N/A	N/A	-	Credit Area Not Applicable to Shell and Core Assessments
Hea 01.2: Visual comfort: Daylighting	2	0	2	Architect	-	Requirements: Up to Two Credits (2 Potential) - Sales areas to achieve point daylight factors of 2%, with 35% of areas to comply - Other occupied areas to achieve: 2% average daylight factor 80% of areas to comply - Either uniformity ratio of 0.3 or minimum point daylight factor of 0.6%. Atria must achieve uniformity of 0.7 or minimum point 1.4% - Or room depth criterion met
Hea 01.3: Visual comfort: View out	1	0	0	Architect	-	Requirements: One Credit (Not Targeted) Where 95% of the floor area in areas occupied for 30 minutes or more is within 7m of a wall which has a window or permanent opening with adequate view out. Opening must be at least 20% of the surrounding wall area. Where room depth is greater than 7m percentage of window/opening must meet values in table 1.0 of BS8206

Hea 01.4: Visual comfort: Internal and external lighting levels, zoning and control	1	1	0	M & E	-	Requirements: One Credit (Targeted) • All external lighting within the construction zone in accordance with BS5489-1:2013 and BS EN12464-2:2014 Internal Lighting, and Zoning and Occupant Control Criteria Not Applicable to Shell and Core Assessments
Hea 02.1: Indoor air quality: Minimising sources of air pollution	1	0	0	Architect & M & E & Contractor	-	Requirements: Ventilation - One Credit (Not Targeted) • Building designed to minimise the concentration and recirculation of pollutants with: o Intakes a minimum of 20m from the source OR o Designed in accordance with BS EN 13779:2007, Annex 2 IAQP, VOCs (Products) and VOCs (Post Construction) Credit Areas Not Applicable to Shell & Core Assessments
Hea 02.2: Indoor air quality: Adaptability - potential for natural ventilation	1	0	0	Architect & M & E & Contractor	-	Initial Information: WCEC Architects drawings indicate the retail units are directly adjacent to highways, deemed a source of external pollution and therefore considered that intakes will be in too close proximity to be compliant. Requirements: One Credit (Not Targeted) • Naturally ventilated, demonstrated through: o Room depth in accordance with CIBSE AM10 section 2.4 with openable window area in each occupied space equivalent to 5% of the gross internal floor area of that room/floor plate; or o Demonstration (through tools recommended by CIBSE AM10) that adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates is provided • The natural ventilation strategy must be capable of providing at least 2 levels of user control on the supply of fresh air to occupied spaces (i.e. higher and lower levels of ventilation)

						Initial Information: Peter Brett Associates Ventilation and Extraction Statement dated July 2016 confirms ventilation provision to the retail units, with it being anticipated that independent fresh air handling units and VRV heating/cooling units being utilised in each space. Sufficient natural ventilation to achieve the credit is not anticipated.
Hea 03: Safe containment in laboratories	N/A	N/A	N/A	N/A	-	Credit Area Not Applicable to Shell and Core Assessments
Hea 04: Thermal comfort	2	2	0	M & E	-	Requirements: Thermal Modelling - One Credit (Targeted) • Full dynamic thermal analysis to be carried out using software in accordance with CIBSE AM11 to demonstrate that compliance is met with CIBSE Guide A. If naturally ventilated the building limits risk of overheating using the adaptive comfort methodology outlined with CIBSE TM52 • For Air conditioned buildings, the predicted mean vote (PMV) and predicted percentage of dissatisfied (PPD) indices are reported Adaptability - One Credit (Targeted) • The previous credit is achieved • Thermal modelling demonstrates thermal comfort is achieved for the projected climate change environment Thermal Zoning & Controls Criteria Not Applicable to Shell and Core Assessments
Hea 05.3: Acoustic performance: Industrial, Retail, Prisons and 'Other' building types	1	0	1	Architect & Acoustician & Contractor	-	Requirements: Internal Indoor Ambient Noise Levels - One Credit (Potential) • Where the building meets the acoustic performance standards and testing requirements (for internal indoor ambient noise levels) detailed in Table 23 for all relevant functional areas (e.g. BS8233) Sound Insulation and Reverberation Criteria Not Applicable to Shell and Core Assessments

						Initial Information: KP Acoustics confirmed the advice given/design input to date has been limited to the residential side only, but further advice could be given in terms of specification to ensure compliance with BS8233.
Hea 06: Safety and security: Safe access	1	1	0	Architect & Contractor	-	Requirements One Credit (Targeted) • Where dedicated cycle paths provide direct access from the site entrance to cycle storage and connect to any off site cycle paths • Footpaths on site provide direct access from the site entrance to the building entrance and connect to off-site footpaths • Drop-off areas designed to provide direct access to pedestrian footpaths • Dedicated pedestrian crossings provided where pedestrian routes cross vehicle access routes and appropriate traffic calming measures • Large developments with a high number of public users, footpaths must be signposted to local amenities and public transport nodes • Lighting for access roads pedestrian routes and cycle lanes must be compliant with BS5489-1:2013 Where delivery vehicles require access: • Delivery areas must not be accessed directly through general parking areas and do not cross or share pedestrian and cyclist routes • Dedicated parking/waiting areas for goods vehicles away from manoeuvring area and car parking • Parking and turning areas designed for simple manoeuvring according to the type of delivery vehicle likely to access the suite • Dedicated pace for storage of refuse skips and pallets away from the delivery vehicle manoeuvring area and parking (if appropriate)

						Initial Information: WCEC Architects have confirmed delivery to the retail units will be through the front of the units at Station Road, with deliveries anticipated to be from a small format vehicle due to the small size of the retail units. Furthermore no drop-off points stipulated at this stage, although anticipated with input from unit operators likely to be required.
Hea 06: Safety and security: Security of site and building	1	1	0	Architect & Contractor	Prior to RIBA Stage 2	Requirements: One Credit (Targeted) • A Suitably Qualified Security Specialist conducts an evidence based Security Needs Assessment during, or prior to, RIBA stage 2. Recommendations/ solutions must be implemented Initial Information: WCEC Architects have confirmed planned liaison with local Design Out Crime Officer (DOCO) to ensure recommendations (specifically to the retail units) can be incorporated into the design.
Hea Totals	11	5	3			

Energy	Available	Targeted	Potential	Responsibility	Critical Early Action	Summary of Requirements & Initial Information Available
	Credits	Credits	Credits	Role		
Ene 01: Reduction of energy use and carbon emissions	12	8	0	M & E	-	Requirements: Up to 12 Credits (8 Targeted) • Calculation of an Energy Performance Ratio for New Construction (EPR NC). Comparison of the EPR NC achieved with the benchmarks in Table 25 to award credits. Initial Information: AES Sustainability Consultants' Energy Statement confirms the SBEM modelling undertaken has resulted in the following EPRNC values: Retail Unit 1: 0.659 (8 Credits) Retail Unit 2: 0.880 (11 Credits)

Ene 02: Energy monitoring	2	2	0	M & E	-	Requirements: Sub-Metering of Major Energy Consuming Systems - One Credit (Targeted - Very Good Minimum Standard) - Where energy metering systems are installed that enable at least 90% of the estimated annual energy consumption of each fuel to be assigned to the various end-use categories of energy consuming systems and labelled appropriately - Where the systems in small building are metered with an appropriate energy monitoring and management system or with separate accessible sub-meters with pulsed output Sub-Metering of High Energy Load and Tenancy Areas - One Credit (Targeted) - Where 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 - This must cover 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
Ene 03: External lighting	1	1	0	M & E	-	Requirements: One Credit (Targeted) Average initial luminous efficacy of the external light fittings is not less than 60 luminaire lumens per circuit Watt and has automatic control for prevention of operation during daylight hours.

