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# Greggs Bakery / Twickenham

## BREEAM Pre-assessment Report



hilsdon  
holmes limited

Energy & Environmental Consultants

## BREEAM Pre-assessment Report

### Greggs Bakery, Twickenham

### For London Square

BREEAM UK 2018 New Construction Non-Domestic Buildings

### Commercial Building – Office – Shell and Core

### Assessment

Date

20.02.19 Rev02

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## Executive Summary

This report provides a route to a minimum BREEAM score of 70% which will lead to an Excellent rating if minimum standards are also met. A number of additional credits have also been identified which may be sought in order to provide a margin over this score. Experience shows that this is good practice at this stage in the project.

The development proposals consist of the demolition of the existing former Greggs factory buildings and the construction of 65 apartments, 51 townhouses and a new 2-storey office block with 175m<sup>2</sup> GIA. This report primarily refers to the commercial element of this development but will cover any communal or common facilities which are provided for both residential and commercial aspects.

This report summarises the features and design criteria to be incorporated to achieve BREEAM *Excellent* certification for the project under the BREEAM New Construction 2018 scheme and assumes that the commercial space will be completed to a shell and core level with works to include the construction of the building sub, superstructure and external works and any core building services; with tenanted area fit out by others. It does not include for a typical Category A fit-out of the spaces which it is assumed will be by any future tenants.

It is proposed to achieve planning for the units based on the following Use Class B1. For the purposes of this report, the pre-assessment has been completed based on the following use type: Commercial – Offices.

Based upon information available from the design team, this development is predicted to obtain the score below and the pre-assessment provides a route to achieving the required rating, although specific credits may be subject to change through the design development process.

Scheme Assessment Type	BREEAM Pre-assessment Score
Commercial Office	74.38% - Excellent

**Refer to Appendix A for the Pre-assessment Summary Document.**

**Appendix B includes a more detailed summary of the credit requirements.**

# Introduction to BREEAM

BREEAM (Building Research Establishment's Environmental Assessment Method) is the world's leading and most widely used environmental assessment method for buildings, with over 260,000 buildings now certified. It sets the standard for best practice in sustainable design and has become the de facto measure used to describe a building's environmental performance. Credits are awarded in ten categories according to performance. These credits are then added together to produce a single overall score on a scale of Pass, Good, Very Good, Excellent and Outstanding.

## **Aims of BREEAM**

- To mitigate the impacts life cycle impacts of buildings on the environment.
- To enable buildings to be recognised according to their environmental benefits.
- To provide a credible, environmental label for buildings.
- To stimulate demand and create a value for sustainable buildings, building products and supply chains.

## **Objectives of BREEAM**

- To provide market recognition to low environmental impact buildings.
- To ensure best environmental practice is incorporated in the planning, design, construction and operation of buildings and the wider built environment.
- To define a robust, cost effective performance standard surpassing that required by regulations.
- To challenge the market to provide innovative, cost effective solutions that minimise the environmental impact of buildings.
- To raise the awareness of owners, occupants, designers and operators of the benefits of buildings with a reduced life cycle impact on the environment.
- To allow organisations to demonstrate progress towards corporate environmental objectives.

The performance of a building is quantified by a number of individual measures and associated criteria stretching across a range of environmental issues as listed below:

- Management
- Health and Wellbeing
- Energy

- Transport
- Water
- Materials
- Waste
- Land Use and Ecology
- Pollution
- Innovation

### **BREEAM Rating Benchmarks**

The BREEAM rating benchmarks for new construction projects assessed using the 2014 version of BREEAM are as follows:-

<b>BREEAM Rating</b>	<b>% Score</b>
Outstanding	≥ 85
Excellent	≥ 70
Very Good	≥ 55
Good	≥ 45
Pass	≥ 30
Unclassified	< 30

*Table 2.1: BREEAM Rating Benchmarks*

Each of these credits is awarded based on the available evidence and its compatibility with the specific requirements for each of the issues.

Within each category there are a number of credit requirements that reflect the options available to designers and managers of buildings. Credits are awarded where evidence has been provided to confirm that the specific requirements have been met. Each of the categories is given a further weighting which reflects the relative importance of the issues and the effect that they will have on the overall score (see Table 2.2 overleaf).

Environmental Section	Weighting		
	Fully Fitted Out	Shell and Core Only	Shell Only
Management	11.0%	11.0%	12.0%
Health and Wellbeing	14.0%	8.0%	7.0%
Energy	16.0%	14.0%	9.5%
Transport	10.0%	11.5%	14.5%
Water	7.0%	7.0%	2.0%
Materials	15.0%	17.5%	22.0%
Waste	6.0%	7.0%	8.0%
Land Use and Ecology	13.0%	15.0%	19.0%
Pollution	8.0%	9.0%	6.0%
Total	100.0%	100.0%	100.0%
Innovation	10.0%	10.0%	10.0%

Table 2.2: BREEAM 2018 Environmental Weightings

### **BREEAM Minimum Standards**

To ensure that performance against fundamental environmental issues is not overlooked in the pursuit of a particular rating, BREEAM sets minimum standards of performance in key areas. These are shown in table 2.3 below:

BREEAM Issue	Minimum Standards by BREEAM Rating Level				
	Pass	Good	Very Good	Excellent	Outstanding
Man03: Responsible Construction Practices	None	None	None	One Credit (responsible construction management)	One Credit (responsible construction management)
Man04: Commissioning and Handover	None	None	Criterion 11 (Building User Guide)	Criterion 11 (Building User Guide)	Criterion 11 (Building User Guide)
Man04: Aftercare	None	None	None	One Credit (commissioning – implementation)	One Credit (commissioning - implementation)



Ene01: Reduction of Energy Use and Carbon Emissions	None	None	None	Four Credits (energy performance)	Six Credits (energy performance) and Four Credits (energy modelling and reporting)
Ene02: Energy Monitoring	None	None	One Credit (First sub-metering credit)	One Credit (First sub-metering credit)	One Credit (First sub-metering credit)
Wat01: Water Consumption	None	One Credit	One Credit	One Credit	Two Credits
Wat02: Water Monitoring	None	Criterion 1 only (water meter on the mains supply)	Criterion 1 only (water meter on the mains supply)	Criterion 1 only (water meter on the mains supply)	Criterion 1 only (water meter on the mains supply)
Mat03: Responsible Sourcing of Construction Materials	Criterion 1 only (timber sourcing)	Criterion 1 only (timber sourcing)	Criterion 1 only (timber sourcing)	Criterion 1 only (timber sourcing)	Criterion 1 only (timber sourcing)
Wst01: Construction Waste Management	None	None	None	None	One Credit
Wst03: Operational Waste	None	None	None	One Credit	One Credit

Table 2.3: Minimum BREEAM Standards

# Appendix A - BREEAM Pre-assessment Summary Document

# Greggs Bakery Site, Twickenham

BREEAM New Construction - Office - Shell & Core

**BREEAM - Pre-Assessment Summary Document \_Rev2\_20.02.19**

	Targeted Credits		Credit not targeted		Potential Credit
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Hilsdon Holmes have been appointed to carry out a BREEAM pre-assessment on the provision of a new office block at the Greggs Bakery site, Twickenham. This report details the pre-assessment stage performance of a typical shell and core office space as measured against the BRE Environmental and Sustainability Standard, BREEAM New Construction 2018 under the category of Commercial - Office. A rating of BREEAM "Excellent" is targeted.

The below summary demonstrates that this development has the potential to achieve a BREEAM score of a minimum of 70%, which would translate into a BREEAM rating of "Excellent". The BREEAM assessor has determined this initial rating on the basis of preliminary drawings and reports provided to date together with feedback from the design team on various issues. Due to limited information, it should be noted that a number of assumptions have had to be made at this stage.

