# 13491 Haverstock Hill

Cambridge Gate Properties

# Sustainability Statement ChapmanBDSP

July 2016

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# 5-17 HAVERSTOCK HILL
# FINAL SUSTAINABILITY STATEMENT FOR PLANNING

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FINAL SUSTAINABILITY STATEMENT FOR PLANNING

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## EXECUTIVE SUMMARY

This Sustainability Statement has been developed to detail the sustainability features of the development and demonstrates how they relate to the following guidance documents:

- National Planning Policy Framework (2012);
- London Plan and minor alterations (2016);
- London Mayor's Supplementary Planning Guidance on Sustainable Design and Construction;
- London Borough of Camden Core Strategy (2010)- Policy CS13: 'Tackling climate change through promoting higher environmental standards';
- Camden Development Policies (2010-2015) – Policy DP22: 'Promoting Sustainable Design and Construction';
- London Borough of Camden Planning Guidance CPG 3 – Sustainability (2015); and
- BREEAM New Construction 2014 assessment tool.

Each of the BREEAM and London Borough of Camden CPG 3 criteria was fully discussed at a Sustainability workshop led by a BREEAM Assessor/Accredited Professional within ChapmanBDSP Sustainability team and attended by the project team on 16 February 2016. This meeting ensured that all members of the development team have a full understanding of the successful integration of the BREEAM credits and CPG 3 requirements into their design.

The Sustainability Statement for 5-17 Haverstock Hill development demonstrates that the design will holistically incorporate sustainable principles into the full range of sustainability aspects covered by BREEAM and the London Borough of Camden CPG 3:

### ENERGY

- The London Plan Energy hierarchy has been followed for the scheme. An optimised energy efficient design will minimise the energy demand of the development. In addition, the use of Low and Zero Carbon systems (LZC) in the form of a gas Combined Heat and Power (CHP) and Photovoltaics (PV) will reduce the $CO_2$ emissions of the scheme. The proposed highly optimised energy strategy will allow the scheme to achieve an improvement over Part L1A: 2013 and Part L2A:2013 of approximately **36.9%** exceeding the requirement of the London Plan and of the London Borough of Camden Core Strategy (2010)) and London Borough of Camden Planning Guidance CPG 3 – 'Sustainability' (2015); and
- Energy display devices, drying spaces, home office and energy labelled white goods provided in all flats;
- Secured and covered cycle storage for the residential scheme.

### WATER EFFICIENCY / FLOOD RISK AND DRAINAGE

- Water efficient fittings for all residential units;
- Where feasible, the water meters within the apartments will be located for easy reading to encourage occupants of the apartments to monitor their water usage over time.
- For the retail areas, a water meter with a pulsed output will be provided for the mains water supply of the building and a major leak detection system will be installed.
- Most of the external landscaping and planting will be self-sufficient and rely on precipitation only following establishment. Irrigation will only be required at level 1 which is a sheltered space receiving less rainfall than other areas. For level 1 planting, a water efficient irrigation method based on drip-fed subsurface irrigation incorporating soil moisture sensors has been selected for the scheme.
- A Flood risk assessment (FRA) has been carried out for the scheme confirming the probability of flooding of the site is low and it is considered that the development of this site will not increase flood risk elsewhere;
- Flooding of property will not occur in the event of local drainage system failure;
- There will be no change in the amount of impermeable surfaces as a result of the re-development of the site. Attenuation up to and including 1 in 100 year plus 30% climate change storm even for the site will be provided and the discharge rate will be 50% of the current discharge rate. The attenuation will consist of underground modular storage units together with blue/green roofs and hydro-brake flow control units;
- The site is car-free, therefore with a low risk of watercourse pollution and an appropriate level of pollution prevention treatment is provided. Blue/Green roofs provide treatment for the water by filtration for all the rainfall on the roofs of the building, other treatment is provided by trapped gullies and catchpits.

### WASTE

- The scheme will follow the waste hierarchy and will aim at having a minimum of 10% of the total value of the materials used within the construction of the proposed development derived from recycled and reused sources;
- On-site construction and operational waste will be sorted on-site into the relevant waste groups in order to improve the efficiency of the waste management process. Procedures and commitments to divert waste from landfill will be implemented;
- Waste generation will be minimised on site and a target of 3.4$m^3$/100$m^2$ GIA has been set for the maximum amount of waste to be generated by the shell retail area construction activities. More than 80% of construction waste and 90% of demolition waste will be diverted from landfill.
- When in operation, the dwellings will be provided with internal and external waste and recyclable waste storage to encourage the appropriate management of materials. Information will be provided to residents on the kitchen and garden waste collection scheme;
- All dedicated storage will be clearly labelled to assist segregation, storage and collection of the recyclable waste streams; external space will be accessible to building occupants / facilities operators for the deposit of materials and collections by waste management contractors, and of a capacity appropriate to the development.

## SUSTAINABLE USE OF MATERIALS

- The building materials will be selected and assessed against the BRE Green Guide to Specification, and the team will aim at specifying A+/A rated building elements where practically feasible;
- Where feasible, the building materials will be sourced from suppliers that participate in responsible sourcing schemes equivalent to BRE BES 6001 Responsible Sourcing Standard. Any timber used within the proposed development will be sustainably and responsibly sourced through the Forest Stewardship Certification (FSC) Chain of Custody Certification scheme;
- The use of locally sourced materials will be prioritised and all reinforced steel will be 100% recycled steel;
- The building will incorporate suitable durability and protection measures;
- The use of high VOC content paints, sealants and all ozone depleting materials including insulation will be avoided.

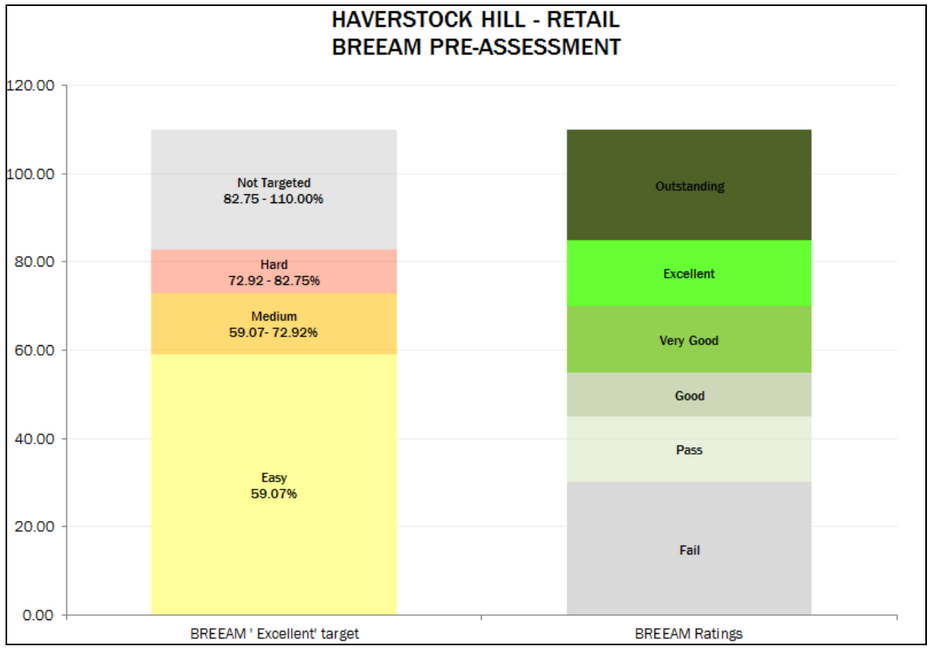
## ADAPTING TO CLIMATE CHANGE

- The development will incorporate a high standard of build fabric. The insulation will be superior to the requirements of the 2013 Part L1A Building Regulations and Part L2A Building Regulations;
- The dwellings design has been optimised to ensure they 'PASS' CIBSE TM 52/TM49 adaptive overheating criteria for current and future climate with blinds without comfort cooling;
- The incorporation of outdoor areas as part of the development is suitable for the increased demand associated with warmer weather. The landscaping areas and the green roof incorporated into the design would assist in the protection of the building from solar gains. The vegetation would also assist in cooling the building through evaporation;
- 100% of the lighting fitted internally will be energy efficient, reducing any excessive internal heat gains due to lighting;
- As noted in the section above, the peak rate of runoff over the development's lifetime, allowing for climate change, will be no greater for the developed site than it was for pre-development rate of run-off;
- The installation of a green/blue roofs will attenuate and treat rainwater and reduce the impact of heavy rainfall on the drainage system;
- The proposed 5-17 Haverstock Hill development will significantly reduce its demands on mains water supply through the use of water efficient fittings.

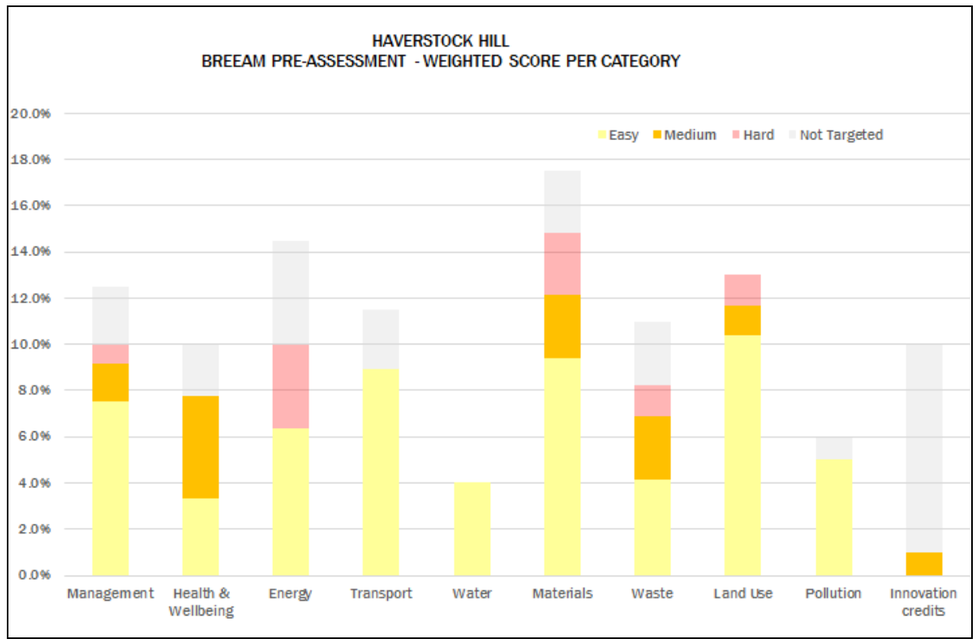
## BROWN ROOFS, GREEN ROOFS AND GREEN WALLS / BIODIVERSITY AND LOCAL FOOD GROWING

- A Suitably Qualified Ecologist (SQE) has been appointed as part of the development to assess the current ecological value of the site and make recommendations for the protection and enhancement of the site and on-site actions during construction to protect features of ecological value;
- The existing site is almost entirely covered by the existing building with associated hardstanding and a small area of butterfly-bush located in the north west of the site. Due to its small size, this area is deemed to have low ecological value;
- The recommendations of the SQE will be implemented for the scheme and will lead to a positive change of ecological value for the site. Recommendations include: Good horticultural practice, provision of a green roofs, shrub planting, tree planting, provision of bird boxes and planting for bees.
- A wildflower and perennial green roof mat has been selected for the scheme by the landscape architect for the scheme for its high ecological value. It includes a ready established mixture of drought tolerant wildflowers, sedum, herbs and flowering perennials, all of which are suited to the growing conditions created on a green roof. The green roof proposed will provide biodiversity networks and allow continuity of green space within the London Borough of Camden. The green roof will also assist with sustainable drainage, overheating and air quality.
- The contractors will be required to minimise the ecological impact of construction activities and a five year landscape and habitat management plan will be produce for the scheme;
- Planting beds are fully planted with low maintenance herbaceous planting to present a cohesive planting scheme from the outset, yet there is an opportunity for residents to use these beds for food growing areas in the future.

The BREEAM New Construction pre-assessment shows a rating of 'Excellent' is robustly targeted for the flats of the scheme with a targeted score of **72.92%** demonstrating it incorporates exemplary standards of sustainable and inclusive urban design and architecture**.** The guidance and involvement of the assessor will continue through construction to confirm that the commitments made at design stage are implemented in the constructed building and necessary changes are considered in a sustainable manner. Post Construction evidence will be gathered throughout and the Final assessment submitted to the BRE for Final certification. The BREEAM assessor and BREEAM Accredited Professional have been and will continue to form an integral part of the design team and a consistent point for reference, review and questions. Experience has proved that this approach offers the surest route to a successful BREEAM certification and holistic sustainable design.




Copy of Figure 3: BREEAM Pre-Assessment – Haverstock Hill – Retail scheme ('Excellent' rating targeted)




Copy of Figure 4: BREEAM Pre-Assessment – Haverstock Hill – Retail scheme – Score per category

# 1 INTRODUCTION

ChapmanBDSP has been commissioned by CBRE to provide a Sustainability Statement in support of the detailed planning application for the proposed development at 5-17 Haverstock Hill (NW3 2BP) in the London Borough of Camden.

## 1.1 SITE LOCATION AND DESCRIPTION

The Site, as shown on Figure 1, is located in Chalk Farm, north London, within the London Borough of Camden (LBC). It is located northwest of Camden town centre and approximately 4km north of the city of London.

The Site is bounded by residential development to the North-west, Haverstock Hill to the North-east and Adelaide Road to the south. The surrounding area is predominantly comprised of residential developments with buildings of two to three storeys. Chalk Farm London Underground station is situated directly adjacent to the Site, and Haverstock School Business and Enterprise College is located close to the Site on Haverstock Hill. A protected retail parade comprising six retail units currently forms the southern boundary of the Site which fronts Adelaide Road.

The current Site comprises a 2,070m$^2$ quadrilateral parcel of land north of Adelaide Road. The current property at the Site is a six storey purpose built brick building for the storage of vehicles, with ten staggered parking levels inside the property. The Site has been vacant since Summer 2015 but was formerly used as a car storage facility by the British Transport Police, with the property containing 227 car parking spaces and ancillary office space. Six A1 retail units totalling 428m$^2$ remain operational and are located at ground level fronting Adelaide Road.

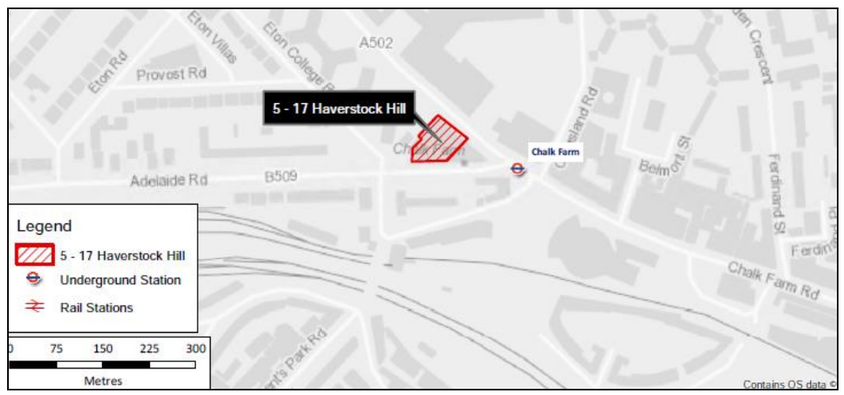



Figure 1: Site Location

## 1.2 PROPOSED DEVELOPMENT

The scheme consists of the demolition of the existing building at 5-17 Haverstock Hill and redevelopment of the site to provide 77 residential units (8 x studios, 18 x 1 bedroom, 32 x 2 bedroom, 19x 3 bedroom) in two 7 storey blocks around a central raised courtyard. The proposals include the re-provision of 283m$^2$ retail floorspace at ground floor level on Adelaide Road. The proposed development will include residential (C3) and retail (A1- A5).


Figure 2: Proposed Scheme

## 1.3 REPORT OBJECTIVES

The objectives of this report are to:

- Demonstrate how the proposed development will meet or exceed London Borough of Camden sustainability requirements and guidelines detailed within their Supplementary Planning Document: CPG 3 – 'Sustainability', Local Development Framework (LDF) policies: CS13: 'Tackling climate change through promoting higher environmental standards' and DP22: 'Promoting sustainable design and construction' and DP23: 'Water'.
- Identify areas for consideration at the early stages of the project to facilitate the incorporation of the principles of sustainable design and construction into the design of the development.
- Summarise the result of the BREEAM New Construction pre-assessment exercise carried out for the retail part of the scheme, detailing the commitments made by the client and the design team in line with the London Borough of Camden's Policy DP22: 'Promoting Sustainable Design and Construction'
- Respond to London Borough of Camden CPG 3 –'Sustainability'.

## 1.4 REPORT STRUCTURE

This introductory section is followed by a comprehensive review of national policy on sustainability. Section 3 summarises the result of the BREEAM New Construction pre-assessment for the scheme and Section 4 covers sustainable design and construction principles which will be incorporated into the proposed development in response to the requirements of the London Borough of Camden's guidance document CPG 3. The following topics will be covered: energy, water efficiency, sustainable construction measures, sustainable use of building materials, construction and operational waste strategies, green roofs, flooding, climate change adaptation and biodiversity and local food growing. Section 5 provides a summary and conclusion on the Sustainable Strategy of the scheme. The detailed BREEAM pre-assessment for the scheme detailing the commitment made by the team can be found in the Appendices.

## 2 CURRENT AND FUTURE PLANNING POLICIES / GOOD PRACTICE REVIEW AND PROJECT REQUIREMENTS

The following key sustainability policies and documents have been reviewed in detail within the context of the scheme, in order to identify and target compliance with relevant requirements and to inform the viable environmental design features and opportunities across all measures of the development. The planning criteria for energy and emissions are generally dictated by the following:

- National Planning Policy Framework;
- Greater London Authority – via the 'London Plan', the SPG on Sustainable Design and Construction and the GLA guidance on preparing energy assessment; and
- London Borough of Camden Policies.