Ene 04.1: Low carbon design : Passive design	2	0	2	Architect & M & E	During RIBA Stage 2	Requirements: Passive Design Analysis - One Credit (Potential) • The Hea04 credit must be achieved • An analysis is carried out during RIBA stage 2 to identify opportunities for the implementation of passive design solutions that reduce the building energy demand • The building must use passive measures to reduce the total heating, cooling, mechanical ventilation and lighting loads and energy consumption in line with the findings, and this demonstrates at least 5% reduction in the total energy demands Free Cooling - One Credit (Potential) • The first credit must be achieved and the passive design analysis includes analysis of free cooling, identifies opportunities for its implementation and the building uses a free cooling strategy
Ene 04.2: Low carbon design : Low or zero carbon technologies	1	0	1	M & E	During RIBA Stage 2	Requirements: One Credit (Potential) • Where a feasibility study has been carried out during RIBA stage 2 to establish the most appropriate LZC source/s and these are specified in line with the recommendations of the study to supply 5% reduction in regulated CO2 Initial Information: AES Sustainability Consultants' Energy Statement confirms the main heating and cooling will be via air source heat pumps (ASHP). The SBEM modelling undertaken (with and without ASHP) indicates reductions in regulated CO2 in excess of 30%. However, this would need to be installed as part of the S&C works to enable the credit to be awarded.
Ene 05: Energy efficient cold storage	N/A	N/A	N/A	N/A	-	Credit Area Not Applicable as no cold storage to be present in accordance with current anticipated use of retail shop
Ene 06: Energy efficient transportation systems	N/A	N/A	N/A	N/A	-	Credit Area Not Applicable as no transportation systems present

Ene 07: Energy efficient laboratory systems	N/A	N/A	N/A	N/A	-	Credit Area Not Applicable as Retail Building Type, with no laboratories present
Ene 08: Energy efficient equipment	N/A	N/A	N/A	N/A	-	Credit Area Not Applicable to Shell and Core Assessments
Ene 09: Drying space	N/A	N/A	N/A	N/A	-	Credit Area Not Applicable as Retail Building Type, with no residential function
Ene Totals	18	11	3			

Transport	Available	Targeted	Potential	Responsibility	Critical Early Action	Summary of Requirements & Initial Information Available
	Credits	Credits	Credits	Role		
Tra 01.1: Public transport accessibility : Accessibility Index	5	4	1	BREEAM Assessor	-	Requirements: Up to 5 Credits (4 Targeted) (1 Potential) • Public transport Accessibility Index (AI) calculation
						Initial Information: Initial review of local public transport including bus and rail services indicates an AI in excess of 12 is achievable, according to current timetables.
Tra 02: Proximity to amenities	1	1	0	BREEAM Assessor	-	Requirements: One Credit (Targeted) • 3 amenities (including 2 core amenities) available within 500m
						Initial Information: Initial review of local area confirms a number of amenities are located at the train station (within 500m), including core and other amenities such as a food outlet, cash machine, and post box.

Tra 03: Cyclist facilities	2	0	1	Architect & Contractor	-	Requirements: Cycle storage - One Credit (Potential) • 5 cycle spaces publicly accessible within the proximity of a main building entrance (50% of 10 required due to Tra 01 AI/credits) • Cycle storage must be covered, set-in or fixed, allow for appropriate access in a prominent site location, adequately lit (refer to Hea01) Cyclist facilities - One Credit (Not Targeted) • Where two of the following are provided: - o 1 shower (one for every 10 cycle storage spaces with a maximum of 8 required) - o Changing facilities (appropriate space with room to hang or store clothing and equipment e.g. bench and hooks) - o Lockers (equal to the number of cycle spaces, in or near the changing rooms and sized for cycling equipment) - o Drying spaces (specifically designed and designated with heating/ventilation for drying of wet clothes)
						Initial Information: WCEC Architects have confirmed the additional cycle storage to the North Elevation will be allocated to both the residential visitors and users of the retail units, but have further confirmed the storage will not be covered under the current proposals.
Tra 04: Maximum car parking capacity	N/A	N/A	N/A	N/A	-	Credit Area Not Applicable as Retail Building Type
Tra 05: Travel plan	1	1	0	Transport Consultant & Contractor & Client	-	Requirements: One Credit (Targeted) • Travel plan and assessment/statement with a package of measures to encourage use of sustainable modes of transport. The occupier must be involved in its development and confirm the travel plan will be implemented.

						Initial Information: Crosby Transport Planning have produced a Transport Statement and Residential Travel Plan both dated July 2016. Crosby have further confirmed that a separate Travel Plan Statement for the retail units could be undertaken to satisfy the BREEAM requirements with the only suggested measure being one of a travel noticeboard within staff areas.
Tra Totals	9	6	2			

Water	Available	Targeted	Potential	Responsibility	Critical Early Action	Summary of Requirements & Initial Information Available
	Credits	Credits	Credits	Role		
Wat 01: Water consumption	5	0	0	M & E & Contractor	-	Requirements: Up to 5 Credits (Not Targeted - Very Good Minimum Standard to be waived by BRE) - Water efficiency calculation required 2 credits achieved where specifications average WC 4.5L flush, WHB 7.5l/min, showers 8l/min, baths 160L, kitchen tap 7.5l/min 3 credits achieved where specifications average WC 4L flush, WHB 4.5l/min, showers 6l/min, baths 140L, kitchen tap 5l/min Initial Information: Initial review has confirmed it is unlikely that any water fittings will be installed within the retail/tenanted units until fit-out. Therefore, minimum standard to be waived by BRE in accordance with FAQ.
Wat 02: Water monitoring	1	1	0	M & E	-	Requirements: One Credit (Targeted - Criterion 1 Very Good Minimum Standard) - Water meter on mains supply - Submetering of all water consuming plant or building areas, consuming more than 10% of the building's total water demand - Meters to be pulsed (or similar)

Wat 03: Water leak detection	2	0	0	M & E	-	Requirements: Leak Detection System - One Credit (Not Targeted) • Installation of a water leak detection system capable of detecting major water leaks on the mains water supply within the building and between the building and the utilities water meter. Flow Control Devices - One Credit (Not Targeted) • Installation of flow control devices that regulate the supply of water to each WC area/facility according to demand. Not required where only a single WC is present - instead a shut-off could be provided via the same switch that controls the lighting
Wat 04: Water efficient equipment	1	1	0	M & E & Contractor	-	Requirements: One Credit (Targeted) • Identification of all unregulated water demands that could realistically be mitigated or reduced and systems or processes have been identified to reduce the demand which lead to a meaningful reduction (irrigation/vehicle wash)
Wat Totals	9	2	0			

Materials	Available	Targeted	Potential	Responsibility	Critical Early Action	Summary of Requirements
	Credits	Credits	Credits	Role		
Mat 01: Life cycle impacts	5	3	1	Architect & Contractor	-	Requirements: Up to 5 Credits (3 Targeted) (1 Potential) • The Green Guide rating of the following elements should be targeted to be A rated: o External Walls o Windows o Roof o Upper Floor Slab o Floor Finishes/Coverings
Mat 02: Hard landscaping and boundary protection	1	0	1	Architect & Contractor	-	Requirements: One Credit (Potential) Where 80% of hard landscaping and boundary protection is A or A+ rated.