## BREEAM Pre-assessment Stage Tracker

Assessment Issue		Credits Available	Mandatory Requirements	Credits Targeted	Comments
<b>Management</b>					
Man01	Project Brief and Design	4		1	<b>Project Delivery Planning</b> - Client, building occupier, design team and contractor to identify and have defined roles and responsibilities for the project delivery and contributing to the decision making process from Concept Design Stage (RIBA Stage 2).
				1	<b>Stakeholder Consultation (interested parties)</b> - Prior to completion of the Concept Design, all relevant third parties and stakeholders have been consulted. This includes: building users, FM staff, representative consultation groups from existing community, potential users of any shared facilities, existing partnerships and networks that have knowledge of and experience working on existing buildings of the same type, local or national historic/heritage groups.
				1	<b>BREEAM Advisory Professional - Pre-requisite</b> - The project team is to formally agree strategic performance targets at Concept Design Stage
					<b>BREEAM AP (Concept Design)</b> - BREEAM AP to be involved in the project at the beginning of the Concept Design Stage to assist the project team in maximising the project's overall performance against BREEAM and monitor progress against the set performance targets throughout their appointment. BREEAM AP will identify risks and opportunities related to achieving the targets, provide feedback in relation to any corrective measures required, and monitor and coordinate the generation of evidence from the design team.
1	<b>BREEAM AP (Developed Design)</b> - BREEAM AP to continue their appointment to assist the project team in maximising the project's overall performance against BREEAM and monitor progress against the set performance targets throughout the Developed Design stage. BREEAM AP will identify risks and opportunities related to achieving the targets, provide feedback in relation to any corrective measures required, and monitor and coordinate the generation of evidence from the design team. Dependant on first credit.				
Man02	Life Cycle Cost & Service Life Planning	4		0	<b>Elemental Life Cycle Cost (LCC)</b> - outline entire asset LCC to be completed at Stage 2 and, using examples, show how the elemental LCC has been used to influence the building and systems design. This was not completed at the appropriate stage.
				0	<b>Component Level LCC Options Appraisal</b> - Component level LCC to be completed by the end of Stage 4 and, using examples, demonstrate how the component level LCC options appraisal has been used to influence the building and systems design.
				1	<b>Capital Cost Reporting</b> - for the building in pounds per square metre. To include 1. construction, including preparatory works, materials, equipment and labour, 2. Site management, 3. Construction financing, 4. Insurance and taxes during construction, 5. Inspection and testing. Costs relating to land procurement, clearance, design, statutory approvals and post-occupancy aftercare should not be included.
Man03	Responsible Construction Practices	6	Excellent - One credit (responsible construction management) Outstanding - Two credits (responsible construction management)	0	<b>Pre-requisite - Legally Harvested and Traded Timber</b> - All timber and timber-based product used during the construction process of the project to be legally harvested and traded timber.
				1	<b>Environmental Management</b> - All parties who at any stage manage the construction site (e.g. principal contractor or demolition contractor) to operate an Environmental Management System and covering their main operations and implement best practice pollution policies and procedures on site in accordance with PPG6.
				1	<b>BREEAM AP (Site)</b> - The client and contractor must formally agree targets. BREEAM AP to assist the project team in maximising the project's overall performance against BREEAM and monitor progress against the set performance targets throughout the Construction, Handover and Close Out Stages. BREEAM AP will identify risks and opportunities related to achieving the targets, provide feedback in relation to any corrective measures required, and monitor and coordinate the generation of evidence from the project team.

				2	<b>Responsible Construction Management</b> - The contractor is to evaluate the risks (on and off site), plan and implement actions to minimise the identified risks covering vehicle movement, pollution management, tidiness, health and wellbeing and security processes. Training, awareness and feedback is provided such as regularly communicating to local community, appropriate training/inductions for site operatives and visitors and fleet operators undertake driver training and awareness to promote safety. All accidents, incidents or feedback is to be recorded from fleet operators, visitors, workforce and the community along with any actions taken. Site to achieve at least 35 points under the Considerate Constructors scheme, with a minimum of 5 under each section.
				1	<b>Utility Consumption</b> - Targets for water and energy consumption from construction plant, equipment and site accommodation are to be set, and consumption to be monitored and recorded during the works and reported at the end of the project.
				1	<b>Transportation of Construction Materials and Waste</b> - Targets for the transport of construction materials to site and waste from site are to be set, and CO2 emissions to be monitored and recorded during the works and reported at the end of the project.
Man04	Commissioning and Handover	4	Very Good and above - one credit (commissioning - test schedule and responsibilities) and Criterion 11 (BUG)	1	<b>Commissioning - Testing Schedule and Responsibilities</b> - schedule to be produced to show commissioning activities, timescales and appropriate standards. Full commissioning of BMS systems to be carried out where applicable. Project team member to monitor commissioning activities on behalf of the client. Contractor to account for commissioning within the contract programme and budget.
				1	<b>Commissioning - Design and Preparation</b> - 1st credit to be achieved. During the design stage, a project team member is appointed to oversee and review the commissioning of simple building systems. Specialist Commissioning Manager to be appointed at design stage to oversee commissioning of any complex systems.
				0	<b>Testing and Inspecting the Building Fabric</b> - Thermography and air testing to be carried out and any defects identified remedied prior to handover.
				1	<b>Handover - Building User Guide (BUG)</b> - two documents to be provided - one for building occupiers and one for facilities management. <b>Training Schedules</b> - two schedules showing training provision at handover - one for building occupiers (to cover building's design intent and introduction to the BUG) and one for FM (to cover building design intent, aftercare provision including seasonal commissioning, demonstrate installed systems, introduce BUG and other relevant documents such as O&Ms and maintenance regimes.
<b>Total Management Credits</b>		<b>18</b>		<b>14</b>	
<b>Management (weighted) Section Score</b>		<b>11.00%</b>		<b>8.56%</b>	
<b>Health &amp; Wellbeing</b>					
Hea01	Visual Comfort	4		2	<b>Daylighting</b> - daylight calculations to be carried out to show compliance with an average daylight of 2% being achieved to 80% of the applicable floor area AND either the uniformity criteria OR the room depth criterion and view of sky criterion being met.
				1	<b>View Out</b> - 95% of floor area in 95% of relevant areas to be within 8m of an external wall with a window/opening providing an adequate view out. Window/opening to form at least 20% of the surrounding wall area OR, where room depths are over 8m, the window to wall ratio should be in accordance with Table 1 of BS 8206.
				1	<b>External Lighting</b> - All external lighting to be in accordance with BS 5489-1:2013 and BS EN 12464-2:2014. Illuminance levels should enable users to perform outdoor visual tasks efficiently and accurately, especially during the night. Where there is no external lighting, the credit can be awarded by default.
Hea02	Indoor Air Quality	1		0	<b>Pre-requisite - Indoor Air Quality Plan (IAQ)</b> - a site specific indoor air quality plan is to be produced by the end of the Concept Design Stage and implemented within the design, specification and installation. <b>Ventilation</b> - Fresh air to be provided in accordance with relevant standards for ventilation. For naturally ventilated or mixed mode buildings, the design should demonstrate that there is adequate cross flow of air to maintain thermal comfort and ventilation rates in accordance with CIBSE AM10 and windows/ventilators to be 10m from sources of external pollution. For air conditioned buildings - air intakes and exhausts to be 10m apart and intakes 10m from sources of external pollution generally and all designed to BS EN 13779:2007 Annexes A3. Where areas of the building are subject to unpredictable and variable occupancy patterns, CO2 or air quality sensors should be specified. NB: The building is too close to the main road.
Hea04	Thermal Comfort	2		1	<b>Thermal Modelling</b> - Thermal model required to be carried out in accordance with CIBSE AM11 Building Energy and Environmental Modelling using software that provides full dynamic thermal analysis. Thermal model to demonstrate that the building design and services strategy can deliver thermal comfort in line with the criteria set out in CIBSE Guide A. For air-conditioned buildings, the PMV and PPD indices must be reported.
				1	<b>Design for Future Thermal Comfort</b> - an allowance for a projected climate change is included within the thermal model.
Hea05	Acoustic Performance	1		1	<b>Internal indoor ambient noise levels</b> - must achieve levels that comply with the design ranges given in Section 7 of BS 8233: 2014. A programme of acoustic testing will need to be carried out by a compliant test body.
Hea06	Security	1		1	<b>Security of Site and Building</b> - A suitably qualified security specialist (e.g. ALO/CPDA) has been consulted at RIBA Stage 2 to carry out a Security Needs Assessment of the proposed site. Security controls and recommendations to be incorporated into the proposals.