### 2.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework sets out the Government's planning policies for England and how these are expected to be applied. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations. The ministerial foreword of this NPPF highlights that 'the purpose of planning is to help achieve sustainable development' and that sustainable development "should go ahead, without delay – a presumption in favour of sustainable development that is the basis for every plan, and every decision."

Sustainable development is defined in the NPPF as comprising developments "meeting the needs of the present without compromising the ability of future generations to meet their own needs" in line with the definition of the Brundtland Commission ('Our Common Future', 1987). The NPPF also refers to the five guiding principles of sustainable development set out in the UK Sustainable Development Strategy, Securing the Future: living within the planet's environmental limits; ensuring a strong, healthy and just society; achieving a sustainable economy; promoting good governance; and using sound science responsibly

### 2.2 THE LONDON PLAN AND MINOR ALTERATIONS (2016)

This Spatial Development Strategy for Greater London includes objectives to reduce the capital's impact on, and exposure to, the effect of climate change. The GLA in March 2016 adopted their Minor Alterations to the London Plan, this included an update on their housing and parking policies including a number of revised standards to bring them in line with the national standards. The most relevant policies for this Sustainability Statement are:

#### POLICY 5.3: 'SUSTAINABLE DESIGN AND CONSTRUCTION'

The highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments and to adapt to the effects of climate change over their lifetime. Developments should incorporate the following sustainable design principles:

- Minimising carbon dioxide emissions across the site, including the building and services (such as heating and cooling systems);
- Avoiding internal overheating and contributing to the urban heat island effect;
- Efficient use of natural resources (including water), including making the most of natural systems both within and around buildings;
- Minimising pollution (including noise, air and urban runoff);
- Minimising the generation of waste and maximising reuse or recycling;
- Avoiding impacts from natural hazards (including flooding);
- Ensuring developments are comfortable and secure for users, including avoiding the creation of adverse local climatic conditions; and
- Securing sustainable procurement of materials, using local supplies where feasible, and promoting and protecting biodiversity and green infrastructure.

#### OTHER RELEVANT POLICIES:

The following other London Plan's policies are considered relevant for this Sustainability Statement:

- Policy 5.2:'Minimising Carbon Dioxide Emissions';
- Policy 5.6: 'Decentralised Energy In Development Proposals';
- Policy 5.7: 'Renewable Energy';
- Policy 5.9: 'Overheating and Cooling';
- Policy 5.10: 'Urban Greening';
- Policy 5.11: 'Green roofs and development site environs';
- Policy 5.12: 'Flood Risk Management';
- Policy 5.13: 'Sustainable Drainage';
- Policy 5.16: 'Waste net self-sufficiency';
- Policy 5.17: 'Waste capacity';
- Policy 6.9: 'Cycling;
- Policy 6.10: 'Walking';
- Policy 7.14: 'Improving Air Quality';
- Policy 7.15: 'Reducing and managing noise, improving and enhancing the acoustic environment and promoting appropriate soundscape'; and
- Policy 7.19: 'Biodiversity and Access to Nature'.

### 2.3 GREATER LONDON AUTHORITY (GLA) SUPPLEMENTARY PLANNING GUIDANCE (SPG) ON SUSTAINABLE DESIGN AND CONSTRUCTION (APRIL 2014)

This Supplementary Planning Guidance (SPG) provides guidance on what measures developers can include in their building designs and operations to achieve the sustainability targets set out in the London Plan. This guidance document includes 3 main sections:

- Chapter 2: 'Resource Management';
- Chapter 3: 'Adapting to climate change and greening the city'; and

- Chapter 4: 'Pollution Management – Land, Air, Noise, Light and Water'.

## 2.4 LONDON BOROUGH OF CAMDEN – CORE STRATEGY (2010)

Camden's Core Strategy set out the key elements of the Council's planning vision and strategy for the Borough. It is the central part of the Local Development Framework (LDF), a group of documents setting out Camden's planning strategy and policies. The most relevant policy for this report is:

**POLICY CS13: 'TACKLING CLIMATE CHANGE THROUGH PROMOTING HIGHER ENVIRONMENTAL STANDARDS'** provides the overarching policy requirements with respect to minimising the effects of climate change, adaptation measures and improved environmental standards during construction and occupation. The main requirements are:

- Ensuring patterns of land use that minimise the need to travel by car and help support local energy networks;
- Promoting the efficient use of land and buildings;
- Minimising carbon emissions from the redevelopment, construction and occupation of buildings by implementing, in order, all of the elements of the energy hierarchy;
- Ensuring buildings and spaces are designed to cope with, and minimise the effects of climate change.

## 2.5 LONDON BOROUGH OF CAMDEN – DEVELOPMENT POLICIES (2010-2015) CORE STRATEGY

Camden Development Policies form part of the Council's Local Development Framework (LDF) and contribute towards delivering Camden's Core Strategy. The most relevant development policy for this scheme relating to Sustainability is:

### POLICY DP22: 'PROMOTING SUSTAINABLE DESIGN AND CONSTRUCTION'

- Non-domestic developments of 500sqm of floor space or above to achieve "Very Good" in BREEAM assessments and "Excellent" from 2016 and encouraging zero carbon from 2019;
- Developments are required to be resilient to climate change;
- Developments are required to incorporate green or brown roofs and green walls wherever suitable.

The BREEAM New Construction pre-assessment carried out for the scheme (Please refer to Section 3 of this report) shows a rating of 'Excellent' is robustly targeted for the non-domestic part of the scheme (Retail areas).

Further details on the energy strategy and carbon emissions reduction achieved for the scheme can be found within the Energy Statement prepared by ChapmanBDSP in support of the planning application.

## 2.6 LONDON BOROUGH OF CAMDEN PLANNING GUIDANCE – CPG 3 – 'SUSTAINABILITY' (2015)

Camden Planning Guidance has been prepared to support the policies of the London Borough of Camden Local Development Framework (LDF). This guidance is therefore consistent with the Core Strategy and the Development Policies, and forms a Supplementary Planning Document (SPD) which is an additional "material consideration" in planning decisions. This guidance provides information on ways to achieve carbon reductions and more sustainable developments. It also highlights the Council's requirements and guidelines which support the relevant Local Development Framework (LDF) policies:

- CS13: 'Tackling climate change through promoting higher environmental standards';
- DP22: 'Promoting sustainable design and construction';
- DP23: 'Water'.

This planning guidance outlines the specific targets and policy requirements relating to the energy performance and sustainable design and construction of new and existing buildings, and provides detailed information on how the requirements of the Core Strategy Policy CS13 are to be implemented.

London Borough of Camden CPG 3 – 'Sustainability' has been used to inform the contents of this report. Section 4 covers in particular the sustainable design and construction principles which will be incorporated into the proposed development in response to the requirements of the London Borough of Camden's guidance document CPG 3.

## 2.7 SUSTAINABILITY ASSESSMENT METHODS – BREEAM NEW CONSTRUCTION 2014

The BREEAM New Construction scheme is an independent, transparent, environmental labelling scheme for new non-residential buildings, the issues assessed are grouped into none categories: Management; Health & Wellbeing, Energy, Transport, Water, Materials, Waste, Land Use & Ecology and Pollution. The scheme has been updated in 2014.

The scheme will be assessed under the BREEAM New Construction (2014) – Retail 'Shell' scheme and will aim at achieving an 'Excellent' rating in line with the requirement of London Borough of Camden Development Policy DP22: 'Promoting Sustainable Design and Construction'.

The scheme will also aim at achieving in line with London Borough of Camden CPG 3 – Sustainability requirements, the following minimum scores:

- 60% of the un-weighted credits in the BREEAM energy section;
- 60% of the un-weighted credits in the BREEAM water section; and
- 40% of the un-weighted credits in the BREEAM material section.

Please note that the score required for the energy section is not achieved for the scheme due to the limitation of the BREEAM 'Shell' only scheme which includes only a very limited number of BREEAM credits in the energy section and due to the methodology used for the assessment of the Ene 01 – 'Reduction of energy uses and carbon emissions' credit which penalise Shell only scheme. Please refer to Section 3.6 of this report for additional details.

## 3 BREEAM UK NEW CONSTRUCTION 2014 PRE-ASSESSMENT

BREEAM (Building Research Establishment's Environmental Assessment Method) is the leading environmental assessment method for UK non-residential buildings. It sets the standard for best practice design and encourages and certifies that best environmental practice is incorporated within the building design and construction.

BREEAM is a nationally recognised standard for the design and construction of new non-residential developments. The BREEAM assessment process involves the evaluation of the buildings performance against the scheme and its criteria using an independent third party auditor; a BREEAM Assessor. The BREEAM certificate provides formal verification that the Assessor has completed an assessment of the building in accordance with the requirements of the scheme and its quality standards and procedures. A BREEAM certificate verifies that a building's BREEAM rating, at the time of certification, accurately reflected its performance against the BREEAM standards.

### 3.1 BREEAM UK NEW CONSTRUCTION 2014 - SCOPE

BREEAM UK New Construction 2014 is applicable to new non-domestic development located in the United Kingdom. The types of buildings that can be assessed under this scheme are:

- Commercial (Office / Industrial /Retail);
- Public (Education, Healthcare, Prison, Law Courts);
- Multi-residential accommodation/ Supported living facility; and
- Other Buildings (Residential institutions / Non-residential institutions, Assembly and Leisure, Others).

The non-residential part of the scheme will be assessed under the BREAM UK New Construction 2014 'Retail' scheme (Shell version).

### 3.2 BREEAM CATEGORIES

The BREEAM UK New Construction 2014 standard assesses and awards credits based on the environmental performance of new non-residential developments within a framework of nine categories for. These being:

- Management;
- Health and Wellbeing;
- Energy;
- Transport;
- Water;
- Materials;
- Waste;
- Land use and Ecology; and
- Pollution.

BREEAM also awards additional credits in recognition of sustainability related benefits or performances that go beyond best practice. An additional 1% can be added to a building's overall score for each 'Innovation Credit' achieved up to a maximum of 10 credits for any one building. Innovation credits can be awarded regardless of the building's final BREEAM rating.

The categories within BREEAM are weighted according to their level of importance. Each category is allocated a different number of credits and therefore individual credits carry specific weightings, as a percentage of the total points score. Please refer to Table 1 for BREEAM Categories weighting factors for the retail scheme (Shell) of 5-17 Haverstock Hill.

| CATEGORY | BREEAM NEW CONSTRUCTION (NC) SHELL |
|---|---|
| Management | 12.50% |
| Health & Wellbeing | 10.00% |
| Energy | 14.50% |
| Transport | 11.50% |
| Water | 4.00% |
| Materials | 17.50% |
| Waste | 11.00% |
| Land Use and Ecology | 13.00% |
| Pollution | 6.00% |
| Innovation | 10.00% |
| **Total** | **110.00%** |

**Table 1: BREEAM Categories Weighting Factors**

### 3.3 BREEAM LEVELS

During the assessment by an independent BREEAM assessor the total number of credits awarded for each of the BREEAM categories is summed and the appropriate category weighting applied. Finally, the weighted score of each category is added together to produce a single environmental score. The BREEAM ratings are divided into five levels of compliance 'Pass', 'Good', 'Very Good', 'Excellent' and 'Outstanding'. Please refer to Table 2 for the BREEAM ratings thresholds.

| TOTAL PERCENTAGE SCORE (EQUAL TO OR GREATER THAN) | BREEAM RATING |
|---|---|
| <30 % | Unclassified |
| 30 % | Pass |
| 45 % | Good |
| 55 % | Very Good |
| **70 %** | **Excellent** |
| 85 % | Outstanding |

**Table 2: BREEAM Rating Thresholds**

## 3.4 BREEAM MINIMUM STANDARDS

The BREEAM standard includes mandatory minimum performance standards which must be met in order to achieve the BREEAM rating sought. Please refer to Table 3 below for the minimum standards required for an 'Excellent' rating for the BREEAM NC scheme 'Shell'.

| BREEAM CREDITS NON-DOMESTIC SCHEME | BREEAM NC 2014 – 'SHELL' MINIMUM STANDARD - EXCELLENT RATING |
|---|---|
| Man 03 - Responsible construction practices | Registration to CCS<br>CCS score ≥ 35 |
| Ene 01 – Reduction of energy use and carbon emissions | 5 Credits<br>Energy Performance Ratio ≥ 0.375 |
| Wat 02 – Water Monitoring – Criterion 1 | The specification of a water meter on the mains water supply to each building. |
| Mat 03 – Responsible Sourcing | All timber used on the project must be 'Legally harvested and traded timber'. |
| Wst 03 – Operational Waste | Dedicated space provided for the segregation and storage of operational recyclable waste. |
| LE 04 – Mitigating Ecological Impact | Change in ecological value of the site ≥ -9 |

**Table 3: BREEAM New Construction 2014 Minimum Standards for 'Excellent'**

The BREEAM rating can only be achieved if the mandatory issues achieve the minimum standards relevant to each scheme. All other credits are tradable (i.e. they are voluntary and a developer/designer can make choices on the most appropriate standards/credits for a given site). It is these tradable credits that provide the flexibility within the BREEAM standard. Once all mandatory credits are achieved the developer is then free to make up the credits required for the target rating from the tradable credits, to give an overall score.

## 3.5 BREEAM PROCESS

BREEAM may be implemented at different stages of the design, construction and use of a building. BREEAM assessment of a new build, refurbishment or fit-out is split into three main stages

- BREEAM Pre-Assessment at RIBA stage 1/2 which will form the basis for the inclusion of BREEAM principles and awareness in the whole design process;
- Assessment of the design and commitments against the BREEAM criteria– this leads to an Interim Certificate; and
- Review of the building during and post construction to ensure the design and commitments have been fully implemented in the building – this leads to a Final Certificate.

BREEAM assessment of existing buildings is carried out using the scheme BREEAM In-Use. This assesses the environmental performance and management of the building and can be carried out either as a follow up to the BREEAM assessment, for example 2 years after occupation, or as an independent tool to assess the performance of the existing building portfolio.

## 3.6 BREEAM - PREDICTION SUMMARY

A BREEAM Pre-Assessment has been carried out for the retail units of the scheme. Each of the BREEAM criteria was fully discussed at a Sustainability workshop led by a BREEAM assessor/ Accredited Professional within the ChapmanBDSP Environmental team and attended by the project team on 16 February 2016. This meeting ensured that all members of the development team have a full understanding of the successful integration of the BREEAM credits and process into their design.

The current prediction is that an **'Excellent'** rating is likely to be achieved, with the following targeted score: 72.92%

The BREEAM pre-assessment checklists provide an approximate indication of how a future formal assessment will score and the rating that will be achieved. The pre-assessment checklists should therefore not be used as a guarantee of a subsequent rating but will inform how credits should be targeted during the formal assessment procedure.

Please refer to Table 5 for the BREEAM risk profiles which have been developed to help appraise the site.

| RISK PROFILE | DESCRIPTION OF RISK |
|---|---|
| EASY | Credits which will require minor actions from the design and construction teams to meet the requirements |
| MEDIUM | Credits requiring additional details from the design and construction team but which are expected to be achieved by the scheme |
| HARD | Credits which are considered very difficult to achieve but which may be kept under review as the design progresses |
| NOT TARGETED | Credits which are not considered practically or economically achievable for the scheme |

**Table 5: Risk Profiles adopted for the BREEAM Pre-Assessments**

The Figure and Table included in the following pages provide a summary of the BREEAM pre-assessment carried out for 5-17 Haverstock Hill. The detailed BREEAM pre-assessment checklist for the scheme detailing the commitments made by the design team can be found in the Appendix A of this statement.