Mat 03: Responsible sourcing of materials	4	2	1	Contractor	-	Requirements: Pre-requisite (Targeted - Criterion 1 Very Good Minimum Standard) • All timber and timber based products are 'legally harvested and traded timber' Sustainable Procurement Plan - One Credit (Targeted) • The principal contractor sources materials for the project in accordance with a documented sustainable procurement plan RSM - Up to 3 Credits (1 Targeted) (1 Potential) • Available for the responsible sourcing of materials e.g. FSC, PEFC, BES6001, ISO14001, CARES SCS (steel)
Mat 04: Insulation: Embodied impact	1	1	0	Architect & Contractor	-	Requirements: One Credit (Targeted) • New insulation must have an insulation index greater than or equal to 2.5 through the BRE calculation incorporating its efficiency and Green Guide rating o External walls o Ground floor o Roof o Building services
Mat 05: Designing for durability and resilience	1	1	0	Architect & Contractor	-	Requirements: One Credit (Targeted) • The building must incorporate suitable durability and protection measures to prevent damage to vulnerable parts of the building including, protection from high pedestrian traffic, internal vehicular/trolley movement and vehicular collision. • Appropriate design and specification measures are implemented to limit material degradation (the corrosion, dimensional change, fading, rotting, leaching, blistering, melting, salt crystallisation or abrasion of foundations, external walls, roof/balconies, glazing, external doors, railings, claddings, external stairs, hard landscaping) due to environmental factors (including solar radiation, temperature variation, water/moisture, wind, precipitation, extreme weather conditions and biological agents - vegetation, pests, air contaminants and ground contaminants)

Mat 06: Material efficiency	1	1	0	Architect & Contractor	During RIBA Stage 1 onwards	Requirements: One Credit (Targeted) • Opportunities have been identified to optimise the use of materials in the building design, procurement, construction, maintenance and end of life by the design/construction team in consultation with relevant parties at each of the following RIBA stages: - o Preparation and brief - o Concept Design - o Developed Design - o Technical Design - o Construction
Mat Totals	13	8	3			

Waste	Available	Targeted	Potential	Responsibility	Critical Early Action	Summary of Requirements & Initial Information Available
	Credits	Credits	Credits	Role		
Wst 01.1: Construction waste management: Construction resource efficiency	3	1	1	Contractor	-	Requirements: Up to Three Credits (1 Targeted) (1 Potential) • Where a resource management plan has been developed covering non-hazardous waste related to on-site construction and off-site manufacture or fabrication (including demolition and excavation waste) • Where existing buildings will be demolished a pre-demolition audit will be required of existing buildings, structures or hard surfaces to determine if refurbishment/reuse is feasible and if not to maximise the recovery of material • Where construction waste (on and off site) is lower than the following waste benchmarks per 100m2 gross internal floor area: - o 1 Credit: ≤13.3m3 or ≤11.1 tonnes (target) - o 2 Credits: ≤7.5m3 or ≤6.5 tonnes - o 3 Credits: ≤3.4m3 or ≤3.2 tonnes

Wst 01.2: Construction waste management: Diversion of resources from landfill	1	1	0	Contractor	-	Requirements: One Credit (Targeted) - Where the following percentages of non-hazardous construction waste and excavation waste have been diverted from landfill: - Non demolition: 70% volume or 80% tonnage - Demolition: 80% volume or 90% tonnage
Wst 02: Recycled aggregates	1	0	1	Contractor	-	Requirements: One Credit (Potential) - Where high grade aggregate meets minimum levels (by weight and volume) that are recycled or secondary aggregate: - Structural frame – 15% - Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads – 30% - Building foundations – 20% - Concrete road surfaces – 15% - Pipe bedding – 100% - Granular fill and capping – 100% - Where the total amount of recycled or secondary aggregate specified is greater than 25% (by weight or volume) of the total high grade aggregate specified for the project.
Wst 03: Operational waste	1	1	0	Architect & Contractor & M & E & Client	-	Requirements: One Credit (Targeted) - Where dedicated space is provided for the segregation and storage of recyclable waste volumes that is: - At least 2m² per 1000m² of net floor area for building <5000m² - At least 10m² for buildings ≥5000m² - Net floor area must be rounded up to the nearest 1000m² - Where large amounts of compostable waste are produced compost vessels are provided, or space for storage and collection - Where organic waste is to be store/composted on-site a water outlet is provided adjacent to or within the facility for cleaning and hygiene purposes

						Initial Information: WCEC Architects confirmed it is envisaged that the retail units' waste strategy will be dealt with as part of the fit out process and that the waste storage will be located within the retail units' space/demise.
Wst 04: Speculative floor and ceiling finishes	N/A	N/A	N/A	N/A	-	Credit Area Not Applicable as Retail Building Type
Wst 05: Adaptation to climate change	1	0	1	Architect	Prior to RIBA Stage 2	Requirements: One Credit (Potential) • Where a climate change adaption strategy appraisal has been conducted prior by the end of RIBA stage 2 to demonstrate a risk assessment of extreme weather impacts arising from climate change, on: o Structural stability o Structural robustness o Weather proofing and detailing o Material durability o Health and safety of building occupants and others o Impacts on building contents and business continuity
Wst 06: Functional adaptability	1	1	0	Architect	Prior to RIBA Stage 2	Requirements: One Credit (Potential) • Where a building specific functional adaptation strategy has been undertaken by RIBA stage 2 which includes recommendations for measures to be incorporated to facilitate future adaption which are then implemented (by RIBA stage 4). The strategy must consider: o Potential for major refurbishment o Design aspects that facilitate plant replacement o Degree of adaptability of internal environment to accommodate changes in working practices o Degree of adaptability of the internal physical space and external shell to accommodate change in use o The extent of accessibility to local services (power/data)
Wst Totals	8	4	3			

Land Use and Ecology	Available	Targeted	Potential	Responsibility	Critical Early Action	Summary of Requirements & Initial Information Available
	Credits	Credits	Credits	Role		
LE 01.1: Site selection: Previously occupied land	1	1	0	Architect	-	Requirements: One Credit (Targeted) Where it is demonstrated that at least 75% of the proposed development is on an area of previously developed land.
						Initial Information: WCEC Architects Design & Access Statement dated August 2016 confirms the site comprises a disused, dilapidated office building and unoccupied shops, with the access route through the rear of the site and existing service yard. REC's July 2016 Site Investigation Report further confirms there has been no significant change in land use since circa 1960.
LE 01.2: Site selection : Contaminated land	1	0	0	Engineer / Surveyor	-	Requirements: One Credit (Not Targeted) - Where a contaminated land specialist's report deems the site to be affected by contamination. - The client or principal contractor confirms that remediation will be carried out in accordance with the recommended remediation strategy
						Initial Information: REC's July 2016 Site Investigation Report confirms that the site is suitable for redevelopment without the requirement for significant remedial action, based on no significant pollutant linkages being identified.
LE 02: Ecological value of site and protection of ecological features	2	2	0	Ecologist & Contractor & Landscape Architect	Appoint during RIBA Stage 1 Survey/ Report prior to	Requirements: Ecological Value of Site - One Credit (Targeted) - Where the land within the assessment zone is defined as 'land of low ecological value' Protection of Ecological Features - One Credit (Targeted) - Where all existing features of ecological value within the assessment zone are adequately protected from damage during clearance, site preparation and construction activities