Hea07	Safe and Healthy Surroundings	2		0	<b>Safe Access</b> - Dedicated and safe cycle paths are to be provided from the site entrance to any cycle storage and connect to off-site cycle paths where applicable. Dedicated and safe footpaths are to be provided on and around the site providing suitable links from the site entrance to the building entrance, car parks to the building entrance, the building to the outdoor space and connecting to off-site paths where applicable. Where there is delivery access and drop-off areas, delivery areas should not be accessed through the general parking areas or cross/share pedestrian and cyclists paths or outside amenity areas. There should be a dedicated parking or waiting area for goods vehicles with appropriate separation from the manoeuvring area and car parking. Parking and turning areas to be designed for simple manoeuvring without the need for repeated shunting. NB: the development has shared surfaces for vehicles, pedestrians and cyclist access and therefore does not meet the criteria for this issue.
				1	<b>Outdoor Space</b> - There is an outdoor space providing building users with an external amenity area. The space must be adequately sized, an outdoor landscaped area such as a garden or balcony or terrace, the majority of space should be open to the sky and it must be provided with appropriate seating and be non-smoking. NB: a landscaped area is provided adjacent to the commercial unit.
<b>Total Health &amp; Wellbeing Credits</b>		<b>11</b>		<b>9</b>	
<b>Health &amp; Wellbeing (weighted) Section Score</b>		<b>8.00%</b>		<b>6.55%</b>	
<b>Energy</b>					
Ene01	Reduction of Energy Use and Carbon Emissions	9	Excellent - 4 credits Outstanding - 6 credits	6	<b>Energy Performance</b> - SBEM Output Brukl Document will determine the score. If building services efficiencies and performance specifications are unknown (i.e. part of the fit out works), services complying with the minimum energy efficiency standards or backstop levels required by building regulations should be used. Alternatively, the design team may use performance specifications confirmed within a green fit-out agreement that is contractually required from the tenants in their fit-out works. NB The initial SBEM is based on an ASHP servicing the heating, cooling and hot water and Photovoltaic panels providing the electricity. The As Designed SBEM shows that the unit achieves an EPRNC of 0.632 for 6 credits.
				4	Outstanding - 4 credits
Ene02	Energy Monitoring	2	Very Good and above	1	<b>Sub-metering of End-Use Categories</b> - The following (where applicable) needs to be sub-metered or monitored by BEMS - space heating, domestic hot water, lighting, small power, humidification, cooling, major fans, renewable or low carbon systems, controls and other major energy consuming items. Where the floor area is greater than 1000m2, an appropriate energy monitoring and management system such as automatic meter reading systems or BEMS.
				1	<b>Sub-Metering of High Energy Load and Tenancy Areas</b> - Each incoming energy supply to be sub-metered or monitored by BEMS. This will need to be sub-metered by tenanted areas or floor plates, or function areas or departments in single occupancy buildings. In large single occupancy areas with one homogenous function, sub-metering by floor plate should also be provided.
Ene03	External Lighting	1		1	Where there is no external lighting, the credit can be awarded by default. Where external lighting is specified, external light fittings are to have an average luminous efficacy of not less than 70 luminaire lumens per circuit Watt. Lighting to be automatically controlled to prevent operation during daylight hours and with presence detection in areas of intermittent pedestrian traffic.
Ene04	Low Carbon Design	3		1	<b>Passive Design Analysis</b> - Thermal modelling as set out in Hea04 must be carried out. Analysis to be carried out at Concept Design Stage to identify opportunities for the implementation of passive design solutions that reduce demands for energy consuming building services. The measures should be implemented to reduce the total heating, cooling, mechanical ventilation, lighting loads and energy consumption in line with the passive design analysis findings. The reduction in total energy demand and carbon dioxide emissions resulting from the passive design measures should be quantified.
				0	<b>Free cooling</b> - The passive design analysis credit must be achieved and must include a free cooling analysis. Opportunities for free cooling solution must be identified. The building should be naturally ventilated or use any combination of free cooling strategies.
				1	<b>Low Zero Carbon Feasibility Study</b> - to be carried out by end of Concept Design Stage (RIBA Stage 2) and the recommendations of the report implemented within the final design. The savings in regulated carbon dioxide emissions resulting from the feasibility study should be quantified. NB: The LZC recommends ASHP and PV panels to the commercial unit.
<b>Total Energy Credits</b>		<b>19</b>		<b>15</b>	
<b>Energy (weighted) Section Score</b>		<b>14.00%</b>		<b>11.05%</b>	
<b>Transport</b>					
Tra01	Transport Assessment and Travel Plan	2		2	<b>Travel Plan</b> - During the feasibility and design stages, a travel plan should be developed based on a site-specific travel assessment or statement. The travel plan will promote sustainable modes of transport and will be implemented post construction.
Tra02	Sustainable Transport Measures	10		5	<b>Transport Options Implementation</b> - Points are available for each sustainable transport measure that has been met by the project. Credits are awarded based on the number of points achieved and the calculated Accessibility Index of the site. The site has an AI of 9.51. Assessment options 1, 4, 7, 8 and 9 will be implemented.
<b>Total Transport Credits</b>		<b>12</b>		<b>7</b>	
<b>Transport (weighted) Section Score</b>		<b>11.50%</b>		<b>6.71%</b>	

Water					
Wat01	Water Consumption	5	Good to Excellent - 1 credit Outstanding - 2 credits	4	Low flush volume toilets/urinals, taps and showers with low flow rates and water efficient dishwashers to be specified. Without the specification of rainwater harvesting or greywater systems, 4 credits can be achieved with careful specification of sanitary fittings.
Wat02	Water Monitoring	1	Good and above - criterion 1	1	A water meter will need to be fitted to the mains water supply to each building/unit. Each tenancy area will also be sub-metered. Each meter will need to have a pulsed or other open communication output and, where installed, connected to the BMS.
Wat03	Major Leak Detection & Prevention	2		1	<b>Leak Detection System</b> - a compliant leak detection system will need to be installed on the mains water supply within the buildings and between the building and the utilities meter.
				1	<b>Flow Control Devices</b> - i.e. sanitary supply shut off to be installed to the water supply to each sanitary area/facility.
<b>Total Water Credits</b>		<b>8</b>		<b>7</b>	
<b>Water (weighted) Section Score</b>		<b>7.00%</b>		<b>6.13%</b>	
Materials					
Mat01	Environmental Impacts from Construction Products - Building Life Cycle Assessment (LCA)	7		5	<b>Superstructure</b> - Comparison with the BREEAM benchmark using either IMPACT compliant software or BREEAM Simplified LCA Tool. Carry out options appraisals on 2-4 significantly different superstructure design options. Both actions to be completed during the Concept Design and again during the Technical Design stage. NB: A comparison with the benchmark was completed at Stage 2 together with 3 options appraisals.
				1	<b>Substructure and Hard Landscaping Options Appraisal</b> - carry out at least 6 significantly different substructure or hard landscaping design options (at least 2 substructure and at least 2 hard landscaping).
Mat02	Environmental Impacts from Construction Products - Environmental Product Declarations (EPD)	1		0	Specify construction products with EPD that achieve a total EPD points score of at least 20, across the following material categories - timber/timber-based, concrete/cementitious, metal, stone/aggregate, clay-based, gypsum, glass, plastic/polymer/resin/paint/chemicals or bituminous, animal fibre/skin or fibre, other materials. A maximum of 4 points may be scored under each category.
Mat03	Responsible Sourcing of Construction Products	4	All levels - Pre-requisite	0	Pre-requisite - All timber and timber products used on the project must be legally harvested and traded timber.
				1	Sustainable Procurement Plan - Principle contractor must source materials for the project in accordance with a documented Sustainable Procurement Plan. The plan must be prepared prior to the Concept Design Stage.
				1	Responsible Sourcing of Materials - It should be sought to select suppliers/manufacturers with Environmental Management Systems in place and any timber should be sourced from suppliers who can provide Chain of Custody Certification. Elements covered include ceilings (including finishes), doors/windows, floors (including finishes), insulation, internal partitions/walls (including finishes), roof, structure - primary and secondary, external walls and hard landscaping. It is possible to achieve at least 2 credits with careful product selection.
Mat05	Designing for Durability and Resilience	1		1	<b>Protecting vulnerable parts of the building from damage</b> - The building should incorporate suitable durability and protection measures or designed features/solutions to reduce damage to the building's fabric or materials in the case of accidental or malicious damage occurring. These must provide protection against: a. negative impacts of high user numbers in relevant areas of the building (e.g. areas of high pedestrian traffic such as public areas, main thoroughfares, corridors, lifts, stairs, doors etc.). b. Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas. c. External building fabric damage by a vehicle. Protection against, or prevention from, any potential vehicular collision where parking and manoeuvring occurs within 1m of the external building façade and where delivery areas or routes are within 2m of the facade i.e. specifying bollards or protection rails. d. Potential malicious damage to building materials and finishes in public and common areas as appropriate. <b>Exposed parts of the building must be protected from material degradation</b> - key exposed building elements need to be designed and specified to limit long and short term degradation due to environmental factors by using materials/products which achieve appropriate quality or durability standards OR via a details assessment of the element's resilience when exposed to material degradation and environmental factors. Convenient access to the roof and facade must be provided for cost effective cleaning, replacement and maintenance. The roof and facade must be designed to prevent water damage ingress and detrimental ponding.
Mat06	Material Efficiency	1		0	At the Preparation and Brief and Concept Design Stages, targets should be set and the opportunities and methods to optimise the use of materials reported for the following stages - 1a) Preparation and Brief, 1b) Concept Design 1c) Developed Design 1d) Technical Design 1e) Construction. The material efficiency should be developed, implemented and recorded during the 2a) Developed Design 2b) Technical Design 2c) Construction. Targets and actual material efficiencies should be recorded.
<b>Total Materials Credits</b>		<b>14</b>		<b>9</b>	
<b>Materials (weighted) Section Score</b>		<b>17.50%</b>		<b>11.25%</b>	