| BREEAM NEW CONSTRUCTION 2014<br>NON-DOMESTIC AREAS – RETAIL - SHELL | Number of credits available | EASY | MEDIUM | HARD | NOT TARGETED |
|---|---|---|---|---|---|
| **MANAGEMENT** | | | | | |
| Man 01 - Project brief and Design - Stakeholder Consultation (Project Delivery) | 1 | 1 | 0 | 0 | 0 |
| Man 01 - Project brief and Design - Stakeholder consultation (third party) | 1 | 0 | 0 | 1 | 0 |
| Man 01 - Project brief and Design - Sustainability Champion (Design)<br>Man 01 - Project brief and Design - Sustainability Champion (monitoring progress) | 2 | 2 | 0 | 0 | 0 |
| Man 02 - Life cycle cost and service life planning - Elemental life cycle cost | 2 | 0 | 0 | 0 | 2 |
| Man 02 - Life cycle cost and service life planning - Component level LCC Plan | 1 | 0 | 0 | 0 | 1 |
| Man 02 - Life cycle cost and service life planning - One credit - Capital cost | 1 | 0 | 1 | 0 | 0 |
| Man 03 - Responsible construction practices | N/A | N/A | 0 | 0 | 0 |
| Man 03 - Responsible construction practices - Environmental management | 1 | 1 | 0 | 0 | 0 |
| Man 03 - Responsible construction practices - Sustainability Champion | 1 | 1 | 0 | 0 | 0 |
| Man 03 - Responsible construction practices - Considerate construction | 2 | 2 | 0 | 0 | 0 |
| Man 03 - Responsible construction practices - Monitoring of construction-site impacts | 2 | 2 | 0 | 0 | 0 |
| Man 04 - Commissioning and handover - Testing and inspecting building fabric | 1 | 0 | 1 | 0 | 0 |
| | **15** | **9** | **2** | **1** | **3** |
| | **0.83%** | | | | |
| **HEALTH AND WELLBEING** | | | | | |
| Hea 01 - Visual comfort - Daylighting | 2 | 0 | 1 | 0 | 1 |
| Hea 01 - Visual comfort - View out | 1 | 0 | 1 | 0 | 0 |
| Hea 01 - Visual comfort - External lighting levels | 1 | 1 | 0 | 0 | 0 |
| Hea 02 - Indoor Air Quality - Adaptability - Potential for natural ventilation | 1 | 0 | 0 | 0 | 1 |
| Hea 04 - Thermal Comfort - Thermal modelling | 1 | 1 | 0 | 0 | 0 |
| Hea 05 - Acoustic performance - Internal indoor ambient noise levels: | 1 | 1 | 0 | 0 | 0 |
| Hea 06 - Safety and security - Security of site and building | 2 | 0 | 2 | 0 | 0 |
| | **9** | **3** | **4** | **0** | **2** |
| | **1.11%** | | | | |
| **ENERGY** | | | | | |
| Ene 01 - Reduction in $CO_2$ emissions. | 12 | 5 | 0 | 2 | 5 |
| Ene 03 -External lighting | 1 | 1 | 0 | 0 | 0 |
| Ene 04 - Low Carbon Design - Passive design - Passive design analysis / Free cooling | 2 | 0 | 0 | 2 | 0 |
| Ene 04 - Low Carbon Design - Low and zero carbon technologies - Low zero carbon feasibility study | 1 | 1 | 0 | 0 | 0 |
| | **16** | **7** | **0** | **4** | **5** |
| | **0.91%** | | | | |
| **TRANSPORT** | | | | | |
| Tra 01 - Public Transport Accessibility | 5 | 5 | 0 | 0 | 0 |
| Tra 02 - Proximity to Amenities | 1 | 1 | 0 | 0 | 0 |
| Tra 03 - Cyclist facilities | 2 | 0 | 0 | 0 | 2 |
| Tra 05 - Travel Plan | 1 | 1 | 0 | 0 | 0 |
| | **9** | **7** | **0** | **0** | **2** |
| | **1.28%** | | | | |
| **WATER** | | | | | |
| Wat 02 - Water monitoring | 1 | 1 | 0 | 0 | 0 |
| Wat 03 - Water Leak Detection & Prevention - Leak detection system | 1 | 1 | 0 | 0 | 0 |
| Wat 04 - Water Efficient Equipment | 1 | 1 | 0 | 0 | 0 |
| | **3** | **3** | **0** | **0** | **0** |
| | **1.33%** | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **MATERIALS** | | | | | |
| Mat 01 - Life cycle impacts | 5 | 3 | 0 | 1 | 1 |
| Mat 02 - Hard Landscaping/Boundary Protections | 1 | 1 | 0 | 0 | 0 |
| Mat 03 - Responsible sourcing of materials | 4 | 2 | 1 | 1 | 0 |
| Mat 04 - Insulation | 1 | 1 | 0 | 0 | 0 |
| Mat 05 - Designing for durability and resilience | 1 | 0 | 1 | 0 | 0 |
| Mat 06 - Material Efficiency | 1 | 0 | 0 | 0 | 1 |
| | **13** | **7** | **2** | **2** | **2** |
| | **1.35%** | | | | |
| **WASTE** | | | | | |
| Wst 01 - Construction Waste Management | 4 | 2 | 2 | 0 | 0 |
| Wst 02 - Recycled aggregates | 1 | 0 | 0 | 1 | 0 |
| Wst 03 - Operational Waste | 1 | 1 | 0 | 0 | 0 |
| Wst 05 - Adaptation to Climate Change | 1 | 0 | 0 | 0 | 1 |
| Wst 06 - Functional Adaptability | 1 | 0 | 0 | 0 | 1 |
| | **8** | **3** | **2** | **1** | **2** |
| | **1.38%** | | | | |
| **LAND USE AND ECOLOGY** | | | | | |
| LE 01 - Site Selection - Previously developed land | 1 | 1 | 0 | 0 | 0 |
| LE 01 - Site Selection - Contaminated land | 1 | 0 | 1 | 0 | 0 |
| LE 02 - Ecological value of site and protection of ecological features | 2 | 2 | 0 | 0 | 0 |
| LE 03 - Minimising Impact on Existing Site Ecology | 2 | 2 | 0 | 0 | 0 |
| LE 04 - Enhancing Site Ecology | 2 | 1 | 0 | 1 | 0 |
| LE 05 - Long Term Impact on Biodiversity | 2 | 2 | 0 | 0 | 0 |
| | **10** | **8** | **1** | **1** | **0** |
| | **1.30%** | | | | |
| **POLLUTION** | | | | | |
| Pol 03 - Surface water run off - Flood risk | 2 | 2 | 0 | 0 | 0 |
| Pol 03 - Surface water run off - Surface water run off | 2 | 2 | 0 | 0 | 0 |
| Pol 03 - Surface water run off - Minimising watercourse pollution | 1 | 0 | 0 | 0 | 1 |
| Pol 04 - Reduction of night time light pollution | 1 | 1 | 0 | 0 | 0 |
| | **6** | **5** | **0** | **0** | **1** |
| | **1.00%** | | | | |
| **INNOVATION** | | | | | |
| Man 03 - Responsible construction practices | 1 | 0 | 1 | 0 | 0 |
| Hea 01 - Visual Comfort | 1 | 0 | 0 | 0 | 1 |
| Mat 01 - Life cycle impacts | 3 | 0 | 0 | 0 | 3 |
| Mat 03 - Responsible sourcing of materials | 1 | 0 | 0 | 0 | 1 |
| Wst 01 - Construction Waste Management | 1 | 0 | 0 | 0 | 1 |
| Wst 02 - Recycled aggregates | 1 | 0 | 0 | 0 | 1 |
| Wst 05 - Adaptation to Climate Change | 1 | 0 | 0 | 0 | 1 |
| Innovative Features | 1 | 0 | 0 | 0 | 1 |
| | **10** | **0** | **1** | **0** | **9** |
| | **1.00%** | | | | |
| | | 59.07 | 72.92 | 82.75 | 110.00 |
| | | Very Good | Excellent | Excellent | Outstanding |

Table 6: Summary – BREEAM Credit List -5-17 Haverstock Hill

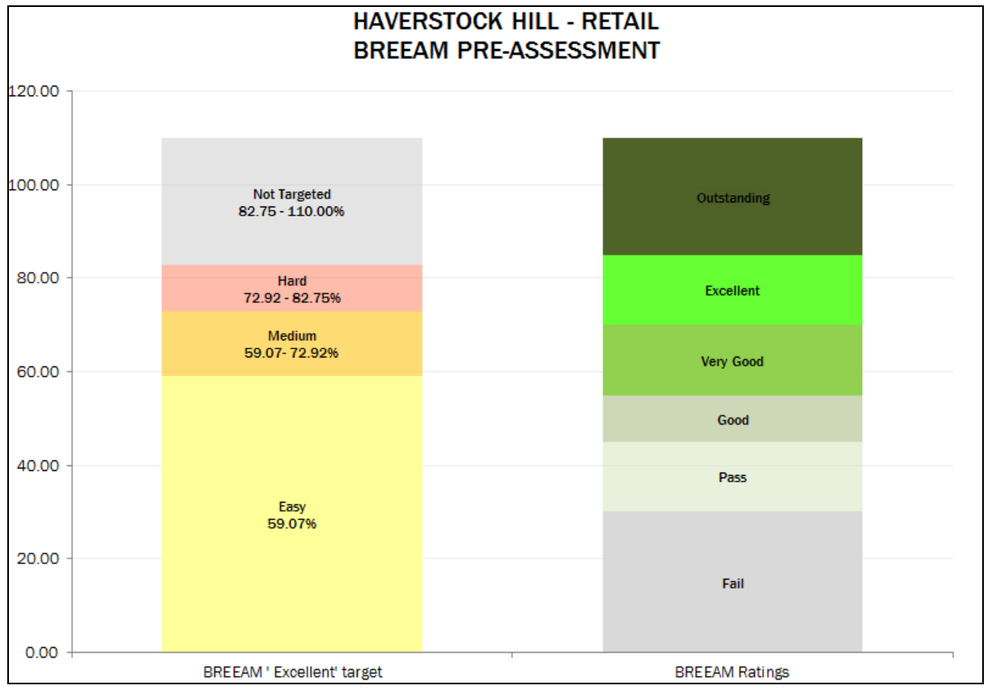



**Figure 3: BREEAM Pre-Assessment – Haverstock Hill – Retail scheme ('Excellent' rating targeted)**

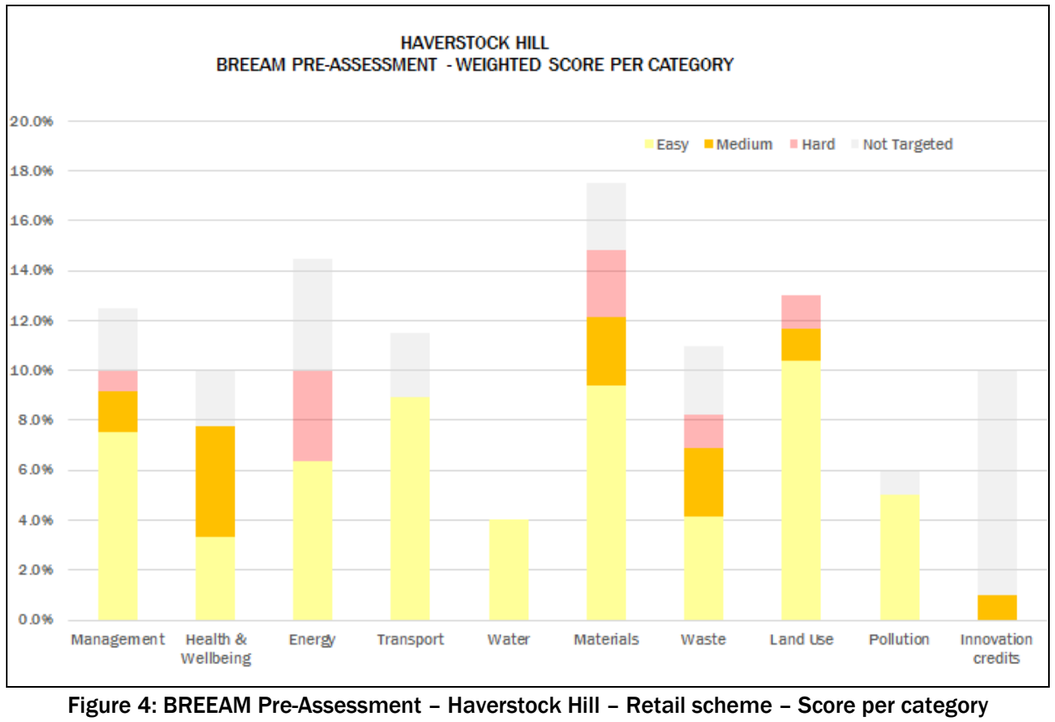



**Figure 4: BREEAM Pre-Assessment – Haverstock Hill – Retail scheme – Score per category**

The pre-assessment indicates that the London Borough of Camden policy requirement for 60% of the available credits under the water section and 40% of the un-weighted credits for materials section to be achieved will be comfortably met, as indicated in the table TT below.

| CATEGORY | CREDITS AVAILABLE | PLANNING POLICY TARGET | CREDITS TARGETED | % OF CREDITS TARGETED |
|---|---|---|---|---|
| **Energy** | 16 | 60% = 9.6 | 7 | 43.8% |
| **Water** | 3 | 60% = 1.8 | 3 | 100% |
| **Materials** | 13 | 40% = 5.2 | 9 | 69.2% |

**Table 7: Percentage of Credits Targeted for Energy, Water and Materials**

Please note, that achieving 60% of the un-weighted credits in the energy section is not considered achievable for this scheme due to the following reasons:

- Scheme assessed under the 'Shell' version of BREEAM 2014 New Construction- Retail scheme, therefore several credits usually included within the energy section and relatively easily achievable are not applicable for our scheme:
    - Ene 02 – 'Energy Monitoring' (2 credits available for S&C and fully fitted scheme);
    - Ene 05 – 'Energy efficient cold storage' (2 credits available for S&C and fully fitted scheme where cold storage present);
    - Ene 06–'Energy efficient transportation systems' (3 credits available for S&C and fully fitted scheme with transportation system present);
    - Ene 08 – 'Energy efficient equipment' (2 credits available for fully fitted scheme).
- As the scheme is assessed against the 'Shell' version of BREEAM 2014 New Construction- Retail scheme, Ene 01 –'Reduction of energy use and carbon emissions' credits can only be achieved based on the reduction of energy demand of the scheme. Assumptions for fit-out systems (included within a legally binding lease agreement) cannot be used to assess Ene 01 BREEAM credit (methodology differing significantly from BREEAM 2011). It is therefore a lot more challenging to achieve a high score for Ene 01 BREEAM issue against the 'Shell' version of BREEAM 2014 New Construction than for the 'Shell & Core' and 'Fully-fitted' versions.

## 3.7 CONCLUSION – NEXT STEPS

The BREEAM pre-assessments of 5-17 Haverstock Hill demonstrate that the design will holistically incorporate sustainable principles into the full range of sustainability aspects covered by BREEAM: management, health & wellbeing, energy, transport, water, materials, waste, land use & ecology and pollution.

Formal assessments will take place once the tender documentation is produced and will require submission of a full evidence bundle from the client and the design team to show compliance with the credits.

The BREEAM assessor and BREEAM Accredited Professional have been and will continue to form an integral part of the design team and a consistent point for reference, review and questions. Experience has proved that this approach offers the surest route to a successful BREEAM certification and holistic sustainable design.

## 4 SUSTAINABILITY FEATURES OF THE SCHEME - LONDON BOROUGH OF CAMDEN CPG 3 – 'SUSTAINABILITY'

The BREEAM pre-assessment and the London Borough of Camden Planning Guidance CPG 3 – 'Sustainability' have been used to assist the successful incorporation of the following sustainability principles within the development proposals for the 5-17 Haverstock Hill development.

### 4.1 ENERGY STRATEGY

The London Plan Energy hierarchy also detailed in Camden Planning Guidance CPG 3 – 'Sustainability' has been followed for the scheme. An optimised energy efficient design will minimise the energy demand of the development. In addition, the use of Low and Zero Carbon systems (LZC) in the form of a gas Combined Heat and Power (CHP) and Photovoltaics (PV) will reduce the $CO_2$ emissions of the scheme.

**'BE LEAN':** The proposed energy strategy has, as its first priority, minimise energy consumption through the performance of the building envelope, facades and plant. The energy efficiency features proposed for the scheme include optimised thermal performance of the facade, low air permeability through a very high standard of construction. The development will meet or exceed all of the building fabric performance standards suggested within Camden guidance document CPG 3 and exceed the minimum requirements of Part L1A and L2A for fabric efficiency standards. The proposed energy conservation measures will reduce the regulated carbon dioxide emissions of the scheme in comparison to the 2013 Building Regulations compliant case by approximately **6.1%**. The 'Be Lean' approach has also followed the cooling hierarchy sets out in London Plan Policy 5.9: 'Overheating and Cooling'.

**'BE CLEAN':** The use of Combined Heat and Power (CHP) has been assessed and it has been determined that due to the consistent base heating load throughout the year (hot water load), CHP would be suitable as the lead heat generator in combination with communal gas boiler sized to provide **70% of the heating demand of the scheme**. The proposed CHP unit is expected to reduce carbon dioxide emissions in comparison to the 2013 Building Regulations compliant case by approximately **26.5%** for the whole development. The opportunity for the proposed development to link into an existing or planned decentralised energy network has been reviewed but the London Heat Map tool indicates that there is no proposed decentralised heat network within proximity of the site. The scheme will however be future-proofed to ensure it can connect in the future to the Community Energy Scheme (space for heat exchangers, pipes routes, water based centralised heating system).

**'BE GREEN':** A Low and Zero Carbon (LZC) feasibility study has been undertaken to establish the most suitable renewable technology for integration at the proposed development. Due to practical constraints, photovoltaics arrays on the flat roofs of the scheme located on tilted structure orientated South and South-West are considered as the most viable and practical option for the scheme. A 150 $m^2$ photovoltaic system mounted on the tilted south-orientated roof of the scheme, combined with the 'Be Lean' energy conservation measures and 'Be Clean' CHP system will provide a further **4.3%** reduction in the $CO_2$ emissions over the Building Regulations compliant case.

The proposed highly optimised energy strategy based on passive design, building fabric performance and building services systems and controls, and suitable Low and Zero Carbon (LZC) systems will allow the scheme to achieve an improvement over Part L1A: 2013 and Part L2A:2013 of approximately **36.9%** exceeding the requirement of the London Plan (Policy 5.2: 'Minimising Carbon Dioxide Emissions') and of the London Borough of Camden Core Strategy (2010) (Policy CS13: 'Tackling climate change through promoting higher environmental standards') and London Borough of Camden Planning Guidance CPG 3 – 'Sustainability' (2015).

Other energy efficient features proposed for the scheme include:

- Energy display devices;
- Drying space;
- Provision of a home office;
- Secured and covered cycle storage for the residential scheme; and
- Energy labelled white goods.

### 4.2 WATER EFFICIENCY / FLOOD RISK AND DRAINAGE

#### WATER EFFICIENCY

The proposed 5-17 Haverstock Hill development will exceed the mandatory minimum requirements for water use as set out by the Building Regulations and achieve a water consumption of less than 117 litres/person/day.

The water consumption of the apartments has been calculated using the 'Government's National Calculation Methodology for Assessing Water Efficiency in New Dwellings' published by Communities and Local Government, September 2009. The document outlines the calculation methodology for assessing the whole dwelling potable water consumption used, and to assess compliance against the water performance targets of the Building Regulations and BREEAM New Construction (Please refer to section 3 above).

The following water fittings and appliances have been used to inform the total water consumption of each dwelling, measured in litres per person per day.

- **WCs:** Dual flush WC with a full flush volume of 6 litres and part flush volume of 3 litres.
- **Basin Taps:** The flow rate of the taps, at full flow rate in litres per minute, measured at a dynamic pressure of 0.3±0.2 MPa for high pressure taps, has been calculated. The apartments will be provided with a single tap providing both hot and cold water. The flow rate of the mixer tap at a dynamic pressure of 0.3Mpa is 5 litres. The taps on the baths are not included within the calculation as the water consumption from bath taps is taken account of in the use factor for baths.
- **Kitchen Taps:** The flow rate of the kitchen tap in litres per minute, measured at a dynamic pressure of 0.3Mpa, is 9 litres.