					RIBA Stage 2	Initial Information: Bridgeway Consulting have confirmed the site is of negligible ecological value with no ecological features to protect.
LE 03: Minimising impact on existing site ecology	2	2	0	Ecologist & Contractor & Landscape Architect	Appoint during RIBA Stage 1 Survey/ Report prior to RIBA Stage 2	Requirements: First Credit (Targeted - Very Good Minimum Standard) - Where the change in ecological value of the site is less than zero but equal to or greater than minus nine plant species, i.e. a minimal change using habitat types in the BREEAM calculator or through the use of an ecologist. the ecologist suggests there will be a small improvement of the number of species Second Credit (Targeted) - This is achieved where there is no negative impact on the ecological value of the site due to the proposed development. the ecologist suggests there will be a small improvement of ecological value Initial Information: Bridgeway Consulting have confirmed the existing ecological value of the site should be easily offset by the new roof terrace planting, hence no negative impact.
LE 04: Enhancing site ecology	2	1	1	Ecologist & Contractor & Landscape Architect	Appoint during RIBA Stage 1 Survey/ Report prior to RIBA Stage 2	Requirements: Ecologist's Report and Recommendations - One Credit (Targeted) - Where a suitably qualified ecologist has been appointed by the end of RIBA stage 1 to advise on Ecology at an early stage - An ecology report must be provided by RIBA stage 2 which is based on a site survey and includes appropriate recommendations for the enhancement for the site's ecology - Recommendations from the report must be implemented Increase in Ecological Value - One Credit (Potential) - The first credit must be achieved and the ecologist must confirm an increase in ecological value of the site (BRE recommend this is increase of six species)

						Initial Information: Bridgeway Consulting have confirmed recommendations have been confirmed within their August 2016 Final Extended Phase 1 Habitat Survey Report, including bird and insect boxes, and planting to the roof terrace. See Initial Information under LE 03 also.
LE 05: Long term impact on biodiversity	2	2	0	Ecologist & Contractor & Landscape Architect	Appoint during RIBA Stage 1 Survey/ Report prior to RIBA Stage 2	Requirements: Two Credits (2 Targeted) - Where an ecologist is appointed prior to commencement of activities on site and they confirm all relevant UK and EU legislation relating to the protection and enhancement of ecology has been complied with - Where a landscape and habitat management plan, appropriate to the site, is produced covering at least the first 5 years after project completion. - The following additional measures should be implemented, unless deemed by the ecologist as 'not applicable' - Nomination of biodiversity champion - Training site workforce in ecology - Contractor recording actions taken to protect biodiversity - Where ecologically valuable habitat is created it supports nationally, regionally or locally important species - Where flora/fauna exist on site, the programme is set to minimise disturbance to wildlife Initial Information: Bridgeway Consulting have confirmed this credit area should be achievable, with only the first additional measure, Biodiversity Champion, (from the 6 available measures) being applicable.
Le Totals	10	8	1			

Pollution	Available	Targeted	Potential	Responsibility	Critical Early Action	Summary of Requirements & Initial Information Available
	Credits	Credits	Credits	Role		
Pol 01: Impact of refrigerants	3	0	0	M & E & Contractor	-	Requirements: Up to 3 Credits (Not Targeted) • 3 credits will be awarded where there are no refrigerants • Any refrigerant systems must comply with BS EN 378:2008 parts 2 and 3. Where they have Direct Effect Life Cycle CO2 equivalent emissions of 100kgCO2e/kW cooling/heating capacity, or less, 2 credits may be awarded. 1 credit where the DELCCO2e is 1000 or less.
						Initial Information: AES Sustainability Consultants' Energy Statement confirms the main heating and cooling will be via air source heat pumps (ASHP), therefore refrigerants will be present but unlikely to be specified/installed as part of the S&C works to enable the credit to be awarded.
Pol 02: NOx emissions	3	0	0	M & E & Contractor	-	Requirements: Up to 3 Credits (Not Targeted) • Where the installed plant to meet the building's delivered heating and hot water demand has a NO_x emission level of: - o 100mg/kWh - 1 credit - o 70mg/kWh - 2 credits - o 40mg/kWh - 3 credits
						Initial Information: AES Sustainability Consultants' Energy Statement confirms the main heating and cooling will be via air source heat pumps (ASHP), therefore NOx emissions are likely to be high when powered by grid electricity.
Pol 03.1: Surface water run-off: Flood risk	2	2	0	Drainage Engineer	-	Requirements: Up to Two Credits (2 Targeted) • A site specific flood risk assessment must be provided confirming the flood zone and flood risk from all sources.

						Initial Information: Water Environment have produced a Sustainable Drainage Systems Report and further confirmed the site is within Flood Zone 1. However, a Flood Risk Assessment (FRA) confirming that the site has a low risk of flooding from all sources will be required.
Pol 03.2: Surface water run-off: Surface water run-off	2	2	0	Drainage Engineer	-	Requirements: One Credit (Targeted) - Where drainage measures are specified to ensure that the peak rate of run-off from the site to watercourse is no greater for the developed site than it was for the pre-development site, complying with the 1 year and 100 year return periods and provide an allowance for climate change. In addition relevant maintenance agreements for the ownership, long term operation and maintenance of all SuDs are in place. One Credit (Targeted) - Where flooding of property will not occur in the event of local drainage system failure and either - Drainage measures are specified to ensure the post development run-off volume, over the development lifetime, is not greater than it would have been prior to development for 100year 6 hour event, with allowance for climate change; or where this cannot be achieved - Justification why the above cannot be achieved (i.e. where infiltration or SuDs not viable and drainage design measures are specified to ensure post development peak rate or run-off is reduced to the limiting discharge (highest of: predevelopment 1 year peak flow, mean annual flow rate Qbar or 2L/s/ha). This must include allowance for climate change.