Waste					
Wst01	Construction Site Waste Management	5	Outstanding - 1 credit	1	<b>Pre-demolition Audit</b> - A pre-demolition audit must be completed at RIBA Stage 2 prior to any strip out or demolition works. This will cover any existing buildings, structures or hard surfaces being considered for demolition to determine the potential for refurbishment, reuse or recovery. It should be used to guide the design, consider materials for reuse and set targeted for waste management. Actual waste arisings and waste management routes should be compared with those forecast and significant deviations investigated.
				3	<b>Construction Resource Efficiency</b> - A compliant Resource Management Plan (RMP/SWMP) will need to be produced. Waste targets for non-hazardous construction waste generated from the building (excluding demolition and excavation waste) need to be set at no more than 3.4m3 or 3.2tonnes per 100m2 of gross internal floor area.
				1	<b>Diversion of Resources from Landfill</b> - At least 70% by volume or 80% by tonnage for non-hazardous construction waste and 80% by volume or 90% by tonnage for demolition waste will need to be diverted from landfill. Waste is to be sorted into separate key waste groups either on-site or through a licensed contractor for recovery.
Wst02	Use of Recycled and Sustainably Sourced Aggregates	1		0	<b>Pre-requisite</b> - A pre-demolition audit must be completed where demolition works are taking place.
				0	<b>Project Sustainable Aggregate Points</b> - Identify all the aggregate uses and types on the project, determine the quantity in tonnes for each, identify the region in which the aggregate source is located and calculate the distance in km travelled by all aggregate by transport type. This information is used to calculate the project sustainable aggregate points achieved, 3.5 to 6 points are required for 1 credit. To be reviewed by engineer during the design development.
Wst03	Operational Waste	1	Excellent and above - 1 credit	1	A dedicated space for the segregation and storage of operations recyclable waste generated will be provided based on a minimum of 2m2 per 1000m2 NIFA for buildings less than 5000m2 for recycled waste, with a minimum of 10m2 for buildings exceeding 5000m2. This is in addition to any storage requirements for general waste. Where catering is provided, an additional 2m2 per 1000m2 of net floor area is required (with a minimum of 10m2 for buildings over 5000m2). The space must be clearly labelled with segregation and accessible to building occupants and facilities operators. Where consistent and large amounts of generated: a) provide a static waste compactor or baler within a service area or dedicated waste management space. b) vessels for composting suitable organic waste OR adequate space for storing segregated food waste and compostable organic waste for collection to an alternative composting facility. c) a water outlet adjacent to the facility for cleaning and hygiene purposes where organic waste is to be stored or composted on site. Small retail or industrial units (of less than 200m2) may be provided with shared facilities which meet the requirements for the building or site as a whole.
Wst04	Speculative Finishes	1		1	For tenanted areas (where the future tenant is not known), floor and ceiling finishes must only be installed to a show area (25% of the net lettable area). NB: Floor and ceiling finishes will only be installed to core areas unless otherwise agreed with tenants.
Wst05	Adaption to Climate Change	1		0	A climate change adaptation strategy appraisal should be conducted covering building services, renewable systems, structural and fabric resilience by the end of Concept Design (RIBA Stage 2 or equivalent), in accordance with the following approach: a. Carry out a systematic risk assessment to identify and evaluate the impact on the building over its projected life cycle from expected extreme weather conditions arising from climate change and, where feasible, mitigate against these impacts. The assessment should cover the following stages: i. Hazard identification ii. Hazard assessment iii. Risk estimation iv. Risk evaluation v. Risk management.
Wst06	Functional Adaptability	2		0	<b>Design for Disassembly and Functional Adaptability - Recommendations</b> - A building-specific functional adaptation strategy study must be undertaken prior to or during Concept Design (RIBA Stage 2 or equivalent), which includes recommendations or solutions that aim to enable and facilitate disassembly and functional adaptation. The report should consider: 1. Feasibility - likelihood to contain multiple or alternative building uses, area functions and different tenancies over the life of the building (i.e. structural design of the building). 2. Accessibility - design aspects facilitating the replacement of all major plant and accessibility to local services. 3. Versatility - the degree of adaptability of the internal environment. 4. Adaptability - the potential of the building ventilation strategy or adapt to future occupants needs and climatic scenarios. 5. Convertibility - degree of adaptability of the internal physical space and external shell to accommodate changes of use. 6 - Expandability - potential for expansion vertically or horizontally. 7. Refurbishment potential - potential for major refurbishment including replacing the facade.
				0	<b>Disassembly and Functional Adaptability</b> - First credit to be achieved. Provide a Functional Adaptation Strategy Study to during the Technical Design stages to confirm how the recommendations or solutions proposed previously have been implemented or justify any omissions and report on any changes to the strategy. Produce a building adaptability and disassembly guide to communicate the characteristics allowing functional adaptability and disassembly guide to prospective tenants/building owners.
<b>Total Waste Credits</b>		<b>11</b>		<b>7</b>	
<b>Waste (weighted) Section Score</b>		<b>7.00%</b>		<b>4.45%</b>	
Land Use & Ecology					
LE01	Site Selection	2		1	<b>Previously Occupied Land</b> - At least 75% of the proposed building footprint will be located on previously occupied land. NB: The site is on the site of the former Greggs Bakery Factory and is therefore fully developed at present.
				0	<b>Contaminated Land</b> - A contaminated land professional site investigation, risk assessment and appraisal has deemed the site to be contaminated and confirmed the degree of contamination, contaminant sources or types and the options for remediation. A remediation strategy and implementation plan should be prepared by the contaminated land professional. The Phase II ground investigation advises that remediation will not be required.