- **Bath:** The apartments will be provided with low capacity baths with a total capacity of 240 litres to the overflow.
- **Showers:** The flow rate of the showers at the outlet using cold water in litres per minute, measured at a dynamic pressure of 0.3±0.02Mpa, is 9 litres.
- **Washing Machine and Dishwasher:** The use of washing machines and dishwashers must always be assumed under the standard methodology. The provision of a water efficient washing machine and dishwasher for each flat has been assumed (1.25 litres per place setting for the dishwasher and 7.5 litres per kilogram for the washing machine).

The above specified systems provide the highest level of efficiency and will significantly reduce the average household water consumption from 150 litres/person/day to 117 litres/person/day without additional sustainable water infrastructure (Please refer to Table TT below).

| INSTALLATION TYPE | UNIT OF MEASURE | CAPACITY / FLOW RATE (1) | USE FACTOR (2) | FIXED USE (LITRES/ PERSON/DAY) (3) | LITRES/PERSON/DAY = [ (1) X (2) ] + (3) (4) |
|---|---|---|---|---|---|
| WC (dual flush) | Full flush volume (litres) | 6 | 1.46 | 0 | 8.76 |
| | Part flush volume (litres) | 3 | 2.96 | 0 | 8.88 |
| Taps (excluding kitchen/ utility room taps) | Flow rate (litres/minute) | 5 | 1.58 | 1.58 | 9.48 |
| Bath (where shower also present) | Capacity to overflow (litres) | 240 | 0.11 | 0 | 26.4 |
| Shower (where bath also present) | Flow rate (litres/minute) | 9 | 4.37 | 0 | 39.33 |
| Kitchen/ utility room sink taps | Flow rate (litres/minute) | 9 | 0.44 | 10.36 | 14.32 |
| Washing machine | Litres/ kg dry load | 7.5 | 2.1 | 0 | 15.75 |
| Dishwasher | Litres/ place setting | 1.25 | 3.6 | 0 | 4.5 |
| | (5) | Total calculated use (litres/person/day) = (SUM column 4) | | | 127.42 |
| | (6) | Contribution from greywater (litres/person/day) from table 4.6 | | | 0 |
| | (7) | Contribution form rainwater (litres/person/day) from table 5.5 | | | 0 |
| | (8) | Normalisation factor | | | 0.91 |
| | (9) | Total water consumption – BREEAM = [ (5) - (6) - (7) ] x (8) (litres/person/day) | | | 115.95 |

**Table 8: Indoor Water Use Calculation**

Where feasible, the water meters within the apartments will be located for easy reading to encourage occupants of the apartments to monitor their water usage over time.

For the retail areas, a water meter with a pulsed output will be provided for the mains water supply of the building and a major leak detection system will be installed.

### RAINWATER HARVESTING / WATER EFFICIENT IRRIGATION

Most of the external landscaping and planting will be self-sufficient and rely on precipitation only following establishment. Irrigation will only be required at level 1 which is a sheltered space receiving less rainfall than other areas. For level 1 planting, a water efficient irrigation method based on drip-fed subsurface irrigation incorporating soil moisture sensors has been selected for the scheme.

### GREYWATER RECYCLING

Camden Guidance Document CPG 3 states that the 'Council require developments of 10 units or more to include a grey water harvesting system, unless the applicant demonstrates to the Council's satisfaction that this is not feasible'.

The proposed 5-17 Haverstock Hill development is limited to 77 residential apartments. Taking into consideration the scale of the development, its low level of water use, the limited use of greywater for toilet flushing and the feasibility of locating the greywater storage tank within the site, greywater recycling is considered to be an unviable proposal for achieving useful water savings at this development.

### FLOOD RISK AND DRAINAGE

Consideration has been made to the conservation of water resources through water efficiency measures, in addition to the risk posed by flooding and the use of Sustainable Urban Drainage Systems (SUDs) to reduce the risk of surface water flooding, in line with the guidance of BREEAM, Camden's Development Policy DP22: 'Promoting Sustainable Design and Construction' and Camden CPG 3 –Section 11.

A Flood risk assessment (FRA) has been carried out for the scheme by Conisbee and confirms that the probability of flooding of the site is low and it is considered that the development of this site will not increase flood risk elsewhere.

There will be no change in the amount of impermeable surfaces as a result of the re-development of the site. The volumetric runoff generated by the proposed development will be equal to that from the predevelopment.

The proposed drainage system will be designed to ensure that the surface water generated by a 1 in 100 year plus 30% for climate change storm event will be attenuated by providing 47m$^3$ of modular storage tanks and 23m$^3$ of blue/green roof storage. The surface water will discharge at a restricted rate of 14.0l/s. Therefore there is no offsite surface water overflow for all storm events until this threshold is exceeded, thus providing a robust flood management regime.

The surface water and foul flows generated by the proposed development will not have any adverse effect off site and the development of this site will not increase flood risk elsewhere owing to the proposed drainage strategy. Flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance).

The site is car-free, therefore with a low risk of watercourse pollution and an appropriate level of pollution prevention treatment is provided. Blue/Green roofs provide treatment for the water by filtration for all the rainfall on the roofs of the building, other treatment is provided by trapped gullies and catchpits.

## 4.3 SUSTAINABLE USE OF MATERIALS / WASTE / CONSTRUCTION ACTIVITIES

Preference has been given to the selection of sustainable materials with a low environmental impact over their life cycle, as well as sustainable procurement and waste disposal. This review has been undertaken in the context of the London Borough of Camden CPG 3 –Section 8 and BREEAM requirements (for the retail space).

### DEMOLITION AND CONSTRUCTION WASTE

The WRAP guidance and the waste hierarchy will be referred to during the construction phase to ensure that materials are used and managed efficiently on site. The scheme will aim at having a minimum of 10% of the total value of the materials used within the construction of the proposed development derived from recycled and reused sources, in accordance with the Waste and Resources Action Programme (WRAP) Quick Wins assessment or the equivalent (in line with Camden CPG 3 requirement).

On-site construction waste will be sorted on-site into the relevant waste groups in order to improve the efficiency of the waste management process. Procedures and commitments to divert waste from landfill will be implemented through:

- Re-use on-site (in situ or for new applications) or re-use on other sites;
- Salvage/reclaim for re-use;
- Return to the supplier via a 'take-back' scheme;
- Recovery and recycling using an approved waste management contractor; or
- Compost.

Where it is not possible to re-use or recycle materials on-site, opportunities to re-use or recycle the materials off-site will be explored where feasible. To avoid the disposal of waste to landfill, materials and material packaging will be returned to suppliers via take back schemes, where available.

Waste generation will be minimised on site and a target of 3.4$m^3$/100$m^2$ GIA has been set for the maximum amount of waste to be generated by the shell retail area construction activities.

More than 80% of construction waste and 90% of demolition waste will be diverted from landfill.

### OPERATIONAL WASTE RECYCLING

Waste will be sorted on-site into the relevant waste groups in order to improve the efficiency of the waste management process.

When in operation, the dwellings will be provided with internal and external waste and recyclable waste storage to encourage the appropriate management of materials. External waste storage facilities will be accessible, easy to use, and sized to meet the requirements of BS 5906 and of London Borough of Camden.

The council offers a food and garden waste collection scheme. It is intended that the development will promote composting by informing residents of the kitchen and garden waste collection scheme within their Home Information Packs. Information on local recycling centres and sustainable living in general will be provided within the Home Information Packs provided to occupants of the dwellings upon completion.

All dedicated storage will be clearly labelled to assist segregation, storage and collection of the recyclable waste streams.

For the retail areas, a central, dedicated storage space will be provided for materials that can be recycled. This space will be clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams, accessible to building occupants / facilities operators for the deposit of materials and collections by waste management contractors, and of a capacity appropriate to the commercial development.

### CONSTRUCTION MATERIALS

The proposed development will give preference to the selection of sustainable materials. The following measures will be considered to demonstrate that the materials specified are sourced, managed and used in a sustainable manner.

- The BRE Green Guide contains more than 1,500 material specifications, each corresponding to one of the main building elements: roof, floors, external walls, internal walls and windows. The impacts of the materials are assessed against 11 lifecycle categories over each stage of the material's life-cycle. Impacts under each category are graded from 'A+' to 'E' and an overall summary rating is assigned for use in the environmental assessment of new developments. The building materials will be selected and assessed against the BRE Green Guide to Specification, and the team will aim at specifying A+/A rated building elements where practically feasible.
- Where feasible, the building materials will be sourced from suppliers that participate in responsible sourcing schemes equivalent to BRE BES 6001 Responsible Sourcing Standard. Any timber used within the proposed development will be sustainably and responsibly sourced through the Forest Stewardship Certification (FSC) Chain of Custody Certification scheme. The use of FSC timber will ensure that the timber is sourced from a well-managed woodland forest.
- The use of locally sourced materials will be prioritised and all reinforced steel will be 100% recycled steel;
- The building will incorporate suitable durability and protection measures or designed features/solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements. The relevant building elements incorporate appropriate design and specification measures to limit material degradation due to environmental factors.
- The use of high VOC content paints, sealants and all ozone depleting materials including insulation will be avoided.

## 4.4 ADAPTING TO CLIMATE CHANGE

### ADAPTATION TO WARMER TEMPERATURES

The development will incorporate a high standard of build fabric. The insulation will be superior to the requirements of the 2013 Part L1A Building Regulations and Part L2A Building Regulations.

The incorporation of outdoor areas as part of the development is suitable for the increased demand associated with warmer weather.

The landscaping areas and the green roof incorporated into the design would assist in the protection of the building from solar gains. The vegetation would also assist in cooling the building through evaporation.

100% of the lighting fitted internally will be energy efficient, reducing any excessive internal heat gains due to lighting.

The measures implemented to limit the risk of overheating of the scheme have followed the London Plan cooling hierarchy developed in Policy 5.9 – 'Overheating and Cooling'. The dwellings design has been optimised to ensure they 'PASS' CIBSE TM 52/TM49 adaptive overheating criteria for current and future climate with blinds without comfort cooling (Please refer to the Energy Statement prepared by ChapmanBDSP in support of the planning application which include the result of the detailed dynamic thermal modelling carried out for the scheme to assess overheating risk).

### ADAPTATION TO HEAVIER RAINFALL

As noted in the section above, the peak rate of runoff over the development's lifetime, allowing for climate change, will be no greater for the developed site than it was for pre-development rate of run-off. The installation of 47m$^3$ of modular storage tanks and 23m$^3$ of blue/green roof storage will attenuate and treat rainwater and reduce the impact of heavy rainfall on the drainage system.

The site is located in Flood Zone 1, both this Flood Risk Assessment and the SFRA have also been found this site to be a low risk from flood from all other sources. The surface water and foul flows generated by the proposed development will not have any adverse effect off site and the development of this site will not increase flood risk elsewhere owing to the proposed drainage strategy.

Flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance).

### ADAPTATION TO DRIER SUMMERS

The proposed 5-17 Haverstock Hill development will significantly reduce its demands on mains water supply through the use of water efficient fittings. Please refer to the water efficiency section of this report for further information on the sanitary ware specification.

## 4.5 GREEN ROOFS & WALLS / BIODIVERSITY AND LOCAL FOOD GROWING

Camden's Development Policy DP22: 'Promoting Sustainable Design and Construction' and Camden CPG 3 –Sections 10, 13 & 14 require developments to protect and enhance biodiversity and incorporate brown roofs, green roofs and green walls unless it can be demonstrated that this is not possible or appropriate.

The benefits afforded by green roofs/walls include:

- Sustainable drainage – the green roof forms part of the sustainable drainage strategy by attenuating water run-off and also by filtering the water before it reaches the drainage system;
- Reduction of the urban heat island effect – green roofs provide cover to buildings and help to reduce surface temperature. They also reduce the reflection of heat from the building surfaces;
- Increased thermal performance – green roofs provide an additional layer of insulation in the winter and screen the building surfaces from solar radiation in the summer, therefore reducing the requirements for internal heating or cooling;
- Biodiversity – green roofs improve the species value of a development and also provide a habitat for local wildlife;
- Improvement of air quality – green roofs can help to filter out pollutants and dust particles from the atmosphere;
- Aesthetics – green roofs enhance the appearance of the building and contribute to the greening of urban environments.

A green roof has been proposed for the scheme on parts of the roofs of the top floor flats which are suitable for this use.

A wildflower and perennial green roof mat (Developed by Lindum) has been selected for the scheme by the landscape architect for the scheme from LUC for its high ecological value. It includes a ready established mixture of drought tolerant wildflowers, sedum, herbs and flowering perennials, all of which are suited to the growing conditions created on a green roof. The mixture includes a range of plants that flower from April to September, including Oxeye Daisy, Lady's Bedstraw, Cats Ear and Yellow Camomile, three native sedum varieties, and herbs such as Wild Marjoram and Thyme, and flowering perennials such as Dianthus. The mats will require a minimum of 100mm depth of substrate, with height of plants when flowering reaching 20-30cm.

The green roof proposed will provide biodiversity networks and allow continuity of green space within the London Borough of Camden. Green roofs also provide habitats for a variety of wildlife in the urban environments.

The incorporation of green walls for the main building's facades is not considered feasible. The north, east and west walls will be subjected to considerable over shading from surrounding existing buildings, making the incorporation of green walls problematic. The south side of the proposed development faces directly onto a busy road and would therefore be unsuitable.

A Suitably Qualified Ecologist (SQE) from Middlemarch Environmental Ltd has been appointed as part of the development to assess the current ecological value of the site and make recommendations for the protection and enhancement of the site and on-site actions during construction to protect features of

ecological value, in line with BREEAM, Camden's Development Policy DP22: 'Promoting Sustainable Design and Construction' and Camden CPG 3 –Section 13. Please refer to Appendix B for full BREEAM Ecology report for the scheme.

The existing site is almost entirely covered by the existing building with associated hardstanding and a small area of butterfly-bush located in the north west of the site. Due to its small size, this area is deemed to have low ecological value.

The ecologist has been providing as part of his ecological assessment recommended suitable protection measures such as protection of the trees outside the site along the northwest boundary, demolition to be undertaken outside the bird nesting season, bat specific recommendations. The contractor is also required to construct ecological protection prior to any preliminary or preparation works on site.

The ecologist has also provided recommendations for ecological enhancement which will be implemented for the scheme:

- Good horticultural practice;
- Provision of a green roofs;
- Shrub planting;
- Tree planting;
- Bird boxes; and
- Planting for bees.

The implementation of the recommended measures will lead to a positive change of ecological value of the site. The relevant UK and EU legislation regarding roosting bats and nesting birds will be adhered to by the client who will also hand a five year ecological management plan developed by Middlemarch Environmental Ltd for the scheme.

The contractors will be required to minimise the ecological impact of construction activities. The following measures will be implemented:

- Nominate a 'Biodiversity Champion' with the authority to influence site activities;
- Train all a personnel on how to protect site ecology;
- Records actions taken to protect biodiversity; and
- Works conducted at times to minimise ecological disturbance.

Planting beds are fully planted with low maintenance herbaceous planting to present a cohesive planting scheme from the outset, yet there is an opportunity for residents to use these beds for food growing areas in the future.

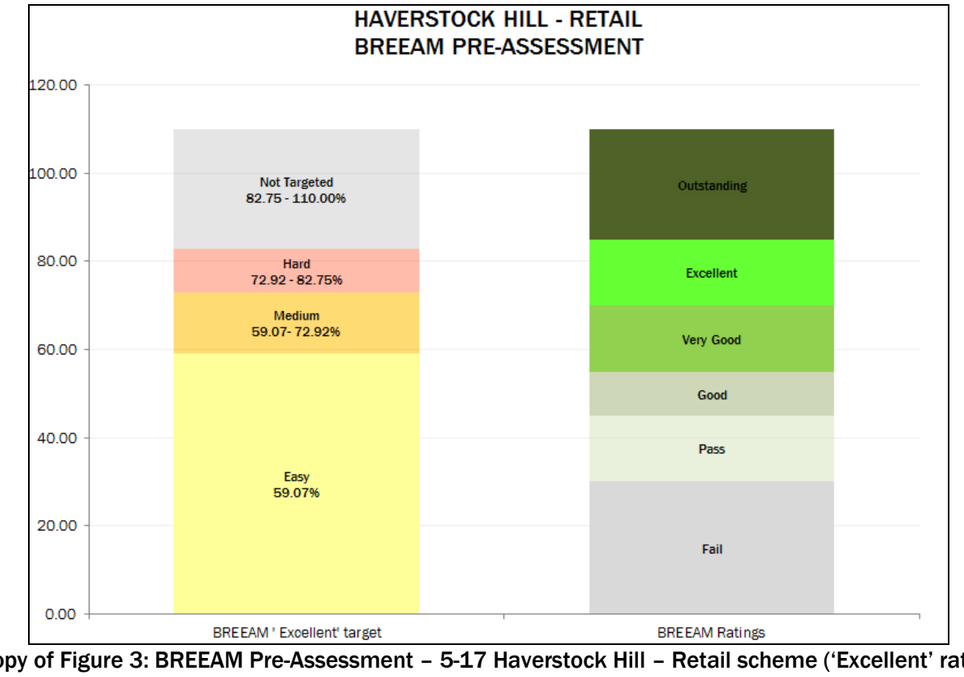
## 5 CONCLUSION

This report has been developed to detail the sustainability features of the development and demonstrates how they relate to the relevant planning policy documents including the London Plan, Camden Core Strategy, Camden Development Policies and Camden Planning Guidance CPG 3 – 'Sustainability'.

Each of the BREEAM and London Borough of Camden CPG 3 criteria was fully discussed at a Sustainability workshop led by a BREEAM Assessor/Accredited Professional within ChapmanBDSP Sustainability team and attended by the project team on 16 February 2016. This meeting ensured that all members of the development team have a full understanding of the successful integration of the BREEAM credits and CPG 3 requirements into their design.

The BREEAM New Construction pre-assessment shows a rating of 'Excellent' is robustly targeted for the flats of the scheme with a targeted score of **72.92%.**

The Sustainability Statement and BREEAM pre-assessment for 5-17 Haverstock Hill development demonstrates that the design will holistically incorporate sustainable principles into the full range of sustainability aspects covered by BREEAM and the London Borough of Camden CPG 3 on Sustainable Design and Construction: Energy, water, waste, sustainable use of materials, flood risk and drainage, adaptation to climate change, green roof, biodiversity and local food growing.