						Initial Information: Water Environment have produced a Sustainable Drainage Systems Report and further confirmed the site is currently 100% impermeable, hence the impermeable area will not increase as a result of the development. In addition, there may be potential to reduce this impermeable area through the possible incorporation of a green roof area. A Flood Risk Assessment (FRA) will be required with opportunities identified to reduce surface water run-off.
Pol 03.3: Surface water run-off : Minimising water course pollution	1	0	1	Drainage Engineer	-	Requirements: One Credit (Potential) • Where there is no discharge from the developed site for rainfall up to 5mm. • In areas of low risk of watercourse pollution appropriate level of SuDs are used • In areas of high risk of watercourse pollution separators are installed in surface water drainage systems. • Any chemical store must have a means of containment (i.e. shutoff valves • All water pollution prevention systems must be designed and installed in accordance with Pollution Prevention Guideline (PPG) 3 and the SuDs manual where applicable. Vehicle wash systems must meet PPG13 • Drainage plans will be made available to occupiers and maintenance agreements for the ownership, long term operation and maintenance of all SuDs must be in place • Any external storage and delivery areas must be designed and detailed in accordance with current best practice planning guidance

Pol 04: Reduction of night time light pollution	1	1	0	M & E & Contractor	-	Requirements: One Credit (Targeted) Where any external lighting • Is designed in compliance with Table 2 of the ILP Guidance notes for the reduction of obtrusive light 2011 • With the exception of safety and security lighting, can be switched off between 2300 and 0700 • Where illuminated advertisements are designed in compliance with the ILE Technical report 5 - The Brightness of Illuminated Advertisements.
Pol 05: Reduction of noise pollution	1	0	1	Architect & Acoustician & Contractor	-	Requirements: One Credit (Potential) • Where there are noise sensitive areas within 800m a noise impact assessment must be complete in compliance with BS 7445 to determine existing background noise levels and the rating noise level from the new noise source (plant). There must be a difference no greater than +5dB during the day and +3dB at night compared to background noise levels.
						Initial Information: KP Acoustics confirmed a Noise Impact Assessment has been completed, but with the assessment and subsequent advice being limited to the residential side only.
Pol Totals	13	5	2			

Innovation	Available	Targeted	Potential	Responsibility	Critical Early Action	Summary of Requirements & Initial Information Available
	Credits	Credits	Credits	Role		
Inn 01: Innovation	10	0	0	Various	-	Requirements: One Credit - (Not Targeted) • When an innovative product/service is used in the project and an application is made to the BRE

Man 03: Responsible construction practices	1	0	1	Contractor	-	Requirements: One Credit - (Potential) • CCS Score of 40 or more
Man 05: Aftercare	N/A	N/A	N/A	N/A	-	Credit Area Not Applicable to Shell and Core Assessments
Hea 01: Visual comfort	1	0	0	Architect	-	Requirements: One Credit - (Not Targeted) • Daylighting criteria in excess of that described under Hea 01
Hea 02: Indoor air quality	2	0	0	Architect & Contractor	-	Requirements: Up to 2 Credits - (Not Targeted) • Air quality criteria in excess of that described under Hea 02
Ene 01: Reduction of energy use and carbon emissions	1	0	0	M & E	-	Requirements: One Credit - (Not Targeted) • Exemplary reduction of energy and CO ₂ consumption
Wat 01: Water consumption	1	0	0	M & E & Contractor	-	Requirements: One Credit - (Not Targeted) • Exemplary reduction of water use in line with Wat 01 requirements
Mat 01: Life cycle impacts	1	0	0	Architect & Contractor	-	Requirements: One Credit - (Not Targeted) • Exemplary levels of materials rated A or A+ from The Green Guide described in Mat 01
Mat 03: Responsible sourcing of materials	1	0	0	Contractor	-	Requirements: One Credit - (Not Targeted) • Available for the responsible sourcing of materials e.g. FSC, PEFC, BES6001, ISO14001, CARES SCS (steel)
Wst 01: Construction site waste management	1	0	0	Contractor	-	Requirements: One Credit - (Not Targeted) • Where the construction waste resource efficiency meets ≤1.6 m3 or ≤1.9 tonnes waste per 100m2 gross internal floor area; and • Where the following percentages of non-hazardous construction waste and excavation waste have been diverted from landfill: o Non demolition: 85% volume or 90% tonnage o Demolition: 85% volume or 95% tonnage o Excavation: 95% volume or 95% tonnage

Wst 02: Recycled aggregates	1	0	0	Contractor	-	Requirements: One Credit - (Not Targeted) - Where high grade aggregate meets minimum levels (by weight and volume) that are recycled or secondary aggregate: - Structural frame – 30% - Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads – 75% - Building foundations – 35% - Concrete road surfaces – 45% - Pipe bedding – 100% - Granular fill and capping – 100% - Where the total amount of recycled or secondary aggregate specified is greater than 35% (by weight or volume) of the total high grade aggregate specified for the project and is sourced from within 30km by road transport.
Wst 05: Adaptation to climate change	1	0	0	Various	Various	Requirements: One Credit - (Not Targeted) - Awarded where the following credits are achieved: - Wst 05 – Adaption to Climate Change - Hea 04 – Thermal Comfort - Ene 01 – Reduction of Energy Use & Carbon Emissions (8 credits) - Ene 04 – Low Carbon Design (Passive Design Analysis) - Wat 01 – Water Consumption (3 credits) - Mat 05 – Designing for Durability and Resilience (material degradation issue) - Pol 03 – Flood Risk (1 credit), Surface Water Runoff (2 credits)
Inn Totals (Max. 10 credits)	10	0	1			
Overall Totals	119	62	20			

Appendix A: Residential Checklist

Appendix 5: Table A5.1

The Sustainability design and construction checklist for residential developments illustrates the measures considered for the proposed residential development with regards to sustainability.

Energy / CO ₂ <i>Aim: To conserve energy, in particular carbon dioxide emissions and maximise the use of energy efficiency techniques</i>	
1. How has the development been designed to optimise the use of the energy from the sun and limit heat losses	Within the development layout, orientation and massing will be designed to maximise (within reason) passive solar gain. Wherever feasible, the buildings are orientated with a southern bias, promoting useful solar gains throughout most of the day. Glazing will be specified with a solar transmittance value (g-value) to strike the balance between useful solar gain in the winter and unwanted solar gain in the summer, this is further reinforced within the overheating analysis carried out for the residential apartments. Heat loss is limited due to excellent thermal properties including low U-values and good thermal bridging details
2. How has the development been designed to optimise natural daylighting, energy efficient lighting, external lighting and natural ventilation	Each flat is also provided with MVHR for constant ventilation and selected opening windows for purge ventilation and an effective means of rejection of heat where necessary. MVHR units that have a summer by-pass facility and boost capability will be specified. The external, communal and internal lighting is all low energy, with external and communal lighting utilising controls to reduce energy demand. The development design seeks to provide a high standard of natural daylighting to all units. This provides the opportunity to create a high quality internal environment, which will reduce the need for artificial lighting
3. How will the design of the building make efficient use of energy	The high levels of insulation improve the u-values and thermal envelope of the building. High efficiency systems will be utilised

4. Has local energy generation from renewables been considered as part of the scheme	The Energy Statement is based on the SAP modelling that has looked at all sources of energy to find the most suitable for the scheme. The building utilises photovoltaic panels on the roof of the development
5. How have cycle storage facilities been considered	The proposals include the provision of a secure, communal cycle parking storage area within the lower ground floor level. The area could accommodate up to 68 cycle parking spaces for residents in the form of two-tier cycle parking
Water <i>Aim: To improve the efficiency in the use of water, conserve water resources and minimise vulnerability to flooding</i>	
6. How will the development incorporate the use of water saving devices to achieve a maximum consumption of 105L pppd	With improved products on the market with low flush WC's, flow restrictor's on the shower and taps and a lower capacity bath, the target of 105 l/p/d should be easily met
7. How will the development incorporate recycling water and reduce the use of potable water	Due to the roof space and lack of outdoor space, it is not feasible to collect and recycle the greywater to make use of internally within the dwellings
8. Has the collection, treatment and re-use of grey water been considered	Due to the layout and space constraints within the apartments it is not feasible to incorporate enough greywater to collect and reuse within the potable demand
Materials <i>Aim: To retain local character and promote the use of materials with a low environmental impact</i>	
9. How will the selected materials help retain the local character, ensure long life and ensure a low environmental impact	Planning policy has governed the materials for local character due to the location within the city centre for apartments. The development will seek to reduce the environmental impact of buildings materials through use of an environmental preference or profiling system. (eg. seek to achieve the BRE's Green Guide Rating of A+ to D for at least 3 of the main building elements).
Surface Water Run-off <i>Aim: To reduce flooding, pollution and other environmental damage</i>	
10. How has the development considered flooding and pollution	The latest online Environment Agency (EA) flood zone maps indicate that the site lies within Flood Zone 1. The report by Water Environment will look into all sources of flooding.