LE02	Identifying and Understanding the Risks and Opportunities for the Project	2		0	<b>Pre-requisite</b> - Ecology Route 2 has been selected and an Ecologist appointed. The client or contractor must confirm that compliance is monitored against all relevant UK and EU legislation relating to the ecology of the site.
				1	<b>Survey and Evaluation</b> - An ecologist Was appointed during the early design stages so they can influence strategic planning decisions and complete an ecological survey and evaluation to establish the ecological baseline of the site.
				1	<b>Determining the Ecological Outcomes for the Site</b> - During the concept design stage, liaise and collaborate with the client/design team, specialist consultants and local stakeholders where relevant to determine the ecological outcome for the site. This should involve the identification, appraisal and selection of specific solutions and measures following the hierarchy of action: a) avoidance, b) protection, c) reduction or limitation of negative impacts, d) on site compensation or e) enhancement, either within the site or off-site.
LE03	Managing Negative Impacts on Ecology	3		0	<b>Pre-requisite</b> - LE02 has been achieved
				1	<b>Planning, Liaison, Implementation and Data</b> - Roles and responsibilities are clearly defined, allocated and implemented to support successful delivery of project outcomes at or prior to Concept Design - this may include clear ownership of tasks, allocation of resources and procedures to promote effective implementation and monitoring. The site preparation and construction works are planned for and implemented at an early project stage to optimise benefits and outcomes - this may include ecological seasonality affecting programming or reducing and managing potential knock-on impacts of the works (pollution/disturbance).
				2	<b>Managing Negative Impacts of the Project</b> - 2 credits where there is no overall loss of ecological value OR 1 credit where the loss of ecological value has been limited as far as possible. Where avoidance, protection, limitation or control of the negative impacts on features of ecological value is not possible, compensation should take place. NB: There are no features of ecological value on the site at present although measures will need to be taken to protect the River Crane during the works.
LE04	Change and Enhancement of Ecological Value	4		0	<b>Pre-requisite</b> - Criteria 3 & 4 of LE03 are met i.e. roles and responsibilities are clearly defined and implemented and site preparation and construction works are planned and implemented at a stage early enough to optimise benefits and outputs (RIBA Stage 2 actions).
				1	<b>Liaison, Implementation and Data Collection</b> - The project team have implemented solutions and measures selected in a way which enhances ecological value either, in the first instance, on site, or where not feasible, off site. Recommendations have been made by the ecologist. These also include improvements along the River Crane.
				2	<b>Enhancement of Ecology</b> - Up to 3 credits can be achieved based on the calculation of the change in ecological value occurring as a result of the project. 2 credits are currently targeted.
LE05	Long Term Ecology Management and Maintenance	2		0	<b>Pre-requisite</b> - Criteria 3 & 4 of LE03 are met i.e. roles and responsibilities are clearly defined and implemented and site preparation and construction works are planned and implemented at a stage early enough to optimise benefits and outputs (RIBA Stage 2 actions). 1 credit is achieved under LE04.
				1	<b>Planning, Liaison, Data, Monitoring and Review Management and Maintenance</b> - Monitoring and reporting on the effectiveness of the ecological management, monitoring, protection and remedial measures. Provide as part of the building/tenant owner information pack, a section on Ecology and Biodiversity in accordance with the criteria requirements.
				1	<b>Landscape and Ecology Management Plan Development</b> - A landscape and ecology management plan, or similar, is developed in accordance with BS 42020:2013 covering as a minimum the first 5 years after project completion. To include a) actions and responsibilities prior to handover, b) the ecological value and condition of the site over the development life, c) identification of opportunities for ongoing alignment with activities external to the development project, d) identification and guidance to trigger appropriate remedial actions to address previously unforeseen impacts, e) clearly defined and allocated roles and responsibilities.
<b>Total Land Use &amp; Ecology Credits</b>		<b>13</b>		<b>11</b>	
<b>Land Use &amp; Ecology (weighted) Section Score</b>		<b>15.00%</b>		<b>12.69%</b>	
<b>Pollution</b>					
Pol01	Impact of Refrigerants	0		0	<b>Prerequisite</b> - All systems with electric compressors must comply with the requirements of BS EN 378: 2016 parts 2 and 3. Refrigerants containing ammonia must comply with the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice.
				2	<b>Impact of Refrigerant</b> - The refrigerants to be specified need to have a Direct Effect Life Cycle CO2 equivalent emissions (DELCO2e) of less than 1000kgCO2e/Kw cooling/heating capacity to gain 1 credit. Where the DELCO2e is less than 100kgCO2e/Kw OR all the refrigerants have a GWP of less than 10, 2 credits may be awarded. Where there are no refrigerants use or specified within the installed plant or systems, the credits may be awarded by default. On shell and core buildings it would need to be that the building has been designed to avoid the need for refrigerant containing building services, i.e. naturally ventilated or free cooling methods have been adopted. NB: The building is unable to be designed as fully naturally ventilated. Refrigerant based systems will need to be specified by the future tenants and therefore compliance with the criteria can not be shown.
				1	<b>Leak Detection</b> - All systems are hermetically sealed or use only environmentally benign refrigerants OR systems have a permanent automated refrigerant leak detection system Or an inbuilt automated diagnostic procedure for detecting leakage is enabled. In the event of a leak, the system must be capable of automatically responding and managing the remaining refrigerant charge to limit loss of refrigerant. Awarded by default where there are no refrigerants specified.
Pol02	Local Air Quality	2		2	2 credits can be awarded where all heating and hot water is supplied by non-combustion systems i.e. only powered by electricity OR emissions from all installed combustion plant that from space heating and domestic hot water do not exceed the levels set out in terms of NOx levels based on the appliance type, fuel and location. Particulate matter and VOC emissions (where biomass, solid fuel and wood pellets are used) must not exceed the maximum values (dependant on appliance type and location). NB: It is confirmed that the heating and hot water systems in core areas will be electric (ASHP).



Pol03	Flood and Surface Water Management	2	2	<b>Flood Resilience</b> - A site-specific FRA confirms the development is in a flood zone that is defined as having a low annual probability of flooding for two credits, taking into account all current and future sources of flooding - fluvial, tidal, surface water: sheet run-off from adjacent land, groundwater, sewers and reservoirs, canals and other artificial sources. Where the flood risk is assessed as medium or high, one credit may be awarded where the ground level of the building and access to both the building and site are designed so they are at least 600mm above the design floor level OR the final design of the building and wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach set out in section 5 of BS 8533:2017. NB: The flood risk assessment confirms the commercial unit to be within a low flood risk area and therefore full credits can be achieved.
		1	1	<b>Surface Water Run Off - Rate</b> - The surface water design must be site-specific and justification must be provided where water is allowed to leave the site. Drainage measures should show a 30% improvement for the developed site (for brownfield sites) or no change (for greenfield site) compared with the pre-developed site (based on the 1-year and 100-year return period events and an allowance for climate change in line with best practice guidance planning). Relevant maintenance agreements should be in place for the SUDs.
		1	1	<b>Surface Water Run Off - Volume</b> - Flooding of property will not occur in the event of local drainage system failure. Any additional predicted volume of run-off is prevented from leaving the site by using infiltration or other SUDs techniques OR where 10 and 11 can not be achieved, justification is provided and drainage design measures are specified so that the post-development peak rate of run-off is reduced to the limiting discharge of either a) the pre-development one-year peak rate of flow, b) the mean annual flow rate (Qbar) or c) 2L/s/ha (which ever is highest). The credit can be awarded by default where there is no increase in impermeable area. NB: The site is currently 100% impermeable and therefore the credit is achieved.
		1	0	<b>Minimising Water Course Pollution</b> - Engineer to confirm no discharge from the site for rainfall up to 5mm. SUDs or source control systems to be specified in areas where there is a low risk of water course pollution. Oil/petrol interceptors will be required to areas of high risk of contamination/spillage. All to be in accordance with SUDs manual. NB: Permeable paving allows for some infiltration but it has not been possible to prevent the first 5mm of rainfall from leaving site completely. The Engineer is to provide justification to see if the credit can be awarded on the basis that all possible measures have been implemented to meet the intent of the criterion.
Pol04	Reduction of Night Time Light Pollution	1	1	If installed, any external lighting must comply with Table 2 of the ILP Guidance Notes for the Reduction of Night Time Light Pollution and be switched off automatically between the hours of 2300 and 0700hrs (with the exception of Security and Safety lighting which should comply with the lower levels during these hours). Any illuminated advertisements to be designed in accordance with ILP PLG05.
Pol05	Reduction of Noise Pollution	1	1	Where there are no noise-sensitive areas or buildings within 800m of the site the credit can be awarded by default. Where noise sensitive buildings/areas are within 800m of the site a suitably qualified acoustician will need to be appointed to carry out a noise impact assessment in line with BS 4142:2014 and where any noise sources from the proposed site/building are greater than the required levels, attenuation measures should be installed. Where no external plant is specified, the acoustician must provide a statement confirming that there will be no significant noise in lieu of the noise assessment.
<b>Total Pollution Credits</b>		<b>12</b>	<b>8</b>	
<b>Pollution (weighted) Section Score</b>		<b>9.00%</b>	<b>6.00%</b>	
<b>Innovation</b>				
		<b>10.0%</b>		
Man03		<b>1.0%</b>	<b>0.0%</b>	<b>Responsible Construction Practices</b> - Achieve all of the responsible construction management items listed.
Hea01		<b>1.0%</b>	<b>0.0%</b>	<b>Daylighting</b> - Exemplary daylight factors are achieved.
Hea06		<b>1.0%</b>	<b>0.0%</b>	<b>Security</b> - A compliant risk based security rating scheme has been used such as SABRE.
Ene01		<b>3.0%</b>	<b>0.0%</b>	<b>Beyond Zero Net Regulated Carbon / Carbon Negative</b> - Building needs to meet the requirements for Beyond Zero Regulated Carbon or Carbon Negative.
Ene01		<b>2.0%</b>	<b>0.0%</b>	<b>Post-Occupancy Stage</b> - Full credits are achieved under Ene02 and the client commits funds to carry out post occupancy stage energy modelling to report the actual energy consumption compared against the targets previously established.
Wat01		<b>1.0%</b>	<b>0.0%</b>	A credit is available where the % improvement is 65% or more over baseline building water consumption for a building of similar type and occupancy.
Mat01		<b>1.0%</b>	<b>0.0%</b>	<b>Core Building Services Options Appraisal</b> - Carry out LCA options on at least 3 different services options during the Concept Design Stage.
Mat01		<b>1.0%</b>	<b>0.0%</b>	<b>LCA and LCC alignment</b> - Both LCC and LCA need to be completed and the results of the appraisals integrated.
Mat01		<b>1.0%</b>	<b>1.0%</b>	<b>Third Party Verification</b> - LCA appraisals to be reviewed and verified by an independent 3rd party.
Mat03		<b>1.0%</b>	<b>0.0%</b>	At least 50% of the available points must be achieved.
Wst01		<b>1.0%</b>	<b>0.0%</b>	Waste targets for non-hazardous construction waste generated from the building (excluding demolition and excavation waste) need to be set at no more than 1.6m3 or 1.9tonnes per 100m2 of gross internal floor area. In addition at least 85% by volume or 90% by tonnage for non-hazardous construction waste and 85% by volume or 95% by tonnage for demolition waste and 95% by volume or tonnage for excavation waste will need to be diverted from landfill.
Wst02		<b>1.0%</b>	<b>0.0%</b>	<b>Project Sustainable Aggregate Points</b> - Identify all the aggregate uses and types on the project, determine the quantity in tonnes for each, identify the region in which the aggregate source is located and calculate the distance in km travelled by all aggregate by transport type. This information is used to calculate the project sustainable aggregate points achieved, more than 6 points are required for the exemplary credit.
Wst05		<b>1.0%</b>	<b>0.0%</b>	The following criteria/credits have been achieved in addition to Wst05 - Hea04 criterion 6, Ene01 - minimum of 6 credits, Ene04 - passive design analysis, Wat01 - minimum of 3 credits, Mat05 criteria 2-4 and Pol03 - Flood resilience (minimum of 1) and Surface water run-off (2 credits).