**Copy of Figure 3: BREEAM Pre-Assessment – 5-17 Haverstock Hill – Retail scheme ('Excellent' rating targeted)**

# 6 APPENDICES

## 6.1 APPENDIX A - BREEAM NEW CONSTRUCTION 2014 PRE-ASSESSMENT – RETAIL - SHELL

| | Credit Criteria<br>Red - Minimum standards<br>Green - Early stage credits | Comments | Number of credits available | EASY | MEDIUM | HARD | NOT TARGETED | KEY RESPONSIBILITY |
|---|---|---|---|---|---|---|---|---|
| **MANAGEMENT** | | | | | | | | |
| **Man 01 - Project brief and Design** | **Stakeholder Consultation (Project Delivery)**<br>**1 credit** where<br>1.Prior to completion of the Concept Design (RIBA Stage 2 or equivalent), the project delivery stakeholders have met to identify and define their roles, responsibilities and contributions for each of the key phases of project delivery.<br>Project delivery stakeholders include the client, the building occupier (where known), the design team and the principal contractor. With regards to contractors' involvement, it ensures their input in terms of formulating sustainable design solutions, commenting/inputting on the practicality and build ability of (one or more) design solutions and their impact on programming, cost etc.<br>Where the contractor for the works is not be appointed at the early stages of the project , criterion 1 will be met provided that a suitably experienced person with substantial construction/contracting experience in projects similar to the proposed works is involved prior to appointment of the contractor. A suitably experienced person could be a contractor appointed as a consultant for this stage or a construction project manager.<br><br>2.In defining the roles and responsibilities for each key phase of the project, the following must be considered:<br>a.End user requirements, b.Aims of the design and design strategy, c.Particular installation and construction requirements/limitations d.Occupiers budget and technical expertise in maintaining any proposed systems, e.Maintainability and adaptability of the proposals f.Requirements for the production of project and end user documentation, g.Requirements for commissioning, training and aftercare support.<br><br>3.The project team demonstrate how the project delivery stakeholder contributions and the outcomes of the consultation process have influenced or changed the Initial Project Brief, including if appropriate, the Project Execution Plan, Communication Strategy, and the Concept Design. | This credit is expected to be achieved for the scheme.<br>The team will forward to the BREEAM assessor any documentation demonstrating involvement from RIBA stage 2 of the client, building occupier, design team and contractor and the contribution of the entire team to the decision making process.<br><br>A confirmation letter signed by the project manager will also be required for formal assessment.<br>This credit is targeted for the scheme.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | Piercy & Co / CBRE |
| | **Stakeholder consultation (third party)**<br><br>**1 credit** where<br>4. Prior to completion of the Concept Design stage, all relevant third party stakeholders have been consulted by the design team and this covers the minimum consultation content: a. Functionality, build quality and impact (including aesthetics), b. Provision of appropriate internal and external facilities (for future building, occupants and visitors/users), c. Management and operational implications, d. Maintenance resources implications, e. Impacts on the local community, e.g. local traffic/transport impact,<br>f. Opportunities for shared use of facilities and infrastructure with the community/appropriate stakeholders, if relevant/appropriate to building type, g. Compliance with statutory (national/local) consultation requirements, h. Inclusive and accessible design.<br><br>5. The project must demonstrate how the stakeholder contributions and outcomes of the consultation exercise have influenced or changed the Initial Project Brief and Concept Design.<br>6. Prior to completion of the detailed design (RIBA Stage 4, Technical Design or equivalent), consultation feedback has been given to, and received by, all relevant parties. | This credit is considered challenging for the scheme due to the very demanding BREEAM requirements relating to the consultation process. Indeed, the consultation process needs to go significantly beyond statutory requirements to achieve this credit. Credit not currently targeted.<br><br>**Confirmed at BREEAM workshop of 16/02/2016** | 1 | | | 1 | | Piercy & Co / CBRE |

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| | **Sustainability Champion (Design)**<br>**1 credit** where<br><br>8.A Sustainability Champion has been appointed to facilitate the setting and achievement of BREEAM performance target(s) for the project. The design stage Sustainability Champion is appointed to perform this role during the feasibility stage (Stage 1, Preparation and Brief stage, as defined by the RIBA Plan of Work 2013 or equivalent).<br>9.The defined BREEAM performance target(s) has been formally agreed between the client and design/project team no later than the Concept Design stage (RIBA Stage 2 or equivalent).<br>10. To achieve this credit at the interim design stage assessment, the agreed BREEAM performance target(s) must be demonstrably achieved by the project design. This must be demonstrated via the BREEAM Assessor's design stage assessment report.<br>Sustainability champion: Currently only BREEAM Accredited Professional (AP) qualifies. | The initial BREEAM review has been carried out by a BREEAM assessor of ChapmanBDSP who is BREEAM AP qualified and therefore considered as a 'Sustainability Champion'. However, the involvement of the BREEAM AP started at RIBA Stage 2 only - Please confirm whether a BREEAM AP was involved with the scheme during RIBA Stage 1.<br><br>The BREEAM AP will remain involved throughout the design phases to monitor BREEAM progress. The BREEAM target agreed will also be achieved at design stage.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 2 | 2 | | | | Chapman BDSP / CBRE / Client |
| | **Sustainability Champion (monitoring progress)**<br>**1 credit** where<br>11. The Sustainability Champion criteria 8, 9 and 10 have been achieved.<br>12. A Sustainability Champion is appointed to monitor progress against the agreed BREEAM performance target(s) throughout the design process and formally report progress to the client and design team.<br>To do this the Sustainability Champion must attend key project/design team meetings during the Concept Design, Developed Design and Technical Design stages, as defined by the RIBA Plan of Work 2013, reporting during, and prior to, completion of each stage, as a minimum | | | | | | | |
| **Man 02 - Life cycle cost and service life planning** | **Elemental life cycle cost ( LCC)Two credits** where: 1. An elemental life cycle cost (LCC) analysis has been carried out, at Process Stage 2 (equivalent to Concept Design - RIBA Stage 2) together with any design option appraisals in line with 'Standardised method of life cycle costing for construction procurement' PD 156865:20081.2. The LCC analysis shows: a.An outline LCC plan for the project based on the building's basic structure and envelope, appraising a range of options and based on multiple cash flow scenarios e.g. 20, 30, 50+ years;b. The fabric and servicing strategy for the project outlining services component and fit-out options (if applicable) over a 15-year period, in the form of an 'elemental LCC Plan'. | These credits are considered very challenging and are not currently targeted for the scheme due to the very demanding BREEAM requirements for life cycle costing and service life planning. **Confirmed at BREEAM workshop of 16/02/2016.** | 2 | | | | 2 | WT/ All |
| | **Component level LCC Plan**<br>**One credit** where<br>3. A component level LCC plan has been developed by the end of Process Stage 4 (equivalent to Technical Design – RIBA Stage 4) in line with PD 156865:2008 and includes the following component types (where present):<br>a. Envelope, e.g. cladding, windows, and/or roofing, b. Services, e.g. heat source cooling source, and/or controls<br>c. Finishes, e.g. walls, floors and/or ceilings, d. External spaces, e.g. alternative hard landscaping, boundary protection. 4.<br><br>4. Demonstrate, using appropriate examples provided by the design team, how the component level LCC plan has been used to influence building and systems design/specification to minimise life cycle costs and maximise critical value.<br><br>Shell & Core: The plan must include all component types to be installed by the developer. | | 1 | | | | 1 | WT/ All |
| | **One credit - Capital cost reporting**<br>**1 credit** where:<br>5. Report the capital cost for the building in pounds per square metre (£k/m2), via the BREEAM Assessment Scoring and Reporting tool, Assessment Issue Scoring tab, Management section. | The capital cost for the building in pounds per square metre (£k/m$^2$) will be reported via the BREEAM Assessment Scoring and Reporting tool.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | 1 | | | Client/ WT |
| **Man 03 - Responsible construction practices** | **Pre-requisite**1. All timber and timber based products used on the project is 'Legally harvested and traded timber'.Note: For other materials there are no pre-requisite requirements at this stage. | All timber and timber based products used on the project should be 'Legally harvested and traded timber'. This requirement will be included in the contractor prelims.**Confirmed at BREEAM workshop of 16/02/2016.** | N/A | N/A | | | | Contractor |
| | **Environmental management**<br>**1 credit** where:<br>1. The principal contractor operates an environmental management system (EMS) covering their main operations. The EMS must be either:<br>a. third party certified, to ISO 14001/EMAS or equivalent standard; or<br>b. have a structure that is in compliance with BS 8555:2003 and has reached phase four of the implementation stage, 'implementation and operation of the environmental management system', and has completed phase audits one to four, as defined in BS 8555.<br><br>2. The principal contractor implements best practice pollution prevention policies and procedures on-site in accordance with Pollution Prevention Guidelines, Working at construction and demolition-sites: PPG6. | It is expected that due to the scale of the scheme, the principal contactor selected for the scheme will operate an environmental management system (EMS) such as ISO 14001 covering their main operations.<br>The principal contractor will be required to implement best practice pollution prevention policies and procedures on-site in accordance with Pollution Prevention Guidelines, Working at construction and demolition-sites: PPG6.<br>This requirement will be included in the contractor prelims.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | Contractor |

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| **Sustainability Champion (construction)**<br>**1 credit** where:<br>3. A Sustainability Champion is appointed to monitor the project to ensure ongoing compliance with the relevant sustainability performance/process criteria, and therefore BREEAM target(s), during the Construction, Handover and Close Out stages (as defined by the RIBA Plan of Works 2013, stages 5 and 6).To do this the Sustainability Champion will ideally be site based or will visit the site regularly to carry out spot checks, with the relevant authority to do so and require action to be taken to address shortcomings in compliance. The Sustainability Champion will monitor site activities with sufficient frequency to ensure that risks of non-compliance are minimised. They will report on progress at relevant project team meetings including identifying potential areas of non-compliance and any action needed to mitigate.<br><br>In this context, visits should occur at key stages of the construction process, at times where: works can be observed before they are covered up or new works or trades start; where significant risks of conflicts or errors could occur; where timing is critical to demonstrating compliance; where key evidence is required to be produced at specific times including, but not limited to photographic, delivery notes and other documentary evidence; and where different trades and systems come together and one could harm the integrity or compliance of another system's performance against BREEAM requirements.<br><br>4. The defined BREEAM performance target forms a requirement of the principal contractor's contract.<br>5. To achieve this credit at the final post construction stage of assessment, the BREEAM-related performance target for the project must be demonstrably achieved by the project. This is demonstrated via the BREEAM Assessor's final post construction stage assessment report. | The initial BREEAM review has been carried out by a BREEAM assessor of ChapmanBDSP who is BREEAM AP qualified and therefore considered as a 'Sustainability Champion'.<br><br>The BREEAM AP will remain involved throughout the design, construction, handover and close out stages.<br><br>The Sustainability Champion will visit the site regularly to carry out spot checks, with the relevant authority to do so and require action to be taken to address shortcomings in compliance.<br>The Sustainability Champion will monitor site activities with sufficient frequency to ensure that risks of non-compliance are minimised. The Sustainability Champion will report on progress at relevant project team meetings including identifying potential areas of non-compliance and any action needed to mitigate.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | Chapman BDSP/ Contractor / Client |
| **Considerate construction**<br>**Up to two credits :**<br>6. Where the principal contractor has used a 'compliant' organisational, local or national considerate construction scheme and their performance against the scheme has been confirmed by independent assessment and verification.The BREEAM credits can be awarded as follows:<br>a. **One credit** where the contractor achieves 'compliance' with the criteria of a compliant scheme (a CCS score between 25 and 34) - A score of at least 5 in each of the five sections must be achieved<br>b. **Two credits** where the contractor significantly exceeds 'compliance' with the criteria of the scheme (a CCS score between 35 and 39) - A score of at least 7 in each of the five sections must be achieved<br>**1 credit - Minimum standard for an Excellent rating, 2 credits- Minimum standard for an Outstanding rating**<br>At the final stage of the BREEAM assessment, the number of BREEAM credits awarded should therefore be based on the final visit and the subsequent Monitor's report and certified CCS score. | These credits are targeted for the scheme based on the achievement of very good environmental construction practices. The project will be registered under the CCS scheme and will achieve a very good score under this scheme.<br><br>This requirement will be included in the contractor prelims.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 2 | 2 | | | | Contractor |
| **Monitoring of construction-site impactsUp to two credits** 7. Responsibility has been assigned to an individual(s) for monitoring, recording and reporting energy use, water consumption and transport data (where measured) resulting from all on-site construction processes (and dedicated off-site monitoring) throughout the build programme. To ensure the robust collection of information, this individual(s) must have the appropriate authority and responsibility to request and access the data required. Where appointed, the Sustainability Champion could perform this role.**First monitoring credit - Utility consumptionEnergy consumption**8. Criterion 7 is achieved.9. Monitor and record data on principal constructor's and subcontractors' energy consumption in kWh (and where relevant, litres of fuel used) as a result of the use of construction plant, equipment (mobile and fixed) and site accommodation.10. Report the total carbon dioxide emissions (total $kgCO_2$/project value) from the construction process via the BREEAM Assessment Scoring and Reporting tool.**Water consumption**11. Criterion 7 is achieved.12. Monitor and record data on principal constructor's and subcontractors' potable water consumption ($m^3$) arising from the use of construction plant, equipment (mobile and fixed) and site accommodation.13. Using the collated data report the total net water consumption ($m^3$), i.e. consumption minus any recycled water use, from the construction process via the BREEAM Assessment Scoring and Reporting tool. | This credit requires that the contractor operates rigorous environmental procedures on their sites and have established systems for monitoring site energy and water consumption and transport $CO_2$ emissions. These credits are targeted for the scheme. These requirements will be included in the contractor prelims.**Confirmed at BREEAM workshop of 16/02/2016.** | 2 | 2 | | | | Contractor |
| **Second monitoring credit - Transport of construction materials and waste**<br>14. Criterion 7 is achieved.<br>15. Monitor and record data on transport movements and impacts resulting from delivery of the majority of construction materials to site and construction waste from site. As a minimum this must cover:<br>a. Transport of materials from the factory gate to the building site, including any transport, intermediate storage and distribution.<br>b. Scope of this monitoring must cover the following as a minimum:<br>i. Materials used in major building elements (i.e. those defined in BREEAM issue Mat 01 Life cycle impacts), including insulation materials.<br>ii. Ground works and landscaping materials.<br>c. Transport of construction waste from the construction gate to waste disposal processing/recovery centre gate. Scope of this monitoring must cover the construction waste groups outlined in the project's waste management plan.<br>16. Using the collated data, report separately for materials and waste, the total fuel consumption (litres) and total carbon dioxide emissions ($kgCO_2$ eq), plus total distance travelled (km) via the BREEAM Assessment Scoring and Reporting tool. | | 2 | 2 | | | | Contractor |

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| **Man 04 - Commissioning and handover** | **Testing and inspecting building fabric**<br><br>**One credit** where:<br>7. The commissioning and testing schedule and responsibilities credit is achieved.<br>8. The integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths is quality assured through completion of post construction testing and inspection. Dependent on building type or construction, this can be demonstrated through the completion of a thermographic survey as well as an air tightness test and inspection.<br><br>The thermographic survey must cover 100% of the treated spaces, unless it is a large complex building, and ensure that all elements of the building fabric that enclose an internal heated and/or conditioned (treated) zone of the building will be tested. This includes internal walls separating treated and untreated zones.<br>In the case of large and complex buildings, it may be impractical for the thermographic survey and air-tightness testing to cover 100% of the building. Where a complete thermographic survey is deemed impractical by a Level 2 qualified thermographic surveyor, the guidance in air tightness standard TSL2 should be followed on the extent of the survey and testing. This could include airports, large hospitals and high-rise buildings.<br><br>The survey and testing is undertaken by a Suitably Qualified Professional in accordance with the appropriate standard:<br>Air tightness testing: by professionals with membership of ATTMA (Air Tightness Testing and Measurement Association) attained at organisational level maintaining UKAS accreditation (as air tightness testing laboratories to ISO 17025).Thermographic survey: by a professional holding a valid Level 2 certificate in thermography, as defined by the UKTA website http://www.ukta.org.<br><br>9. Any defects identified in the thermographic survey or the air tightness testing reports are rectified prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building/element. | Although the cost and practical implications of this credit, we would recommend it is targeted for the scheme to assist the achievement of the targeted 'Excellent' BREEAM rating.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.**<br><br>Achieving this credit has a cost and practicality implications but it will be only required for the retail space. Item to be checked with client and included in the cost plan.<br><br>Requirements will be included in the contractor tender documentation. | 1 | | 1 | | | Chapman BDSP /Contractor |
| | | **Total - Management:** | **15** | **9** | **2** | **1** | **3** | |
| | | **Credit value:** | **0.83%** | | | | | |
| **HEALTH & WELLBEING** | | | | | | | | | |
| **Hea 01 - Visual comfort** | **Daylighting**<br>**Two credits** where:<br>3. Daylighting criteria have been met using either of the following options:<br><br>Sales areas: 35% area meet 2% point daylight factor - 1 credit<br>and other occupied area: 80% area meet 2% DF - 1 credit and (a) or ((b) and (c))<br><br>(a) A uniformity ratio of at least 0.3 or a minimum point daylight factor of at least 0.3 times the relevant average daylight factor value. Spaces with glazed roofs, such as atria, must achieve a uniformity ratio of at least 0.7 or a minimum point daylight factor of at least 0.7 times the relevant average daylight factor value in Table - 10.<br>(b) At least 80% of the room has a view of sky from desk or table top height (0.7m in other buildings).<br>(c) The room depth criterion d/w +d/HW < 2/(1-RB) is satisfied. Where: d = room depth,w = room width,HW = window head height from floor level,RB = average reflectance of surfaces in the rear half of the room<br><br>OR b. The relevant building areas meet good practice average and minimum point daylight illuminance criteria:<br>Retail buildings: Sales areas: 35% area comply - Average and Min: 200 point daylight illuminances for 2650/yr - 1 credit and other occupied area: 80% area comply - Average: 200 lux for 2650h/yr, Min: 60 lux for 2650h/yr - 1 credit. | Credit achievable for the sales area but not for the back of house areas.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 2 | | 1 | | 1 | Piercy & Co / Daylighting consultant |
| | **View out**<br>**One credit** where:<br><br>4. 95% of the floor area in relevant building areas is within 7m of a wall which has a window or permanent opening that provides an adequate view out.<br>5. The window/opening must be ≥ 20% of the surrounding wall area (Surrounding wall area refers to the area (in $m^2$) of the internal wall on which the window/opening is located, including the area of the window/opening itself). Where the room depth is greater than 7m, compliance is only possible where the percentage of window/opening is the same as, or greater than, the values in table 1.0 of BS 8206.<br><br>BREEAM defines relevant building areas requiring a view out to include areas of the building where:<br>1. There are or will be workstations/benches or desks for building users.<br>2. Close work will be undertaken or visual aids will be used.<br>3. A view out is deemed to be of benefit to the building occupants, e.g. in spaces where occupants are likely to spend a significant amount of time. | Layout of floor plans will be optimised to ensure this credit is met.<br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | 1 | | | Piercy & Co |