11. Has the development considered the use of SUDS	The Report by Water Environment has considered the use of SUDS and confirms the most appropriate SUDS option identified for the development is the incorporation of a green roof on the main building's roof area and provision for raised planters on the amenity space of the building extension area over the rear alley. Additionally, the report confirms the sustainable drainage strategy is considered compliant with the DEFRA SUDS guidance, issued in March 2015.
Waste <i>Aim: To minimise the production of waste and maximise the re-use and recycling</i>	
12. How will the development minimise waste sent to landfill	The scheme is to produce a Site Waste Management Plan, setting appropriate targets
13. How will the development make maximum use of construction and demolition waste	The scheme is to produce a Site Waste Management Plan, which aims to predict the waste volumes and look into ways of reducing the waste and incorporating the waste into the build
14. How will the development make maximum use of re-used and recycled materials	The scheme is to produce a Site Waste Management Plan, setting targets and benchmarks to look at re-use of materials and if any recycling is possible
15. How will the provision be made for storage and recycling of waste for all users of the site	The basement of Station Road holds the refuse and recycling for the occupants of the building. The waste store is accessible, secure, ventilated with low energy lighting.
Pollution <i>Aim: To minimise damage to the environment through air, ground/surface water, land, noise or light pollution</i>	
16. What measures have been incorporated to ensure that noise and light pollution will be minimised throughout the development	In terms of light pollution, any external lights are to be designed to minimise light pollution once the building is occupied. During the construction phase the strict noise and lighting legislation are to be adhered to within set hours. Internally the party walls and floors are above Building Regulations to reduce noise issues once occupied. A noise impact assessment has been carried out for the development
17. What measures have been incorporated to reduce nitrogen oxide emissions and reduce the GWP of insulants	Heating and hot water for the flats is proposed to be provided via communal energy efficient gas boilers with a with low NO _x emission within the basement plant room. Where feasible it is proposed that insulation with a low GWP will be specified.

18. What measures have been incorporated to reduce the release of pollution into the atmosphere	It is intended the contractor is to commit to following Best Practice Policies for water and air pollution during the construction phase. The design of the development ensures low energy demand and low emissions from the heating and hot water demand
Health and Wellbeing <i>Aim: To improve the quality of life in homes through good daylighting, improved sound insulation, provision of outdoor space with good accessibility</i>	
19. How has the development been designed to maximise natural lighting, reduce the likelihood of noise complaints, incorporate private outdoor space and ensure the layout of the development can be easily adapted to meet the needs of future occupants	The development uses large glazing areas to promote natural daylighting. The Daylight Impact Assessment Report confirms which rooms will exceed the BRE threshold of 1.5% and of these, which will achieve an ADF of 2% or more. Furthermore, the Daylight Impact Assessment Report confirms the daylight distribution within the rooms will predominantly be even, rather than concentrated solely at the room perimeter. The development proposals incorporate good levels of internal daylighting, and robust balance of density, daylighting and avoidance of summertime overheating risk. Where feasible the development will seek to achieve an improvement over Building Regulations for party walls and floors, thus reducing the likelihood of noise complaints.
Management <i>Aim: To manage the site in an environmentally and socially considerate manner</i>	
20. What measures have been taken to ensure the construction of the site is managed in an environmentally and socially considerate manner, mitigating environmental impacts	Through the use of Best Practise Policies for water and air pollution, also with monitoring and recording the energy use and water use on site during the construction phase, ensures the site is managed to reduce the environmental impact
21. How has the development been designed to ensure people feel safe and secure	Where feasible, the development will seek to achieve section 2 (Physical Security) measures from the Secured By Design scheme. Advice from an Architectural Liaison officer will be sought, and to ensure security and safety of residents, the appropriate measures will be incorporated within the design. The

	communal areas are lit with controls for movement and daylight. The entrance is to have an entry system for each apartment.
Ecology	
<i>Aim: To retain, protect and enhance wildlife habitats and natural features</i>	
22. How have the wildlife habitats and natural features on and adjacent to the site been considered and how will they be retained, protected and enhanced	The former building is to be demolished and no ecological features are currently present. The new development will incorporate Communal Amenity Space and Green Roof, enhancing the ecological value. The Extended Phase 1 Habitat Survery further details the ecology strategy.

Appendix B: Non-Residential Checklist

Appendix 5: Table A5.2

The Sustainability design and construction checklist for commercial developments have their requirements based on BREEAM standards. The checklist is prepared to illustrate the measures considered for the proposed residential development with regards to sustainability and should be read in conjunction with the BREEAM Pre-Assessment Estimator (PAE) (APPENDIX C)

Management – Aim: To recognise and encourage environmentally and socially considerate development.	
1. Will guidance for the non-technical building user be provided so they can understand and operate the building efficiently and understand how the design reduces the overall environmental impact of the building and raise environmental awareness?	A building user guide (BUG) will aim to be developed prior to handover for distribution to the building occupiers, facilities manager/premises manager. The content of the guide will aim to illustrate the building and its environmental strategy, e.g. energy/water/waste efficiency policy/strategy and how users should engage with/deliver the policy/strategy. Please refer to BREEAM PAE MAN04 for further details in regards to handover arrangements, and associated BUG and training schedule measures.
2. What consideration has been given to resource use, energy consumption and pollution in terms of the construction site impacts?	Monitoring, recording and reporting energy and consumption data will be considered in regards to Construction site impacts. Implement best practice pollution prevention policies and procedures on site in accordance with the Environmental Checklist section 2.2.5 Preventing Pollution in the England and Wales Environment Agency's 'Building a Better Environment, a guide for developers'. Please refer to BREEAM PAE MAN03 for further details in regards to Responsible Construction Practices and associated monitoring of construction-site impacts.