LE02	1.0%		0.0%	Determine ecological outcome for the wider site sustainability related activities and ecosystem service related benefits and achieved both Hea07 credits, Pol03 Minimising Watercourse Pollution and Surface Water Run Off credits and Pol05
LE04	1.0%		0.0%	Using the ecology calculation methodology, there is shown to be a significant net gain of ecological value (110% or above)
	<b>110.00%</b>		<b>74.38%</b>	

# Appendix B - BREEAM Detailed Pre-assessment Report

# Management

## Man01 - Project Brief and Design

### Stakeholders (Project Delivery)

The client, design team and contractor will have defined roles and responsibilities and will contribute to the decision-making process from Concept Design Stage (RIBA Stage 2). This will ensure an integrated design process that will hopefully optimise the buildings' performance.

### Stakeholder Consultation (Third Party)

Prior to the end of the Concept Design Stage (RIBA Stage 2) and as part of the planning process, all relevant third parties and stakeholders will be consulted. This will include: building users, FM staff, representative consultation groups from existing community, potential users of any shared facilities, existing partnerships and networks that have knowledge and experience working on existing buildings of the same type and local or national heritage groups. Where deemed relevant, local or national historic/heritage groups will also be consulted. As part of the planning process, consultation with the local community has taken place along with public exhibitions. The introduction of the commercial element within this development is a result of the consultation process.

### BREEAM Advisory Professional (AP) (Concept and Developed Design)

A BREEAM Advisory Professional has been appointed from the Concept Design Stage of the office block (RIBA Stage 2) to facilitate the setting and achievement of BREEAM performance targets for the project. The BREEAM AP will also be appointed to monitor progress throughout the design process and formally report on progress. This is to ensure that any amendments through design development will not have a detrimental impact on the building achieving the targeted rating. A target rating of excellent has been set and a route to achieving this is set out within the pre-assessment in Appendix A.

## Man02 – Life Cycle Cost and Service Life Planning

Capital Cost Reporting in terms of cost of the building in pounds per square metre will be available covering the construction (including preparatory works, materials, equipment and labour), site management, construction financing and insurance and taxes during construction but excluding costs relating to land procurements, clearance, design, statutory approvals and post occupancy aftercare. This data will be used by the BRE to inform on future BREEAM performance benchmarking.

## Man03 – Responsible Construction Practices

The project will aim to be managed in an environmentally and socially considerate and accountable manner by achieving all 6 available credits within this section.

### Temporary Site Timber

It is a pre-requisite for all temporary site timber to be legally harvested and traded timber. This will include any timber used for site hoarding or shuttering.

### Environmental Management

The Principal Contractor and demolition contractor will operate an ISO 14001 Environmental Management System. Best practice pollution policies and procedures will be implemented on site in line with Pollution Prevention Guidelines: Working at Construction and Demolition Sites: PPG6.

### BREEAM Advisory Professional (Site)

A BREEAM AP will be appointed to oversee the construction phase to ensure ongoing compliance with the performance criteria by attending key meetings, site visits and providing regular updates/reports. Their role will be to monitor construction progress against the performance targets, advise on the impact of any changes and monitor and coordinate the gathering of site evidence.

### Responsible Construction Management

The project will be registered under the Considerate Constructor Scheme prior to commencing on site. There is a commitment to achieve 'Performance Beyond Compliance' with a score of 35 and a minimum of 7 scored under each section. The construction process will be managed to minimise nuisance and inconvenience during the build.

### Utility Consumption

The Principal Contractor will be required to monitor and record energy consumption (kWh or litres of fuel) to report the total carbon dioxide emissions (kg/CO<sub>2</sub>) and water consumption (m<sup>3</sup>) from construction plant, equipment (mobile and fixed) and site accommodation during the construction works. Targets will be set for the project of 350kgCO<sub>2</sub>e/£100k for energy consumption and 8m<sup>3</sup>/£100k for water consumption during the construction process. By monitoring these it will enable company targets to be set to minimise water usage and CO<sub>2</sub> emissions from site activities.

### Transport of Construction Materials and Waste

The Principal Contractor will be required to monitor and record data on transport movements from the delivery of the majority of construction materials to site and construction waste from site. Using this collated data, the total fuel consumption (litres), total carbon dioxide emissions (kg/CO<sub>2</sub>e) and total distance travelled (km) will be reported to the BRE for future benchmarking.

## Man04 – Commissioning and Handover

### Commissioning – Testing, Schedule and Responsibilities

A schedule of commissioning and testing will be produced to identify and include a timescale for any commissioning and re-commissioning works and testing and inspection of the building fabric. This will identify the appropriate standards to which the commissioning will be conducted in accordance with. An appropriate member of the design team will be appointed to monitor and programme the commissioning process. This is to ensure that the building services are working efficiently and installed to the correct settings.

### Training Schedule

Appropriate training will be provided to the future building users and facilities management team upon completion of the building; covering the building design intent, aftercare provision, demonstration of the installed systems and maintenance requirements. This will be tailored to the needs of the building occupants, to ensure they understand how to use and manage the building effectively and efficiently.

### Building User Guide (BUG)

A compliant Building User Guide will be produced, separate to the O&M manuals. This will be a dedicated building/site specific guidance for the non-technical building user to help them access, understand and operate the building efficiently and in a manner in keeping with the original design intent. This will be passed to the fit-out contractor to complete for tenanted areas.

# Health and Well-being

## Hea01 – Visual Comfort

These credits are to ensure that daylighting, artificial lighting and occupant control are considered at the design stage to ensure best practice in visual performance and comfort for building occupants.

### Daylighting

The buildings will be designed to ensure natural daylighting is optimised thereby improving the quality of life for occupants and reducing the reliance upon artificial lighting. Daylight Calculations will be carried out as soon as possible to show that good practice daylighting levels have been met. This includes the requirement for at least 80% of the relevant areas to have a daylight factor of 2%.

### View Out

95% of the floor area in 95% of relevant areas will be provided with an adequate view out, being either within 8m of an external wall with a window/opening which forms at least 20% of the surrounding wall area, or where depths are over 8m the window to wall ratio will be in accordance with Table 1 of BS 8206. An external view out offers positive effects on the health and wellbeing of occupants.

### External Lighting

All lighting installed will be designed to meet the required BREEAM standard i.e. BS EN 12464-2:2014 for external lighting.

## Hea04 – Thermal Comfort

A full dynamic thermal model analysis will be carried out using software in accordance with CIBSE AM11 Building Energy and Environmental Modelling to ensure that appropriate thermal comfort levels are achieved through design and controls will be selected to maintain a thermally comfortable environment for occupants of the building in accordance with the criteria set out within CIBSE Guide A. The thermal model will include an allowance for a projected climate change.

## Hea05 – Acoustic Performance

A Suitably Qualified Acoustician will be appointed during the early design stages to advise on performance criteria and set out testing regimes for indoor ambient noise levels for non-residential areas. Any recommendations will be incorporated within the design. Pre-completion testing will be carried out to ensure the performance standards have been met.

## Hea06 – Security

To promote secure use and access to and from the building a Security Specialist (e.g. ALO or CPDA) has been consulted during the Concept Design Stages (RIBA Stage 2) to carry out a Security Needs Assessment of the proposed site and their recommendations and comments incorporated into the final design.

## Hea07 – Safe and Healthy Surroundings

### Outside Space

An adequately sized outdoor space will be provided for building users of the commercial unit as an external amenity area with seating. This will be located behind the commercial unit, adjacent to the cycle store.



# Energy

## Ene01 – Reduction of Energy Use and Carbon Emissions

Credits are awarded for buildings designed to minimise operational energy demand, primary energy consumption and CO2 emissions. These credits recognise improvements in energy performance of the building above that of the national building regulations. A calculation of the energy performance ratio (EPR) of the building compared to a benchmark level will determine the number of credits from a possible twelve maximum. The SBEM Brukl document will provide the information required to establish the building EPR rating. 6 credits currently targeted and the minimum 4 credits required for an excellent rating.