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| | **External lighting levels**<br><br>**One credit** where:<br>10. All external lighting located within the construction zone is designed to provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night. To demonstrate this, external lighting provided is specified in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas and BS EN 12464-2:2014 Light and lighting - Lighting of work places - Part 2: Outdoor work places. | The external lighting fittings specified for the scheme will comply with BREEAM requirements.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | ChapmanBDSP |
| **Hea 02 - Indoor Air Quality** | **Adaptability - Potential for natural ventilation**<br>**One credit** where:<br><br>13. The building ventilation strategy is designed to be flexible and adaptable to potential building occupant needs and climatic scenarios. This can be demonstrated as follows: a.<br>Occupied spaces of the building are designed to be capable of providing fresh air entirely via a natural ventilation strategy. The following are methods deemed to satisfy this criterion dependent upon the complexity of the proposed system: i.<br>Room depths are designed in accordance with CIBSE AM10 (section 2.4) to ensure effectiveness of any natural ventilation system. The openable window area in each occupied space is equivalent to 5% of the gross internal floor area of that room/floor plate. OR<br>ii. The design demonstrates that the natural ventilation strategy provides adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates. This is demonstrated using ventilation design tool types recommended by CIBSE AM107 (or for education buildings by using the ClassVent tool).For a strategy which does not rely on openable windows, or which has occupied spaces with a plan depth greater than 15m, the design must demonstrate (in accordance with criterion 13.a.i. above) that the ventilation strategy can provide adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates.<br>14. The natural ventilation strategy is capable of providing at least two levels of user-control on the supply of fresh air to the occupied space. The two levels of ventilation must be able to achieve the following:Higher level: higher rates of ventilation achievable to remove short term odours and/or prevent summertime overheating, Lower level: adequate levels of draught-free fresh air to meet the need for good indoor air quality throughout the year, sufficient for the occupancy load and the internal pollution loads of the space.<br><br>Note: Any opening mechanisms must be easily accessible and provide adequate user-control over air flow rates to avoid draughts. Relevant industry standards for ventilation can be used to define 'adequate levels of fresh air' sufficient for occupancy and internal air pollution loads relevant to the building type. | This credit is not achievable for the scheme (scheme will not include sufficient openable window to meet BREEAM requirements).<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | | | 1 | Piercy & Co / ChapmanBDSP |
| **Hea 04 - Thermal Comfort** | **Thermal modellingOne credit** where:1. Thermal modelling has been carried out using software in accordance with CIBSE AM11 - Building Energy and Environmental Modelling.2. The software used to carry out the simulation at the detailed design stage provides full dynamic thermal analysis. For smaller and more basic building designs with less complex heating or cooling systems, an alternative less complex means of analysis may be appropriate (such methodologies must still be in accordance with CIBSE AM11).3. The modelling demonstrates that:a. For air conditioned buildings, summer and winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design2, Table 1.5; or other appropriate industry standard (where this sets a higher or more appropriate requirement/level for the building type).b. For naturally ventilated/free running buildings:i. Winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5; or other appropriate industry standard (where this sets a higher or more appropriate requirement/level for the building type).ii. The building is designed to limit the risk of overheating, in accordance with the adaptive comfort methodology outlined in CIBSE TM52: The limits of thermal comfort: avoiding overheating in European buildings.4. For air conditioned buildings, the PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied) indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool. | This credit is targeted for the scheme. The thermal modelling carried out for the scheme confirms the scheme achieves the required thermal comfort levels: CIBSE TM 52, CIBSE Guide A. **Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | ChapmanBDSP |

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| **Hea 05 - Acoustic performance** | **One credit - Internal indoor ambient noise levels:**<br>Indoor ambient noise levels comply with the design ranges given in BS 8233: 2014 unless otherwise stated below.<br><br>Internal indoor ambient noise levels - Testing requirement:<br>A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the acoustic testing and measurement procedures outlined in the Additional information section of this BREEAM issue.<br>Compliant test body<br>A Compliant Test Body is defined as :<br>1. Organisations having United Kingdom Accreditation Scheme (UKAS) accreditation to the appropriate scope, or who are accredited by a member of the International Accreditation Forum (IAF - www.iaf.nu) to the appropriate scope OR<br>2. Organisations or individuals registered with the Association of Noise Consultants (ANC) Registration Scheme OR<br>3. Organisations who can provide evidence that they follow the relevant principles of BS EN ISO/IEC 17024 (Conformity assessment - General requirements for bodies operating certification of persons) in relation to<br>BREEAM requirements<br>Shell & Core guidance:<br>The basic built form has a large impact on the acoustic performance of the building, and in the case of a shell only or shell and core development, this aspect of the build would be outside the control of the tenant. A suitably qualified acoustician (SQA) must carry out a quantifiable assessment of the specification of the build form, construction and any external factors that are likely to affect the indoor ambient noise<br>levels. From this assessment, the SQA must confirm that given a typical arrangement and fit-out specification for the building type, the development is likely to meet the<br>levels required to demonstrate compliance with the BREEAM criteria. Where the specific room functions and areas within the building are yet to be defined, the acoustician must base their assessment on the most sensitive room type likely to be present in the building, as a worst case. | The BREEAM acoustic requirements (indoor ambient noise levels) will be met for the scheme.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | Sandy Brown Associates LLP/ Piercy & Co |
| **Hea 06 - Safety and security** | **Security of site and building**<br>**One credit** where:<br>11. A suitably qualified security specialist (SQSS) conducts an evidence-based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent).<br>12. A suitably qualified security specialist (SQSS) develops a set of recommendations or solutions during or prior to Concept Design (RIBA Stage 2 or equivalent). These recommendations or solutions aim to ensure that the design of buildings, public and private car parks and public or amenity space are planned, designed and specified to address the issues identified in the preceding SNA.<br>13. The recommendations or solutions proposed by the suitably qualified security specialist (SQSS) are implemented (see CN9. Any deviation from those recommendations or solutions will need to be justified, documented and agreed in advance with a suitably qualified security specialist.<br>SNA to include:<br>- A visual audit of the site and surroundings, identifying environmental cues and features pertinent to the security of the proposed development.<br>- Formal consultation with relevant stakeholders, including the local ALO, CPDA & CTSA (as applicable), in order to obtain a summary of crime and disorder issues in the immediate vicinity of the proposed development.<br>- Identify risks specific to the proposed, likely or potential use of the building(s).<br>- Identify risks specific to the proposed, likely or potential user groups of the building(s).<br>- Identify any detrimental effects the development may have on the existing community | We would recommend this credit is reviewed and targeted if possible based on consultation with an appropriate suitably qualified security specialists (QCIC, CPDA, ALO, CTSA) during RIBA Stage 2 and incorporation of their recommendation in the design.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 2 | | 2 | | | Piercy & Co / Landscape Architect / Client / Suitably Qualified Security Specialist |
| **Total - Health& Wellbeing:** | | | **9** | **3** | **4** | **0** | **2** | |
| **Credit value:** | | | **1.11%** | | | | | |
| **ENERGY** | | | | | | | | |
| **Ene 01 - Reduction of energy uses and carbon emissions** | **Up to 15 credits** can be awarded for buildings designed to minimise operational energy demand, primary energy consumption and $CO_2$ emission.<br>Credit are awarded based on the Energy Performance Ratio for New Construction ($EPR_{NC}$) using BREEAM Ene 01 calculator.<br>The calculation is determined using performance data from the approved building energy calculation software.<br><br>**$EPR_{NC}$: 0.075 0.15 0.225 0.3 0.375 0.45 0.525 0.60 0.675 0.75 0.825 0.90 and zero net regulated $CO_2$ emissions**<br>**BREEAM credits: 1 2 3 4 5 6 7 8 9 10 11 12**<br><br>**Pass, Good, Very Good minimum standards: Requires a performance improvement progressively better than the relevant national building regulations compliant standard**<br>**Excellent minimum standard: Requires 5 credits to be achieved (equivalent to an EPR of at least 0.375).**<br>**Outstanding minimum standard: Requires 8 credits to be achieved (equivalent to an EPR of at least 0.6).**<br><br>Shell only: Calculate an Energy Performance Ratio just for the building's heating and cooling energy demand only (EPRED). Compare the EPRED achieved with the EPRNC benchmark scale' with the EPRED substituted for the EPRNC. Award the corresponding number of BREEAM credits. | The energy strategy for the Shell scheme has been optimised to ensure its energy demand is minimised.<br><br>The energy modelling carried out for the scheme confirms the achievement of an Energy Performance Ratio for the energy demand of the scheme compared to a benchmark scale of 0.375 leading to the award of 5 credits exceeding the minimum energy standard for an 'Excellent' rating.<br><br>Please note that achieving more credits is not currently considered feasible for the scheme due to the Part L compliance methodologies and assumptions for the energy demand of the notional building.<br><br>**Confirmed following completion of the energy modelling for the retail scheme.** | 12 | 5 | | 2 | 5 | ChapmanBDSP / Piercy & Co |

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| **Ene 03 -External lighting** | **One credit** where:<br><br>1. The building has been designed to operate without the need for external lighting (which includes on the building, signs and at entrances). OR alternatively, where the building does have external lighting, one credit can be awarded as follows:<br>2. The average initial luminous efficacy of the external light fittings within the construction zone is not less than 60 luminaire lumens per circuit Watt. .<br>All external light fittings are automatically controlled for prevention of operation during daylight hours and presence detection in areas of intermittent pedestrian traffic. | The external lighting for the scheme will be BREEAM compliant. In particular, the average initial luminous efficacy of the external light fittings within the construction zone will not be less than 60 luminaire lumens per circuit Watt.<br>All external light fittings will be automatically controlled for prevention of operation during daylight hours and presence detection in areas of intermittent pedestrian traffic.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | ChapmanBDSP |
| **Ene 04 - Low Carbon Design** | **Passive design - Passive design analysis**<br>**One credit** where:<br>1. The first credit within issue Hea 04 Thermal comfort has been achieved to demonstrate the building design can deliver appropriate thermal comfort levels in occupied spaces.<br>2. The project team carries out an analysis of the proposed building design/development to influence decisions made during Concept Design stage (RIBA Stage 2 or equivalent) and identify opportunities for the implementation of passive design solutions that reduce demands for energy consuming building services<br>3.The building uses passive design measures to reduce the total heating, cooling, mechanical ventilation and lighting loads and energy consumption in line with the findings of the passive design analysis and the analysis demonstrates a meaningful reduction in the total energy demand as a result.<br><br>**Free cooling**<br>**One credit** where:<br>4. The passive design analysis credit is achieved.<br>5. The passive design analysis carried out under criterion 2 includes an analysis of free cooling and identifies opportunities for the implementation of free cooling solutions.<br>6. The building uses ANY of the free cooling strategies listed below to reduce the cooling energy demand, i.e. it does not use active cooling:<br>1.Night time cooling (which could include the use of a high exposed thermal mass), 2.Ground coupled air cooling, 3.Displacement ventilation (not linked to any active cooling system) | A detailed passive design analysis has not been carried out for the scheme (Be Lean strategy).<br>It would require a very detailed analysis and the achievement of significant $CO_2$ emissions reduction based on passive design.<br><br>A free cooling strategy is not considered feasible for the scheme.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 2 | | | 2 | | ChapmanBDSP |
| | **Low and zero carbon technologies - Low zero carbon feasibility study**<br>**One credit** where:<br>7. A feasibility study has been carried out by the completion of the Concept Design stage (RIBA Stage 2 or equivalent) by an energy specialist (see Relevant definitions) to establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy source(s) for the building/development.<br>The LZC study should cover as a minimum:<br>1.Energy generated from LZC energy source per year, 2.Carbon dioxide savings from LZC energy source per year<br>3.Life cycle cost of the potential specification, accounting for payback, 4.Local planning criteria, including land use and noise<br>5.Feasibility of exporting heat/electricity from the system, 6.Any available grants<br>7.All technologies appropriate to the site and energy demand of the development, 8.Reasons for excluding other technologies<br>9.Where appropriate to the building type, connecting the proposed building to an existing local community CHP system or source of waste heat or power OR specifying a building/site CHP system or source of waste heat or power with the potential to export excess heat or power via a local community energy scheme.<br>8. A local LZC technology/technologies has/have been specified for the building/development in line with the recommendations of this feasibility study and this method of supply results in a meaningful reduction in regulated carbon dioxide ($CO_2$) emissions: The amount of energy or $CO_2$ emissions reduction is not specified in the criteria in this issue. However, it should not be a trivial amount. As a guide, the installation should contribute at least 5% of overall building energy demand and/or $CO_2$ emissions<br><br>Shell only building : All criteria relevant to the building type and function apply, subject to the following: The LZC feasibility study must be completed as part of the shell only design, based on the expected building use and loads specified in the design brief or, where these are not specified, for likely scenarios. The built form should allow for the future installation of the most cost effective LZC options. | A compliant Low and Zero Carbon feasibility study will be carried out as part of the energy strategy for the scheme.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | ChapmanBDSP |
| | | **Total - Energy:** | **16** | **7** | **0** | **4** | **5** | |
| | | **Credit value:** | **0.91%** | | | | | |
| **TRANSPORT** | | | | | | | | |
| **Tra 01 - Public Transport Accessibility** | **Three credits are available based on the Accessibility Index(AI) of the site** where:<br><br>1. The public transport Accessibility Index (AI) for the assessed building is calculated and BREEAM credits awarded in accordance with the BREEAM tables:<br>AI ≥ 2 : 1 credit, AI ≥ 4 : 2 credits, AI ≥ 8 : 3 credits, AI ≥ 10 : 4 credits, AI ≥ 12 : 5 credits<br>2. The Accessibility Index is determined by entering the following information in to the BREEAM Tra 01 calculator:<br>a. The distance (m) from the main building entrance to each compliant public transport node<br>b. The public transport type(s) serving the compliant node e.g. bus or rail<br>c. The average number of services stopping per hour at each compliant node during the operating hours of the building for a typical day . | The site is located in London city centre and close to numerous and frequent public transport nodes. The Public Transport Accessibility Index (AI) is 27.52. Five credits will therefore be achieved for the scheme.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 5 | 5 | | | | Steer Davies Gleave |