	The Air Quality Assessment report highlights that the site is considered suitable for the proposed end-use and air quality and mitigation measures are not required to protect future users from elevated pollution levels. Please refer to Air Quality Assessment for full details on the impact on local air quality given within Air Quality Management Area (AQMA) and BREEAM PAE, HEA02.
3. Will site investigation and appropriate remedial action be undertaken?	The Station Road development is located on previously developed land and includes a disused, dilapidated office building and unoccupied shops, with the inclusion of an access route through the rear of the site and existing service yard. Geo-Environmental Site Investigation Report and associated contamination assessment has not identified any concentrations of constituents of concern. However, if unexpected contamination is encountered during construction phase, REC advise works are to be ceased, and contact be made with a suitable qualified geo-environmental consultant for remediation. Please refer to Geo-Environmental Site Investigation Report for full details and BREEAM PAE LE01: Site Selection.
4. Will the community and stakeholders be involved in the design process encouraging flexibly designed buildings which cater for shared use with the local community?	Consultation has commenced and appointed Public Affairs Consultants will ensure key local stakeholders are consulted and the feedback considered to enable their contributions and outcomes of the consultation process to influence the development design. The commercial retail unit will enable the provision for shared facilities with the local and wider community. Please refer to BREEAM PAE MAN01: Stakeholder Consultation
5. How has the building been designed to reduce the opportunity for and the fear of crime?	In line with the BREEAM criteria it is anticipated that a Suitably Qualified Security Specialist (SQSS) will conduct an evidence-based Security Needs

	Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent). Please refer to BREEAM PAE HEA06: Security of Site and building
6. What consideration has been given to the maintenance of the building?	A building User Guide and full operation and Maintenance (OandM) manual will aim to be prepared for building occupiers/premises managers, timed appropriately around handover, with the inclusion of proposed occupation plans and will cover maintenance requirements. It is proposed that an aftercare service would be provide to ensure that that management team fully understand the systems in place, maintenance requirement and operation parameters. The building materials specified will be suitably robust and hard wearing where feasible in order to reduce maintenance requirements, with the inclusion of specification details for vulnerable areas. Where feasible the building layout and design will aim to allow the commercial development to respond to the potential for change of use or requirements, enabling alterations and conversions, thus facilitating future adaption. Please refer to BREEAM PAE MAN04 (BUG and Training schedule, MAN05 in regards to Aftercare Support and WST06 for further details on Functional adaptability.
Health and Well-being - Aim: To ensure a good quality amenity level is afforded to occupants of buildings.	
7. How has the development been designed to ensure users have sufficient daylight, an external view, adequate and appropriate lighting, ventilation, air quality and drinking water?	Through appropriate fenestration design and orientation of the proposed glazed façade, where feasible the daylight factor >2% will aim to be achieved for 35% of the sales area, and enabling view out. All fluorescent and compact fluorescent lamps are fitted with high frequency ballasts and internal lighting illuminance levels will be in accordance with the SLL Code for Lighting 2012 and any other relevant industry standard.

	Where installed, lighting will be fitted with daylight control and presence detection, thus responding to the natural daylight and reducing energy consumption. The potential for natural/mixed mode ventilation will be reviewed. The mechanical ventilation intakes will be positioned to reduce risk of internal air recirculation and intakes from sources of external pollution. Please refer to HEA01 for Visual comfort and indoor air quality strategy.
Energy - Aim: To conserve energy and maximise the use of energy efficiency techniques.	
8. How has the building been designed to minimise CO2 emissions associated with their operational energy consumption?	The proposed development is looking to achieve a low energy design by reducing energy demand through a very good thermal fabric. By improving the building fabric, the heat loss during the heating season is reduced, minimising energy required for space heating. Additionally, the performance of the building and reduction CO2 emissions is further achieved by good air tightness, appropriate Heating distribution and control, Low energy Lighting and Control and Passive Design strategy where feasible. The commercial developments predicted energy performance achieves a 0.659 EPR_{NC} (Energy Performance Ratio for New Construction) when compared to a Building Regulation 2013 Compliant Development, achieving the minimum standard for BREEAM 'Excellent' and demonstrating an 'Excellent' energy performance improvement. Details of how the credits are achieved are included in the Pre-Assessment Estimator Please refer to the Energy Statement and BREEAM PAE ENE01 and ENE04 for further details on the minimisation of CO2 emissions,
9. How has the development been designed to optimise the use of the energy from the sun, natural daylighting and controlled natural ventilation?	In order to maximise natural daylight, the proposed façade design and associated glazing is appropriately considered, whilst ensuring overheating is not a risk.

10. How will the design of the building make efficient use of energy? (E.g. use of thermally massive materials, levels of insulation and use of green / brown roofs etc.).	The proposed development is looking to achieve a low energy design by reducing energy demand through a very good thermal fabric. By improving the building fabric, the heat loss during the heating season is reduced, minimising energy required for space heating. Additionally, the performance of the building and reduction CO2 emissions is further achieved by good air tightness, appropriate Heating distribution and control, Low energy Lighting and Control and Passive Design strategy where feasible.
11. Have renewable energy sources or decentralised energy been considered for this development and if so, how would they be incorporated within the development?	The renewable source considered is ASHP Please refer to the Energy Statement and BREEAM PAE ENE04 for further details in regards to the energy strategy.
Transport – Aim: To reduce the need to travel through appropriately located development	
12. How has the design and layout incorporated measures to reduce the need to travel, especially by car, and promote alternative and sustainable modes of transport such as walking, cycling and the use of public transport?	The provision of cycle storage will promote the use of alternative use of transport. Additionally, Reading Station is positioned north of the site and is the major railway station and transport hub in Reading. Reading has links to London with approximately 200 trains a day from the revitalised rail station to London. In addition, there are regular services to Oxford, Birmingham, Bristol and Cardiff
13. How have public transport networks been considered in terms of the location of the development and proximity to local amenities?	The location of proposed development is in the heart of Reading's commercial area. To the south of Reading Station comprises predominantly of commercial, retail and community use. Further retail uses are located on the Vaster Road Retail Park to the north of the railway, which consist of a supermarket, a wine warehouse and restaurant.
14. How have deliveries and the manoeuvring of delivery vehicles been considered?	Where feasible, the development will incorporate dedicated delivery access areas and drop off areas.
Water – Aim: To improve efficiency in the use of water, conserve water resources and minimise vulnerability to flooding.	
15. How will the development incorporate the use of water saving devices to achieve a maximum consumption of 5.5 cubic metres	Water services installed by future tenants should be include water saving devices where feasible to maximise water efficiency including sanitary ware.

per year per person for office developments? (Or the most appropriate benchmark for other types of development).	Please refer to BREEAM PAE WAT01 for further details.
16. Will the development and access to and from it such as roads and paths be located away from areas of potential flooding?	Sustainable Drainage Systems Strategy Report confirms the latest online Environment Agency (EA) flood zone maps indicate that the site lies within Flood Zone 1. Please refer to the Sustainable Drainage Systems Strategy Report and BREEAM POLO3 for further details.
17. How will the development incorporate harvesting and re-use of rainwater?	At this current stage of the proposed development, it is thought that rainwater harvesting will not be specified as it is not feasible due to its location and the type of development.
Materials - Aim: To retain local character and promote the use of materials with a low environmental impact.	
18. How will the selected materials help retain local character, ensure long life and ensure a low environmental impact?	Planning policy has governed the materials for local character due to the location within the city centre. The materials used will be sensitive to the local character and where feasible the specification of robust materials to ensure long life, thus reducing maintenance requirements, with preference for locally and responsibly sourced materials. All timber used on site and in the construction will be sources in accordance with the UK Government Timber Procurement Policy. The environmental impact is covered within the BREEAM assessment for External wall, windows, roof, upper floor slab and floor finishes/ coverings. The development will aim to achieve at least 3 credits under MAT01, and where feasible attain A or A+ rated. Please refer to BREEAM PAE MATERIALS Category for further details in regards to the aimed strategy for material selection and associated environmental impact.