The Desco Energy Strategy report ref: 1823-50-RPT05 sets out the proposed strategy for a heating and cooling system using VRF air conditioning and air source heat pumps. Renewable energies will be provided in the form of high efficiency photovoltaic panels. For further details please refer to the Desco Energy Strategy report.

### Summary of Proposals:

Heating and Cooling System:	Variable refrigerant flow (VRF) air conditioning
Domestic Hot Water:	Electric point of use hot water heaters
Ventilation:	Mechanical ventilation with heat recovery
Insulation:	Enhanced u-values to all elements as set out below
Air Tightness:	APR = 3m <sup>3</sup> /m <sup>2</sup> /hr @ 50pa
Lighting:	High efficiency lamps throughout
On Site LZC Technology:	Air source heat pumps and photovoltaics

## Ene02 – Energy Monitoring

This credit is to encourage the installation of sub-metering that facilitates the monitoring of operational energy consumption.

### Sub-metering of Major Energy Consuming Systems

All major energy consuming systems will be sub-metered or monitored by BEMS as follows (where applicable): space heating, domestic hot water, lighting, small power, humidification, cooling, major fans, renewable or low carbon systems, controls and other major energy consuming items.

### Sub-metering of High Energy Load and Tenancy Areas

Each incoming energy supply will be sub-metered or monitored by BEMS. These will be sub-metered by floor plates or tenancy/function areas.

## Ene03 - External Lighting

External lighting will be designed to have an average luminous efficacy of not less than 70 luminaire lumens per circuit watt and be controlled to prevent operation during daylight hours through the use of daylight sensors and time clocks. Presence detection will be specified for areas of intermittent pedestrian traffic.

## Ene04 - Low Carbon Design

An initial Passive Design Analysis and Low Zero Carbon Feasibility Study (LZC) has been carried out as part of the planning process. This identifies the opportunities for incorporating passive design measures such as thermal insulation, air tightness, maximised daylighting and passive solar gain in order to reduce the total heating and cooling demand of the building. Renewable energies will be specified in accordance with the recommendations of the LZC Study to ensure clean, green energy is provided to the building where feasible. The LZC currently recommends the use of an air source heat pump for heating and cooling and high efficiency photovoltaic panels delivering the building's electricity. The building is unable to be naturally ventilated due to external noise and insufficient cross ventilation.

Below is a summary of the predicted carbon dioxide savings resulted from passive design measures and the use of on-site renewable energy.

### Summary of regulated carbon dioxide savings from each stage of the Energy Hierarchy:

	<b>% regulated carbon dioxide savings</b>
Savings from energy demand reduction	<b>20%</b>
Savings from ASHP (Be Lean):	<b>15%</b>
Savings from renewable energy (Be Clean):	<b>13%</b>
Total cumulative savings (Be Green):	<b>48%</b>

# Travel

## Tra01 – Transport Assessment and Travel Plan

A travel plan has been developed for the site at pre-planning stage which gives consideration to a range of transport options for building users to encourage a reduction on the reliance on forms of travel that have the highest environmental impact. It includes a site-specific assessment on existing travel patterns; the travel patterns and transport impact of future building users; current and future facilities for pedestrians, cyclists and disabled users and public transport links. From this a package of measures has been provided to encourage the use of more sustainable modes of transport and movement of goods and people during the building's operation and use. These include car parking restricted for blue bay parking only, cycle storage to encourage cycling, promotion and free membership to a car club and a travel pack provided to each resident and building user promoting the local transport network and public services.

## Tra02 – Sustainable Transport Measures

This credit is to encourage development in proximity of good public transport networks and amenities, helping to reduce transport related pollution and congestion. It also seeks to promote more sustainable modes of travel such as walking, cycling, public transport, car sharing and electric cars.

Up to 10 credits are available based upon how many sustainable transport measures have been incorporated within the scheme. The number of points required is related to a building's Accessibility Index (AI) i.e. more sustainable transport measures will be encouraged where there are poor transport links. This site has an AI of 9.51 and as such falls within the lowest scoring bracket. In the table below, the available transport measures have been summarised, along with some comments on how or if the measure can be/will be achieved and confirmation of the points scored for each item to be implemented.

Transport Option	Sustainable Transport Measures	Comments	Points Awarded
1	Existing AI of $\geq 8$	The existing AI has been calculated using the Transport for London Planning Information Database. The AI is confirmed as 9.51 and the PTAL for the site is 2.	1
2	An increase in the AI has been achieved through additional or enhanced services or a dedicated service or bus route is provided	There are no improvements proposed to the existing services which are sufficient to serve the site.	0

3	Provide a public transport information system in a publicly accessible area to allow up-to-date information on public services and transport infrastructure	This will not be provided as part of the shell and core fit-out	0
4	Provide electric recharging stations of a minimum of 3kW for at least 10% of the total car parking capacity for the development	The car parking space allocated to the commercial unit, will be provided with infrastructure for future installation of car charging point i.e. cabling and network capacity will be made available	1
5	Provision and promotion of car share group, 5% of total car parking to be priority spaces for car sharers and to be located nearest the development entrance	This cannot be provided as the car parking space allocated to the commercial unit will be a blue badge parking space.	0
6	Make improvements, in consultation with the LA, to the either the existing pedestrian routes or cycle network	Improvements to the existing footways and cycle networks are not proposed	0
7	Install compliant cycle storage spaces	The space is designated as an office space and as such will require 1 cycle space per 10 staff. Based on a NIFA of 175m <sup>2</sup> and assumed use as a general office, a default occupancy rate of 0.111 has been used to calculate building user numbers of 20. This means that the minimum cycle provision of 4 compliant spaces must be applied. These spaces will be covered and accessible to the users of the commercial unit. The cycle storage will be provided in the form of secure, easily accessible cycle racks with an overhead covering	1
8	Install two compliant cyclists' facilities – showers, changing facilities, lockers or drying space	Cyclist facilities are proposed in the form of a shower and changing space	1
9	At least 3 existing amenities are present where relevant for a Building Group	It is confirmed that the building will be within 500m of a food outlet and access to cash (Tesco Express on Heath Road) and Pharmacy (on The Green)	1
10	Ensure at least one new accessible amenity is provided	None to be provided	0

11	Implement one site-specific improvement measure, not listed above, in line with the recommendations of the Travel Plan	No additional sustainable transport improvement measures are proposed	0
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The above table shows that 5 of the available points will be achieved, equating to 5 credits for this issue. A possible additional credit may be available for the provision of up to date travel information.

# Water

## Wat01 – Water Consumption

To reduce the consumption of potable water for sanitary use in buildings from all sources through the use of water efficient components and water recycling systems, through the specification of low flush toilets/urinals, low flow rates for taps/showers and water efficient dishwashers.

A 50% improvement over the baseline building water consumption is targeted.

## Wat02 – Water Monitoring

Water consumption will be monitored and managed in order to encourage reductions in use. A pulsed water meter will be fitted to the mains water supply to the commercial unit and each tenancy area will be sub-metered.

## Wat03 – Major Leak Detection & Prevention

Water leak detection and prevention measures will be adopted to reduce the impact of water leaks which may otherwise go undetected.

A compliant water leak detection system will be installed on the mains water supply within the building and between the building and the utilities meter. This will alert the building occupants when the flow of water passing through the water meter/data logger is at a flow rate above a pre-set maximum for a pre-set period of time (programmable to suit the building occupier's water consumption needs).

Flow control devices in the form of sanitary supply shut off will be installed on the water supply to each WC area/facility (regardless of whether areas are to be fitted out or not). These will generally be controlled by presence detectors which will switch the water on when movement is detected within an area and turn it off when that presence is removed. This will reduce the risk of leaks and flooding through appliances such as taps being left running or dripping.

# Materials

## Mat01 – Life Cycle Impacts

A life cycle analysis of the building has been completed at Concept Design to establish how the building performs against a BREEAM benchmark building. Options appraisals have been carried out on at least 3 different superstructure design options. Options appraisals have also been completed to advise on the substructure and hard landscaping constructions. Where required a detailed life cycle analysis will also be completed at Technical Design to review further construction options and their impact on the embodied carbon over the life cycle of the building.

## Mat03 - Responsible Sourcing

The principal contractor will have a sustainable procurement plan and materials will be sourced in line with this, for instance selecting local suppliers or those who can show responsible sourcing through CoC or EMS certification.

All timber and timber products used on the project will be legally harvested and traded timber with Chain of Custody certification (e.g. FSC, PEFC). All non-timber products will be sought to be from suppliers/manufacturers with Environmental Management System (EMS) certification (e.g. ISO 14001, BES 6001). Elements covered include ceilings (including finishes), doors and windows, floors (including finishes), insulation, internal partitions/walls (including finishes), roof, structure (primary and secondary), external walls, building services and hard landscaping.