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| **Tra 02 - Proximity to Amenities** | **One credit:**<br>1. Where the building is located within close proximity (500m walking distance) of, and accessible to three ( retail) local amenities which are likely to be frequently required and used by building occupants.<br><br>**Core amenities:** Food outlet, Access to cash, Access to recreation/leisure facility for fitness/sports<br>**Other amenities:** Access to an outdoor space, publicly available postal facility, community facility, pharmacy, childcare or school<br><br>Two out of the three required amenities should be a core amenity. | The site is located in London city centre and close to numerous amenities. Credit will therefore be achieved.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | Steer Davies Gleave |
| **Tra 03 - Cyclist facilities** | **One credit - Cycle storage**<br>**Retail:** One per 10 staff; One per 20 public car parking spaces. This is subject to providing a minimum of 10 cycle customer space. Site with 50 cycle space will comply regardless of the number of car parking space.<br>sliding scale of compliance: 1-200 users @ 1; 201-300 users @ 1.5, 301-400 @ 2, 401+ @ 2.5.<br>The number of staff should be the maximum number using the building at any time/shift. The staff spaces must be provided in addition to customer spaces.<br><br>Requirements can be halved as the scheme is in a city centre with high public transport accessibility.<br><br>**One credit - Cyclist facilities (only for staff)**<br>2. Criterion 1 has been achieved.<br>3. At least two of the following types of compliant cyclist facilities have been provided for all staff (where appropriate) (see relevant definitions for the scope of each compliant cyclist facility):<br>a. Showers (one per 10 cycle racks - minimum of 2), b. Changing facilities, c. Lockers (number of lockers: number of cycle racks) , d. Drying spaces .<br><br>Compliant cyclist facilities (showers, changing areas etc.) can be provided in shell and core areas of the building as part of the base build. Alternatively, compliance can be demonstrated where the shell and core building is designed to facilitate future installation of the compliant number and type of cyclist facilities by the tenant/owner-occupier through the provision of an appropriately sized and dedicated space in the base building, including either the installation of the appropriate services (for showers) or infrastructure to allow the future installation of the relevant services e.g. capped water supply, service or ventilation ducts, drainage etc. | Compliant cycle space will not be provided for the retail area of the scheme due to the space constraints of this constricted site.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 2 | | | | 2 | Piercy & Co /Steer Davies Gleave |
| **Tra 05 - Travel Plan** | **One credit** where:<br>1. A travel plan has been developed as part of the feasibility and design stages.<br>2. A site specific travel assessment/statement has been undertaken to ensure the travel plan is structured to meet the needs of the particular site and covers the following (as a minimum):<br>a. Where relevant, existing travel patterns and opinions of existing building or site users towards cycling and walking so that constraints and opportunities can be identified.<br>b. Travel patterns and transport impact of future building users.<br>c. Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children)<br>d. Disabled access (accounting for varying levels of disability and visual impairment)<br>e. Public transport links serving the site<br>f. Current facilities for cyclists.<br>3. The travel plan includes a package of measures to encourage the use of sustainable modes of transport and movement of people and goods during the buildings operation and use.<br>4. If the occupier is known, they must be involved in the development of the travel plan and they must confirm that the travel plan will be implemented post construction and be supported by the buildings management in operation. | A compliant BREEAM travel plan will be developed for the scheme and its recommendation implemented.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | Steer Davies Gleave |
| | | **Total - Transport:** | **9** | **7** | **0** | **0** | **2** | |
| | | **Credit value:** | **1.28%** | | | | | |

| WATER | | | | | | | | |
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| **Wat 02 - Water monitoring** | **One credit** where:<br><br>1. The specification of a water meter on the mains water supply to each building; this includes instances where water is supplied via a borehole or other private source.<br>**Criterion 1 - Minimum standard for a Good, Very Good, Excellent and Outstanding ratings.**<br><br>2. Water-consuming plant or building areas, consuming 10% or more of the building's total water demand, are either fitted with easily accessible sub-meters or have water monitoring equipment integral to the plant or area .<br>As a minimum, this includes the following (where present):<br>2.On-sites with multiple units or buildings, e.g. shopping centres, industrial units, retail parks etc. separate sub meters are fitted on the water supply to the following areas (where present):Each individual unit supplied with water, Common areas (covering the supply to toilet blocks), Service areas (covering the supply to outlets within storage, delivery, waste disposal areas etc.), Ancillary/separate buildings to the main development with water supply.<br>3. Each meter (main and sub) has a pulsed or other open protocol communication output to enable connection to an appropriate utility monitoring and management system, e.g. a building management system (BMS), for the monitoring of water consumption<br>4. If the site on which the building is located has an existing BMS, managed by the same occupier/owner (as the new building), the pulsed/digital water meter(s) for the new building must be connected to the existing BMS. | Please note this credit is a minimum requirement for a 'Very Good' or and 'Excellent' rating.<br>A water meter with a pulsed output will be provided for the water supply of the building.<br>Water consuming plant or building areas that consume 10% of the schemes total demand will be fitted with sub-meters with a pulsed output.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | ChapmanBDSP |
| **Wat 03 - Water Leak Detection & Prevention** | **Leak detection system**<br>One credit where:<br><br>1. A leak detection system which is capable of detecting a major water leak on the mains water supply within the building and between the building and the utilities water meter is installed. The leak detection system must be:<br>a. A permanent automated water leak detection system that alerts the building occupants to the leak OR an in-built automated diagnostic procedure for detecting leaks is installed.<br>b. Activated 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.<br>c. Able to identify different flow and therefore leakage rates, e.g. continuous, high and/or low level, over set time periods.<br>d. Programmable to suit the owner/occupiers' water consumption criteria.<br>e. Where applicable, designed to avoid false alarms caused by normal operation of large water-consuming plant such as chillers. | A compliant major leak detection system will be installed for the scheme.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | ChapmanBDSP |
| **Wat 04 - Water Efficient Equipment** | **One credit** where:<br>1. The design team has identified all unregulated water demands that could be realistically mitigated or reduced.<br>2. System(s) or processes have been identified to reduce the unregulated water demand, and demonstrate, through either good practice design or specification, a meaningful reduction in the total water demand of the building.<br><br>Compliant water irrigation system:<br>- Drip-fed subsurface irrigation incorporating soil moisture sensors. The irrigation control will be zoned to permit variable irrigation to different planting assemblages.<br>- Reclaimed/recovered water from a rainwater collection or waste water recovery system, with appropriate storage, i.e. greywater collection from building functions or processes that use potable water, e.g. vehicle wash, training water in fire stations, sanitary facilities, irrigation etc.<br>- This will take into account the Government Buying Standards where appropriate to the building type.<br>- External landscaping and planting that relies solely on precipitation, during all seasons of the year.<br>- All planting specified is restricted to contextually appropriate species that thrive without irrigation and will continue to do so in those conditions likely as a result of climate change.<br><br>Shell only buildings:<br>Where the only unregulated water demand comes from an irrigation system specified/installed by the developer, then this system must be used for the purpose of assessing compliance.<br>Where no irrigation systems are specified, and therefore there are no unregulated water demands for the building, this issue can be awarded by default. | Most of the external landscaping and planting will be self-sufficient and rely on precipitation only following establishment. Irrigation will only be required at level 1 which is a sheltered space receiving less rainfall than other areas. For level 1 planting, a water efficient irrigation method based on drip-fed subsurface irrigation incorporating soil moisture sensors has been selected for the scheme.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | LUC/ ChapmanBDSP |
| | | **Total - Water:** | **3** | **3** | **0** | **0** | **0** | |
| | | **Credit value:** | **1.33%** | | | | | |

| MATERIALS | | | | | | | | |
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| **Mat 01 - Life cycle impacts** | **5 credits are available where the use of construction materials with a low environmental impact over the life cycle of the building is encouraged.**<br>Credits are awarded based on the areas and green guide to specification ratings of the different type of external walls, windows, roof, upper floor slab and floor finishes/coverings present in the development.<br><br>Life cycle Green House Gas emissions for each elements are also required to be reported based on a 60-year building life. Where data is not available, generic data from the online Green Guide for each element can be used. | At this stage of design it is not possible to assess the exact number of credits that can be achieved. However Piercy & Co will review the BRE Green Guide to Specification (www.thegreenguide.org.uk) and bear it in mind when considering materials selections for the main building fabric. Where possible the team will aim to use A and A+ rated materials as these have the lowest environmental impact.<br><br>At this stage, 3 credits are targeted for the scheme.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 5 | 3 | | 1 | 1 | Piercy & Co |
| **Mat 02 - Hard Landscaping/ Boundary Protections** | **One credit:**<br>1. Where at least 80% of all external hard landscaping and 80% of all boundary protection (by area) in the construction zone achieves an A or A+ rating, as defined in the Green Guide to Specification. Green Guide ratings for the specification(s) of each element can be found at www.thegreenguide.org.uk<br><br>If one of the elements is not present, e.g. boundary protection, then the credit must be assessed on the basis of the specification of the single element, e.g. hard landscaping. Where the development has neither element, the credit can be awarded.<br><br>Where there is hard landscaping or boundary protection which is to remain as existing, then, provided no more than 20% of the total area of the existing hard landscaping and boundary protection elements are subject to minor alterations, repair or maintenance, these elements can be awarded an A+ rating for the purposes of determining compliance with this issue. | Credit achieved by default as there is not hard landscaping areas nor boundary protection.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | LUC |
| **Mat 03 - Responsible sourcing of materials** | **Pre-requisite**<br>1. All timber and timber based products used on the project is ' Legally harvested and traded timber'<br>**Note:**<br>**a.It is a minimum requirement for achieving a BREEAM rating (for any rating level) that compliance with criterion 1 is confirmed.**<br>b. For other materials there are no pre-requisite requirements at this stage.<br><br>**One credit - Sustainable procurement plan**<br>2. The principal contractor sources materials for the project in accordance with a documented sustainable procurement plan<br><br>**Up to 3 credits** - Responsible sourcing of materials (RSM) are responsibly sourced in accordance with the BREEAM methodology.<br>18% RSM points achieved - 1 credit, 36% RSM points achieved - 2 credits, 54% RSM points achieved - 3 credits<br><br>**Location use categories:**<br>1.Ceiling (including ceiling finishes), 2.Door/window, 3.Floor (including floor finishes), 4.Insulation<br>5.Internal partition/internal walls (including finishes), 6.Roof (including roof finishes), 7.Structure, primary and secondary, 8.External wall ( e.g cladding, lining, render, including finishes ), 9.Building service, 10.Hard landscaping, 11.Other<br><br>**Material categories:**<br>1. Timber/ timber-based products (TBP), 2. Concrete/ cementitious (plaster, mortar, screed etc.)<br>3. Metal, 4. Stone/ aggregate, 5. Clay-based (pavers, blocks, bricks, roof tiles, etc.), 6. Gypsum, 7. Glass, 8. Plastic, polymer, resin, paint, chemicals and bituminous, 9. Animal fibre/skin, cellulose fibre, 10. Other. | All timber and timber based products used on the project will be ' Legally harvested and traded timber'.<br><br>The principal contractor will source materials for the project in accordance with a documented sustainable procurement plan.<br><br>The contractor should ensure that all construction materials and insulation products used for the scheme are sourced from manufacturers who hold certification for responsibly manufacturing their products. Ideally manufacturers will be accredited under BES 6001 (Cemex, Lafarge, Hanson Aggregates, Bardon Aggregates and Tarmac have achieved Excellent or Very Good accreditation). Those suppliers who have not achieved BES 6001 should be ISO 14001 accredited. As a minimum this will cover the manufacturing plant preferably this should also cover the extraction and processing of raw materials (e.g. Corus' ISO 14001 certificate covering their ore extraction, coke plants, blast furnaces and steel mills). All timber will be FSC or equivalent.<br><br>Three credits at this stage are targeted for the scheme.<br><br>These requirements will be included in the contractor prelims.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 4 | 2 | 1 | 1 | | Contractor/Piercy & Co / Conisbee |
| **Mat 04 - Insulation** | **Embodied impact**<br><br>**One credit** where:<br>1. Any new insulation specified for use within the following building elements must be assessed:<br>a. External walls, b. Ground floor, c. Roof, d. Building services.<br><br>2. The Insulation Index for the building fabric and services insulation is the same as or greater than 2.5.<br><br>If the insulation is incorporated as a component of an element that has been manufactured off-site (in order to maximise material optimisation), e.g. a wall or roof, and that element has been assessed as part of Mat 01, then for the purpose of assessing the insulation for this BREEAM issue, a Green Guide rating of A+ should be used. The same rule applies to insulation that has a significant additional function, such as providing supporting structure, e.g. structural insulated panels (SIPS). In the Green Guide, the actual insulation will be listed within the element title, rather than under the generic insulation category. | The design team will specify insulation materials that have a Green Guide A or A+ rating and that have very good R values. Details of the materials specification, area, thickness and length of insulation products will be required at detailed design stage to assess this credit fully.<br><br>These requirements will be included in the contractor prelims.<br><br>Green guide rating for insulation materials issued to the team by CBDSP.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | Piercy & Co / ChapmanBDSP / Conisbee / Contractor |

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| **Mat 05 - Designing for durability and resilience** | **Protecting vulnerable parts of the building from damage.One credit** where: 1. The building incorporates suitable durability and protection measures or designed features/solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements. This must include, but is not necessarily limited to:a. Protection from the effects of high pedestrian traffic in main entrances, public areas and 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. Protection against, or prevention from, any potential vehicular collision where vehicular parking and manoeuvring occurs within 1m of the external building façade for all car parking areas and within 2m for all delivery areas.Protecting exposed parts of the building from material degradation2. The relevant building elements incorporate appropriate design and specification measures to limit material degradation due to environmental factors. **Applicable building elements:** 1.Foundation/substructure/lowest floor/retaining walls, 2.External walls, 3.Roof/balconies, 4.Glazing: windows, skylight, 5.External doors, 6.Railings/balusters (where exposed to external environment), 7.Cladding (where exposed to external environment), 8.Staircase/ramps (where exposed to external environment), 9.Hard landscaping**Environmental factors:** 1.Environmental agents, including:a.Solar radiation, b.Temperature variation, c.Water/moisture, d.Wind, e.Precipitation, e.g. rain and snow, f.Extreme weather conditions: high wind speeds, flooding, driving rain, snow,2. Biological agents, including:a.Vegetation, b.Pests, insects, c.Pollutants, including:d.Air contaminants, e.Ground contaminants**Material degradation effects** (includes, but not necessarily limited to the following): 1.Corrosion, 2.Dimensional change, e.g. swelling or shrinkage, 3.Fading/discolouration, 4.Rotting, 5.Leaching, 6.Blistering, 7.Melting, 8.Salt crystallisation, 9.Abrasion | The scheme will include measures to ensure the building is resistant to damage. Measures should include where relevant, bollards and barriers to loading bays and delivery points, hard finishes to loading bays, service corridors and plant areas and corner protection, kick plates and skirting where appropriate.A study detailing the measures implemented to limit material degradation due to environmental factors is carried out for the scheme in line with BREEAM requirements. CBDSP to issue detailed credit requirement.**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | 1 | | | Piercy & Co /Landscape Architect /Conisbee |
| **Mat 06 - Material Efficiency** | **One credit** where:<br>1. Opportunities have been identified, and appropriate measures investigated and implemented, to optimise the use of materials in building design, procurement, construction, maintenance and end of life<br>2. The above is carried out by the design/construction team in consultation with the relevant parties at each of the following RIBA stages: a. Preparation and Brief, b. Concept Design, c. Developed Design, d. Technical Design, e. Construction.<br><br>All parties (as relevant to the project stage) involved in the design, specification and/or construction of the building should be consulted. This includes but is not limited to the following:<br>1.Client/developer, 2.Cost consultant, 3.Architect, 4.Structural/civil engineers, 5.Building services engineers - mechanical, electrical, 6.Principal contractor, 7.Demolition/strip-out contractor, 8.Environmental consultant, 9.Project management consultant, 10.Materials/component manufacturers/suppliers. | This credit is considered too challenging for the scheme. Please note it should have been carried out during RIBA stage 1.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | | | 1 | Piercy & Co / All |
| | | **Total - Materials:** | **13** | **7** | **2** | **2** | **2** | |
| | | **Credit value:** | **1.35%** | | | | | |
| **WASTE** | | | | | | | | |
| **Wst 01 - Construction Waste Management** | One credit required for an Outstanding rating.<br>Construction resource efficiency<br>Up to three credits<br>1. Where a Resource Management Plan (RMP) has been developed covering the non-hazardous waste related to on-site construction and dedicated off-site manufacture or fabrication (including demolition and excavation waste) generated by the building's design and construction.<br>2. Where construction waste related to on-site construction and dedicated off-site manufacture/fabrication (excluding demolition and excavation waste) meets or is lower than the following:<br>1 credit - ≤ 13.3 $m^3$/100 GIA or ≤ 11.1 tonnes/100 $m^2$ GIA;<br>2 credits - ≤ 7.5 $m^3$/100 GIA or ≤ 6.5 tonnes/100 $m^2$ GIA;<br>3 credits - ≤ 3.4 $m^3$/100 GIA or ≤ 3.2 tonnes/100 $m^2$ GIA.<br><br>3. Where existing buildings on the site will be demolished a pre-demolition audit of any existing buildings, structures or hard surfaces is completed to determine if, in the case of demolition, refurbishment/reuse is feasible and, if not, to maximise the recovery of material from demolition for subsequent high grade/value applications. The audit must be referenced in the RMP and cover:<br>a. Identification of the key refurbishment/demolition materials. b. Potential applications and any related issues for the reuse and recycling of the key refurbishment and demolition materials in accordance with the waste hierarchy.<br><br>Diversion of resources from landfill<br>One credit where: 4. The following percentages of non-hazardous construction (on-site and off-site manufacture/fabrication in a dedicated facility), demolition an waste (where applicable) generated by the project have been diverted from landfill:<br>Demolition waste: 80% by volume or 90% by weight; Non-demolition waste: 70% by volume or 80% by weight;<br>5. Waste materials will be sorted into separate key waste groups (according to the waste streams generated by the scope of the works) either on-site or through a licensed contractor for recovery. | A compliant Resource Management Plan (RMP) will be developed for the site. Limits will be placed on the amount of construction waste that is produced by the contractor, and that obligations on construction waste recycling are set. Options for off-site fabrication will be proposed and the use of standardised materials be considered.<br><br>The limits will be set to <3.4$m^3$ or <3.2 tonnes of construction waste per 100$m^2$ GIA and a recycling rate of 80% by weight or 70% by volume for construction waste (and a recycling rate of 90% by weight or 80% by volume for demolition waste).<br><br>Where existing buildings on the site will be demolished a pre-demolition audit of any existing buildings, structures or hard surfaces is completed to determine if, in the case of demolition, refurbishment/reuse is feasible and, if not, to maximise the recovery of material from demolition for subsequent high grade/value applications.<br><br>Requirements will be included in the contractor prelims.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 4 | 2 | 2 | | | Contractor/Piercy & Co |