19. What consideration has been given to reusing materials in-situ, responsibly sourcing materials and re-using existing structures?	To be in line with the BREEAM targeted requirements, the contractor will require to commit to seeking at least 18% of available responsible sourcing of materials points in term of construction materials. All timber used on site and in the construction will be sources in accordance with the UK Government Timber Procurement Policy. Please refer to BREEAM PAE MAT03 and MAT04 for strategy.
Waste - Aim: To minimise the production of waste and maximise re-use and recycling.	
20. Has an audit of the materials present on the site been conducted with an assessment of the extent to which materials could be re-used?	The proposed development will aim to meet the WST01 (Construction of Waste Management) criteria, which covers the execution of a pre-demolition audit for existing buildings on the site which are to be demolished. Thus enabling the determination for any structures or hard surfaces which are eligible for refurbishment/reuse, if not, maximisation of the recovery of material from demolition for subsequent high grade/value applications are to be considered. The pre-demolition audit will be referenced within the RMP. Please refer to BREEAM PAE WST01 for aimed construction waste management strategy
21. How will the development make the maximum use of construction, demolition waste and recycled materials?	A Site Waste Management Plan/ or Resource Management Plan will be carried out which will provide an opportunity to address materials on site for reuse, and will aim to meet the Waste Hierarchy outlined within the SPD (Clause 6.4). The contractor; plan will outline the aspects to minimise the generation of waste, and where feasible the re-use and recycling of construction waste. Please refer to BREEAM PAE WST01 for aimed construction waste management strategy
22. How will provision be made for the storage and recycling of waste for all users of the site?	Waste storage area located within the Lower Ground floor of the development for residential and commercial unit will provide adequate facilities for waste storage and recycling.

	Please refer to BREEAM PAE WST03 for the provision of operational waste.
Land Use and Ecology- <i>Aim: To retain, protect and enhance wildlife habitats and natural features.</i>	
23. How have the wildlife habitats and natural features on and adjacent to the site been considered and how will they be retained, protected and enhanced?	The Extended Phase 1 Report Confirms the habitats on site comprised predominantly of a building and hardstanding and those habitats have been assessed as being of negligible ecological value. The new development will incorporate Communal Amenity Space, and Green Roof, enhancing the ecological value. Please refer to the Extended Phase 1 Habitat Survey and the BREEAM PAE Ecology Section (LE02-LE05) further details the ecology strategy.
24. What consideration has been given to not using previously undeveloped land?	The proposed development is to be constructed within the footprint of the existing building, which will be demolished for the erection of the residential and commercial unit. Please refer to the BREEAM PAE (LE01: Previously Occupied Land)
25. What consideration has been given to the removal of contamination from the land?	Geo-Environmental Site Investigation Report by REC Ltd (Resource & Environmental Consultants Ltd) stated that the Environmental Protection Team at the Reading Borough Council confirm the subject site did not have a potential contaminative land use, although an adjacent did (former garage located 10m north-west of the site). REC Ltd have carried out a conceptual site model (CSM) to identify potential contamination sources, migration pathways and receptors within the study area and the Tier 1 Human Health Risk Assessment has not identified any concentrations of constituents of concern. However, if unexpected contamination is encountered during construction phase, REC Ltd advice works are to be ceased, and contact be made with a suitable qualified geo-environmental consultant, and if remediation is carried out in line with the consultant's remediation strategy this credit may be achievable.

	Please refer to Geo-Environmental Site Investigation Report and BREEAM PAE (LE01: Contaminated Land)
Pollution - Aim: To minimise damage to the environment through air, ground/surface water, land, noise or light pollution.	
26. What measures have been incorporated to ensure that noise and light pollution plus pollution transported through surface water runoff will be minimised throughout the development?	Where feasible, the design and construction of the development will aim to reduce noise pollution where feasible. The Sustainable Drainage System Strategy report confirms as the site is currently 100% hardstanding, the proposed development itself will not increase surface water runoff rates or volumes from the site. The post-development runoff rates and volume of runoff produced above Greenfield state will be reduced, through the incorporation of the green roof and raised planters, to less than existing (pre-development) flow rates and volume. The reduction of the post-development runoff rates and runoff volume above Greenfield state will provide a betterment to the existing situation and will be sufficient to mitigate the impact of climate change. The above strategy and measures described above and within Sustainable Drainage System Strategy report will reduce flood risk thus mitigating surface water treated for pollution. Please refer to the Sustainable Drainage System Report and the BREEAM PAE POL03, POL04 & POL05 and answer to question 27 below.
27. What measures have been incorporated to ensure that light pollution will be minimised throughout the development?	By aiming to address the BREEAM POL04 Reduction of night time light pollution criteria, all external lighting strategy will require to be designed in compliance with Table 2 (and its accompanying notes) of the ILP Guidance notes for the reduction of obtrusive light, 2011. The external lighting pollution has been eliminated through effective design that removes the need for external lighting without adversely affecting the safety and security of the site and its users. All external lighting (except for safety and security lighting) will be automatically switched off between 23:00 and 07:00. And for where safety or security lighting is provided and will be used between 23:00 and 07:00, this

	part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP's Guidance notes. Additionally, if applicable, illuminated advertisements will be designed in compliance with ILE Technical Report 5 - The Brightness of Illuminated Advertisements.
28. What consideration has been given to reducing refrigerants and minimising nitrogen oxide emissions?	Plant installed by future tenants should aim where feasible to limit the use of refrigerants and minimise NOx emissions. Please refer BREEAM POL01 and POL02 for further details.
29. How has the development been sited to minimise the impact of flooding?	An appropriate consultant will advise on the peak and volume rate of run-off from the proposed development.
30. How has the design considered the use of sustainable drainage systems (SUDS) and how will they be incorporated within the development?	Sustainable Drainage Systems Strategy Report confirms the SUDS Options identified are the incorporation of a green roof on the main building's roof area and provision for raised planters on the amenity space of the building extension area over the rear alley. The report further confirms the management and maintenance of the drainage network, including the green roof areas, will be the responsibility of the freeholder of the site. Management and maintenance agreements and plans will be arranged prior to completion of development. The drainage specialist confirms the management and maintenance of the green roof should be carried out in accordance with the green roof supplier's guidance and specification. Please refer to the Sustainable Drainage Systems Strategy Report and BREEAM POL03 for further details.
Innovation - Aim: To recognise innovation in the field of sustainability.	
31. What consideration has been given to innovative sustainability measures in terms of a procurement strategy, design feature, management process or technological development?	As stated above the commercial developments predicted energy performance achieves a 0.484 EPR _{NC} (Energy Performance Ratio for New Construction) when compared to a Building Regulation 2013 Compliant Development, achieving the minimum standard for BREEAM 'Excellent' and demonstrating an 'Excellent' energy performance improvement. Details of how the credits are

	achieved are included in the Pre-Assessment Estimator in the Sustainability Statement Please refer to the Energy Statement and BREEAM PAE ENE01, ENE04 and INN for further details.
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