## Mat05 – Designing for Durability and Resilience

The exposed elements of the buildings and landscape will be designed to be durable or incorporate protection measures in order to minimise damage, wear and tear and the frequency of replacement, maximising the materials optimisation. This includes the:

- a) Protection from the effects of high pedestrian traffic in main entrances, public areas and circulation spaces (through the specification of hardwearing and easily washable floor finishes, barrier matting to entrances, kick plates to doors, robust wall constructions, etc).
- b) Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas (protection rails to walls, impact protection to doors)
- c) Protection against, or prevention from, any potential vehicular collision where vehicular parking and maneuvering occurs within 1m of the external building façade for all car parking areas and within 2m for all delivery areas (specification of bollards/barriers/raised kerbs, robust external wall construction up to 2m).
- d) Protection from potential malicious damage to building materials and finishes in public and communal areas.

Suitable building materials will be specified for the locations or measures incorporated which will limit material degradation due to environmental factors.

# Waste

## Wst01 - Construction Waste Management

The development will minimise the impact of construction waste on the environment through the promotion of resource efficiency via effective management and the reduction of waste.

An initial pre-demolition audit will be completed prior to any strip out or demolition works. This will be used to determine the potential for refurbishment, reuse or recovery. The audit will identify the materials within the building, their amount and their potential waste management routes. At least 80% by volume or 90% by tonnage of demolition waste will be diverted from landfill. It is proposed that any bricks or concrete demolition waste will be crushed on site and used to backfill. Any insulation, plasterboard, mixed waste and hard landscaping will be collected by a waste management contractor for off-site recycling where possible. Copper and metal will be set aside and sold as scrap metal. Timber from floors, structural timber and internal joinery will be reclaimed where possible, with any remaining timber sent for shredding/firewood.

The Contractor will prepare a compliant Resource Management Plan (RMP/ SWMP) setting out waste targets, procedures for minimising waste and for monitoring and recording site waste. Waste targets for non-hazardous construction waste (excluding demolition and excavation waste) will be targeted at no more than 3.4m<sup>3</sup> or 3.2tonnes per 100m<sup>2</sup> of GIFA. 70% by volume or 80% by tonnage of non-hazardous construction waste will be diverted from landfill.

## Wst03 – Operational Waste

The development will provide adequate space for the provision of dedicated storage facilities for a building's operational-related recyclable waste streams to encourage the diversion of waste from landfill or incineration.

A minimum of 2m<sup>2</sup> per 1000m<sup>2</sup> NIFA will be provided for buildings of less than 5000m<sup>2</sup> for the storage of recyclable waste. This is in addition to the provision of adequate storage for general waste.

A minimum space of at least 3m<sup>2</sup> (2m<sup>2</sup> of which will be for recyclable waste) will be allocated for the commercial space. It is assumed, at this stage, that the end use of the building will be such that a compactor/baler or compost facilities are not required. A bin store sufficient for 3 x 1100 litre wheelie bins is currently proposed.

## Wst04 – Speculative Finishes

Floor and ceiling finishes will only be installed to the core areas unless specifically agreed with the tenants.



## Land Use and Ecology

### LE01 - Site Selection

The proposed building footprint is located more than 75% on previously occupied or developed land. The site was formerly occupied by Greggs Bakery with a number of buildings including offices, sheds, production buildings, two tall silos and hard standings. The site is currently nearly entirely developed and a brownfield site.

A credit is also available where the site is significantly contaminated and requires remediation. Initial ground investigation works confirm there is likely to be no ground contamination and therefore it is doubtful the requirements of this credit will be met.

### LE02 – Identifying and Understanding the Risks and Opportunities for the Project

A Suitably Qualified Ecologist has been appointed during the very early design stages to complete a Phase 1 habitat assessment. The survey showed the site is generally of low ecological value consisting of buildings and hard standing with the exception of some buddleia, ivy and bramble.

Although the site is of low ecological values, the survey shows that there is a low risk of bats roosting and also some scope for nesting birds. Nesting birds a protected species under the Wildlife and Countryside Act 1981 and therefore building demolition will take place outside the bird nesting season or the building inspected by an ecologist prior to demolition. Toolbox talks will be given to site operatives in relation to any ecological issues. Any nests found will be reported to the ecologist.

The development bounds the River Crane which supports a variety of protected and notable species. Therefore, appropriate measures will be taken to protect them from pollution during the construction works. These procedures will be set out within the Construction Management Plan and will include limiting lighting, construction dust and noise so as not to cause disturbance to nearby wildlife and habitats. Construction activities will be appropriately managed in line with current best practice to minimise pollution from surface water run-off to nearby watercourses.

### LE03 – Managing Negative Impacts on Ecology

The proposed development intends to demonstrate a 'neutral' impact on the ecological value of the site. This calculation will be demonstrated by the Suitably Qualified Ecologist commissioned to carry out the BREEAM specific ecological assessment.

## LE04 – Change and Enhancement of Ecological Value

A suitably Qualified Ecologist has been appointed to make recommendations for the enhancement of the site ecology. Landscape proposals will include native species in new landscape planting, the creation of diverse green roofs and the installation of bird nesting and bat roosting provision and stag beetle loggeries. Improvements are also proposed to the River Crane as suitable locations. The scheme overall will show a positive change in the ecological value of the site through enhancement measures.

## LE05 – Long Term Ecology Management and Maintenance

During the construction phase, the contractor will monitor and report on the effectiveness of the ecological management, monitoring, protection and remedial measures. All relevant UK and EU legislation relating to the protection and enhancement of ecology will be complied with during the design and construction process. The contractor will appoint a Biodiversity Champion to ensure detrimental impacts on the site diversity are minimised in line with the Ecologist's recommendations, train workforce on how to avoid damaging the site ecology, record actions taken to protect biodiversity and programme site works to minimise disturbance to wildlife.

A 5-year landscape and ecology management plan will be developed in accordance with BS 42020:2013 to ensure the landscaping and ecology is maintained appropriately.

## Pollution

### Pol02 – Local Air Quality

It is assumed that all heating and hot water will be supplied by non-combustion systems such as electricity and therefore the credits are awarded on this basis. The current proposal is for an air source heat pump.

### Pol03 – Flood and Surface Water Management

The aim of this category is to avoid, reduce and delay the discharge of rainfall to watercourses and public sewers, thereby minimising the risk and impact of localized flooding, through the use of sustainable drainage systems (SuDS).

#### Flood Resilience

The Environment Agency Flood Risk map shows that the site is classified as being in Zone 1 with a corresponding low annual risk of flooding. A site-specific flood risk assessment has been carried out and this shows that the site is of low risk of flooding from all other sources including surface water, ground water, sewers and any artificial water sources such as reservoirs or canals.

#### Surface Water Run-Off – Rate

This development will incorporate drainage measures to ensure a reduction in the peak rate of run-off of at least 30% from that pre-development and the design will incorporate an allowance for climate change. The drainage strategy includes the use of green roofs and permeable paving as complimentary sustainable drainage measures. The surface water drainage will have run off will discharge through a combination of infiltration and a pumped outfall into the River Crane.

#### Surface Water Run-Off – Volume

The impermeable area of the site will be decreased through the development and therefore this should be achieved by default.

#### Minimising Watercourse Pollution

In areas of low risk source of water pollution, an appropriate level of pollution prevention treatment will be provided using SuDs techniques. In areas at high risk of contamination or spillages of substances such as petrol or oil, separators will be installed in surface water drainage systems, although there are no high-risk areas currently proposed within the development. All water pollution systems will be designed and installed in accordance with the recommendations of the Pollution Prevention Guideline 3 (PPG3) and/or where applicable the SuDs manual.

## Pol04 – Reduction of Night Time Light Pollution

Any external lighting will be designed in accordance with the ILP Guidance Notes to ensure it is concentrated in the appropriate areas and to minimise upward lighting, reducing unnecessary light pollution and nuisance to neighbouring properties. All external lighting will be automatically switched off between the hours of 23:00 and 07:00, with the exception of security and safety lighting, which will be switched to compliant lower levels during these periods. Any illuminated advertisements will be designed in accordance with ILP PLG05.

## Pol05 – Noise Attenuation

There are residential/noise sensitive buildings within an 800m radius of the site. An Acoustician will be appointed to undertake a Noise Impact Assessment and advise on any attenuation measures that may be required should the noise levels exceed the minimum BREEAM requirements. In order to comply, noise levels from the proposed buildings should not be at least 5dB lower than the background noise levels throughout the day and night. The acoustician will identify the maximum levels to which any plant must meet or be attenuated to.