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| | **Resource Management Plan (RMP)**<br>The aim of the RMP is to promote resource efficiency and to prevent illegal waste activities. Resource efficiency includes minimising waste at source and ensuring that clients, designers and principal contractors assess the use, reuse and recycling of materials and products on and off the site.<br>A compliant RMP is one that defines:<br>1.A target benchmark for resource efficiency, i.e. m3of waste per 100m² or tonnes of waste per 100m².<br>2. Procedures and commitments for minimising non-hazardous waste in line with the target benchmark<br>3.Procedures for minimising hazardous waste<br>4.A waste minimisation target and details of waste minimisation actions to be undertaken<br>5.Procedures for estimating, monitoring, measuring and reporting hazardous and non-hazardous site waste. If waste data is obtained from licensed external waste contractors, the data needs to be reliable and verifiable, e.g. by using data from EA/SEPA/EA Wales/NIEA Waste Return Forms<br>6.Procedures for sorting, reusing and recycling construction waste into defined waste groups (see additional guidance section), either on-site or through a licensed external contractor<br>7.Procedures for reviewing and updating the plan<br>8.The name or job title of the individual responsible for implementing the above.A Site Waste Management Plan is a form of Resource Management Plan and for BREEAM should be written in line with best practice:. Best practice is a combination of commitments to:<br>1.Design out waste (materials optimisation), 2.Reduce waste generated on site, 3.Develop and implement procedures to sort and reuse/recycle construction and demolition waste on-site and off-site (as applicable), 4.Follow guidance from: Defra (Department of Environment, Food and Rural Affairs), BRE (Building Research Establishment Ltd), WRAP (Waste and Resources Action Programme), Welsh Government. | | | | | | | |
| **Wst 02 - Recycled Aggregates** | **Recycled aggregates**<br>**One credit** where:<br>1. The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the following minimum % levels (by weight or volume) to contribute to the total amount of recycled or secondary aggregate: 15% structural frame, 30% bitumen or hydraulically bound base, 20% building foundations, 15% concrete road surfaces, 100% pipe bedding, 100% granular fill and capping.<br><br>2. The total amount of recycled or secondary aggregate specified, and meeting criterion 1, is greater than 25% (by weight or volume) of the total high grade aggregate specified for the development. Where the minimum level in criterion 1 is not met for an application, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified.<br>3.The recycled or secondary aggregates are EITHER:<br>a.Construction, demolition and excavation waste obtained on-site or off-site OR b. Secondary aggregates obtained from a non-construction post-consumer industrial by product source. | This credit is currently considered challenging for the scheme.<br>Structural engineer should however confirm whether this credit may be achievable.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | | 1 | | Conisbee/Piercy & Co/ Contractor |
| **Wst 03 - Operational Waste** | Credit required for Excellent and Outstanding ratings. **Operational wasteOne credit** where: 1. Dedicated space(s) is provided for the segregation and storage of operational recyclable waste volumes generated by the assessed building/unit, its occupant(s) and activities. This space must be:a. Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streamsb. Accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractorsc. Of a capacity appropriate to the building type, size, number of units (if relevant) and predicted volumes of waste that will arise from daily/weekly operational activities and occupancy rates.2. Where the consistent generation in volume of the appropriate operational waste streams is likely to exist, e.g. large amounts of packaging or compostable waste generated by the building's use and operation, the following facilities are provided:a. Static waste compactor(s) or baler(s); situated in a service area or dedicated waste management space.b. Vessel(s) for composting suitable organic waste resulting from the building's daily operation and use; OR adequate space(s) for storing segregated food waste and compostable organic material prior to collection and delivery to an alternative composting facility.c. Where organic waste is to be stored/composted on-site, a water outlet is provided adjacent to or within the facility for cleaning and hygiene purposes. | This credit will be achieved for the scheme. Please note it is a minimum requirement for an Excellent rating. Compost bins are not expected to be required, as there will not be a significant amount of organic waste.<br><br>steer davies gleave report confirms that the commercial waste storage provision (2 x general waste bins, 2 x recyclables bins and 1 x organic waste bin) will be situated in a dedicated commercial bin store at the south-west corner of the Site, adjacent to the primary residential bin store, and accessed from Adelaide Road<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | Piercy & Co / Client/Steer davies gleave |
| **Wst 05 - Adaptation to Climate Change** | **Adaptation to climate change – structural and fabric resilience**<br>**One credit** where:<br>1. Conduct a climate change adaptation strategy appraisal for structural and fabric resilience by the end of Concept Design (RIBA Stage 2 or equivalent), in accordance with the following approach:<br>a. Carry out a systematic (structural and fabric resilience specific) 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 - See detailed guidance on each topics. | This credit is considered too challenging for the scheme.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | | | 1 | Piercy & Co /Conisbee |
| **Wst 06 - Functional Adaptability** | **Functional adaptability**<br>**One credit** where:<br>1. A building-specific functional adaptation strategy study has been undertaken by the client and design team by Concept Design (RIBA Stage 2 or equivalent), which includes recommendations for measures to be incorporated to facilitate future adaptation.<br>2. Functional adaptation measures have been implemented (RIBA Stage 4 or equivalent) in accordance with the functional adaptation strategy recommendations, where practical and cost effective. Omissions have been justified in writing to the assessor. | This credit is considered too challenging for the scheme.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | | | 1 | Piercy & Co /Conisbee |
| | | **Total - Waste:** | **8** | **3** | **2** | **1** | **2** | |

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| | | **Credit value:** | **1.38%** | | | | | | |
| **LAND USE & ECOLOGY** | | | | | | | | | |
| **LE 01 - Site Selection** | **Previously developed land**<br>**1 credit** where:<br><br>1. At least 75% of the proposed development's footprint is on an area of land which has previously been occupied by industrial, commercial or domestic buildings or fixed surface infrastructure. | The site is almost completely reused, this credit is therefore expected to be achieved.<br><br>**Confirmed at BREEAM workshop of 16/02/2016 and following review of the BREEAM Ecology report (April 2016).** | 1 | 1 | | | | Piercy & Co |
| | **Contaminated land**<br>**One credit** where:<br>2. A contaminated land specialist's site investigation, risk assessment and appraisal has deemed land within the site to be affected by contamination. The site investigation, risk assessment and appraisal have identified:<br>a. The degree of contamination<br>b. The contaminant sources/types<br>c. The options for remediating sources of contamination which present an unacceptable risk.<br>3. The client or principal contractor confirms that remediation of the site will be carried out in accordance with the remediation strategy and its implementation plan as recommended by the contaminated land specialist.<br><br>Where the only remediation required is the removal of asbestos within an existing building fabric, the site cannot be classified as contaminated land. However, where asbestos is found to be present in the ground this will be classed as contamination for the purposes of assessing this issue. | Contamination has been found on the ground and a suitable remediation strategy will be implemented for the scheme. Credit targeted for the scheme.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | 1 | | | Conisbee |
| **LE 02 - Ecological value of site and protection of ecological features** | **One credit - Ecological value of site**<br>**One credit** where:<br>1. Land within the assessment zone is defined as 'land of low ecological value' using either:<br>a. The BREEAM checklist for defining land of low ecological value;<br>OR b. A Suitably Qualified Ecologist (SQE) who has identified the land as being of 'low ecological value' within an ecological assessment report, based on a site survey<br><br>**Protection of ecological features**<br>**One credit** where:<br>2. All existing features of ecological value within and surrounding the construction zone and site boundary area are adequately protected from damage during clearance, site preparation and construction activities in line with BS42020: 2013<br>3. In all cases, the principal contractor is required to construct ecological protection recommended by the SQE, prior to any preliminary site construction or preparation works (e.g. clearing of the site or erection of temporary site facilities).<br><br>For sites cleared prior to purchase of the site and less than five years before assessment, a Suitably Qualified Ecologist should estimate the site's ecological value immediately prior to clearance using available desktop information (including aerial photography) and the landscape type/area surrounding the site. Where it is not possible for the ecologists to determine that the site was of low ecological value prior to the site clearance then the credits must be withheld, i.e. where there is no evidence and therefore justification for awarding the credits. For sites cleared more than five years ago, the ecological value of the site is to be based on the current situation on the basis that within five years, ecological features would have started to re-establish themselves and therefore act as an indicator of the site's ecological value. | A Suitably Qualified Ecologist (SQE) has been appointed as part of the development to assess the current ecological value of the site and make recommendations for the protection and enhancement of the site and on-site actions during construction to protect features of ecological value, in line with BREEAM, Camden's Development Policy DP22: 'Promoting Sustainable Design and Construction' and Camden CPG 3 –Section 13. The investigation will include a desktop study, site survey and protected species search.<br><br>The existing site is almost entirely covered by the existing building with associated hardstanding and a small area of butterfly-bush located in the north west of the site. Due to its small size, this area is deemed to have low ecological value.<br><br>The ecologist has been providing as part of his ecological assessment recommended suitable protection measures such as protection of the trees outside the site along the northwest boundary, demolition to be undertaken outside the bird nesting season, bat specific recommendations. The contractor is also required to construct ecological protection prior to any preliminary or preparation works on site.<br><br>The implementation of the ecologist's recommendation will lead to the award of one credit.<br><br>**Confirmed at BREEAM workshop of 16/02/2016 and following review of the BREEAM Ecology report (April 2016).** | 2 | 2 | | | | Middlemarch / Contractor |

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| **LE 03 - Minimising Impact on Existing Site Ecology** | **Credit required for Very Good, Excellent and Outstanding ratings.**<br>**Change in ecological value 1 - Two credits** where:<br>1. The change in ecological value of the site is equal to or greater than zero plant species, i.e. no negative change, using the methods outlined in either (a) or (b) below:<br>a. Determine the following information and input this data in to the BREEAM LE 03/LE 04 calculator:<br>i. The broad habitat type(s) that define the landscape of the assessed site in its existing pre-developed state and proposed state<br>ii. Area (m2 ) of the existing and proposed broad habitat types.<br>OR<br>b. Where a Suitably Qualified Ecologist (SQE) has been appointed and, based on their site survey, they confirm the following and either the assessor or ecologist inputs this data in to the BREEAM LE 03/LE 04 calculator:<br>i. The broad habitat types that define the landscape of the assessed site in its existing pre-developed state and proposed state.<br>ii. Area (m 2 ) of the existing and proposed broad habitat plot types.<br>iii. Average total taxon (plant species) richness within each habitat type.<br><br>**Change in ecological value 2 - One credit** where:<br>2. 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, use the methods outlined in either 1(a) or (b) above.<br><br>The contribution of plant species on a green roof can only be incorporated within the calculation where a Suitably Qualified Ecologist has been appointed to advise on suitable plant species for the roof.<br>Presently green walls cannot be considered compliant within this BREEAM issue due to concerns over high maintenance requirements which are often not self-supporting/sustainable, resulting in deterioration of these plants. If the assessor feels that the green wall specified meets the aims of this issue and will be self-sustaining, details can be sent to BRE Global for consideration. Ground planted plants trained up a framework supported by the building would be acceptable (confirmed by the SQE) as these are not so dependent on systems and maintenance. | The change of ecological value of the site has been calculated by the ecologist based on the implementation of her recommendations within the landscaping proposal -it is positive allowing the award of two credits.<br><br>**Confirmed at BREEAM workshop of 16/02/2016 and following review of the BREEAM Ecology report (April 2016).** | 2 | 2 | | | | Middlemarch / LUC |
| **LE 04 - Enhancing Site Ecology** | **Ecologist's report and recommendations One credit** 1.A suitably qualified ecologist (SQE) has been appointed by the client or their project representative by the end of the Preparation and Brief stage (RIBA Stage 1 or equivalent) to advise on enhancing the ecology of the site at an early stage.2. The SQE has provided an Ecology Report with appropriate recommendations for the enhancement of the site's ecology at Concept Design stage (RIBA Stage 2 or equivalent). The report is based on a site visit/survey by the SQE3. The early stage advice and recommendations of the Ecology Report for the enhancement of site ecology have been, or will be, implemented in the final design and build.**Increase in ecological value One credit** 4. The criteria of the first credit are met.5. The recommendations of the Ecology Report for the enhancement of site ecology have been implemented in the final design and build, and the SQE confirms that this will result in an increase in ecological value of the site, with an increase of six plant species or greater .6.The increase in plant species has been calculated using the BREEAM LE 03/LE 04 calculator, using actual plant species numbers.The role of the SQE during the Preparation and Brief stage (RIBA Stage 1 or equivalent) will be to advise on early stage site layout and development density decisions so that opportunities to enhance site ecology are maximised. SQE involvement at the Concept Design stage (RIBA Stage 2 or equivalent) will be necessary to provide more detailed ecological recommendations (see Definitions) based on the outline design.The suitably qualified ecologist must carry out site surveys of existing site ecology, on which their report is based (or to provide verification where the report is prepared by others) at the Concept Design stage (RIBA Stage 2 or equivalent) in order to facilitate and maximise potential ecological enhancement. | The ecologist has been providing as part of his ecological assessment recommended suitable protection measures such as protection of the trees outside the site along the northwest boundary, demolition to be undertaken outside the bird nesting season, bat specific recommendations. The contractor is also required to construct ecological protection prior to any preliminary or preparation works on site.<br><br>The ecologist has also provided recommendations for ecological enhancement which will be implemented for the scheme:<br><br>• Good horticultural practice;<br>• Provision of a green roofs;<br>• Shrub planting;<br>• Tree planting;<br>• Bird boxes;<br>• Planting for bees.<br><br>The implementation of the recommended measures will lead to a positive change of ecological value of the site.<br>Two credits will therefore be awarded for the scheme.<br>**Confirmed at BREEAM workshop of 16/02/2016 and following review of the BREEAM Ecology report (April 2016).** | 2 | 1 | | 1 | | Middlemarch / LUC |
| **LE 05 - Long Term Impact on Biodiversity** | **Up to two credits**<br>1. Where a Suitably Qualified Ecologist (SQE) is appointed prior to commencement of activities on-site and they confirm that all relevant UK and EU legislation relating to the protection and enhancement of ecology has been complied with during the design and construction process.<br>2. Where a landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion in accordance with BS 42020:2013 Section 11.1. This is to be handed over to the building owner/occupants for use by the grounds maintenance staff<br><br>**3. Where additional measures to improve the assessed site's long term biodiversity are adopted, where 2-4 additional requirements,1- 2 credits may be awarded respectively.**<br>**Additional requirements:**<br>a) Nominate a 'Biodiversity Champion' with the authority to influence site activities;<br>b) Train all a personnel on how to protect site ecology;<br>c) Records actions taken to protect biodiversity;<br>d) Ecologically valuable habitats to be created that contribute to local biodiversity action plan targets;<br>e) Works conducted at times to minimise ecological disturbance. | The relevant UK and EU legislation regarding roosting bats and nesting birds will be adhered to by the client who will also hand a five year ecological management plan developed by Middlemarch Environmental Ltd for the scheme. The contractors will be required to minimise the ecological impact of construction activities. The following measures will be implemented:<br><br>• Nominate a 'Biodiversity Champion' with the authority to influence site activities;<br>• Train all a personnel on how to protect site ecology;<br>• Records actions taken to protect biodiversity;<br>• Works conducted at times to minimise ecological disturbance.<br><br>**Confirmed at BREEAM workshop of 16/02/2016 and following review of the BREEAM Ecology report (April 2016).** | 2 | 2 | | | | Middlemarch / LUC/ Contractor / Client |
| | | **Total Land Use & Ecology:** | **10** | **8** | **1** | **1** | **0** | |
| | | Credit value: | **1.30%** | | | | | |

| POLLUTION | | | | | | | | |
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| Pol 03 - Surface water run off | **Two credits - Low flood risk**<br>1. Where a site-specific flood risk assessment (FRA) confirms the development is situated in a flood zone that is defined as having a low annual probability of flooding (in accordance with current best practice national planning guidance). The FRA must take all current and future sources of flooding into consideration.<br><br>One credit - Medium/high flood risk<br>2. Where a site-specific FRA confirms the development is situated in a flood zone that is defined as having a medium or high annual probability of flooding and is not in a functional floodplain (in accordance with current best practice national planning guidance). The FRA must take all current and future sources of flooding into consideration.<br>3. To increase the resilience and resistance of the development to flooding, one of the following must be achieved:<br>a. The ground level of the building and access to both the building and the site, are designed (or zoned) so they are at least 600mm above the design flood level of the flood zone in which the assessed development is located.<br>OR<br>b.The final design of the building and the wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach outlined in section 5 of BS 8533:2011. | Conisbee Flood Risk Assessment confirms that: The site is located in Flood Zone 1, both this Flood Risk Assessment and the SFRA have also been found this site to be a low risk from flood from all other sources.<br>**Confirmed at BREEAM workshop of 16/02/2016 and following review of the FRA (April 2016).** | 2 | 2 | | | | Conisbee |
| | **Surface water run off**<br>Pre-requisite<br>4. An Appropriate Consultant is appointed to carry out, demonstrate and/or confirm the development's compliance with the following criteria: Surface water run-off - volume, attenuation, and/or limiting discharge.<br>One credit where:<br>5. Where drainage measures are specified to ensure that the peak rate of run-off from the site to the watercourses (natural or municipal) is no greater for the developed site than it was for the pre-development site. This should comply at the 1-year and 100-year return period events.<br>6. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place.<br>7. Calculations include an allowance for climate change; this should be made in accordance with current best practice planning guidance.<br>One credit<br>8. Where flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance); AND<br>EITHER<br>9. Drainage design measures are specified to ensure that the post development run-off volume, over the development lifetime, is no greater than it would have been prior to the assessed site's development for the 100-year 6-hour event, including an allowance for climate change (see criterion 14).<br>10. Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other Sustainable Drainage System (SuDS) techniques.OR (only where criteria 9 and 10 for this credit cannot be achieved):<br>11. Justification from the Appropriate Consultant indicating why the above criteria cannot be achieved, i.e. where infiltration or other SuDS techniques are not technically viable options.<br>12. Drainage design measures are specified to ensure that the post development peak rate of run-off is reduced to the limiting discharge. The limiting discharge is defined as the highest flow rate from the following options:<br>a. The pre-development 1-year peak flow rate; OR b. The mean annual flow rate Qbar; OR c. 2L/s/ha.<br>13. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place.<br>14. For either option, above calculations must include an allowance for climate change; this should be made in accordance with current best practice planning guidance. | The peak rate of runoff from the site to the sewer is no greater for the developed site than it was for the pre-development site. Attenuation up to and including 1 in 100 year plus 30% climate change storm even for the site will be provided and the discharge rate will be 50% of the current discharge rate. The attenuation will consist of underground modular storage units together with blue/green roofs and hydro-brake flow control units<br><br>Flooding of property will not occur in the event of local drainage system failure. The volumetric runoff generated by the proposed development will be equal to that from the predevelopment.<br>There is no change of impermeable areas for the site pre and post development.<br><br>**Confirmed at BREEAM workshop of 16/02/2016 and following review of the FRA (April 2016).** | 2 | 2 | | | | Conisbee |
| | **Minimising watercourse pollution**<br>**One credit** where:<br>15. There is no discharge from the developed site for rainfall up to 5mm.<br>16. In areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques.<br>17. Where there is a high risk of contamination or spillage of substances such as petrol and oil (an area that presents a risk of watercourse pollution includes vehicle manoeuvring areas, car parks, waste disposal facilities, delivery and storage facilities or plant areas.), separators (or an equivalent system) are installed in surface water drainage systems.<br>18. Where the building has chemical/liquid gas storage areas, a means of containment is fitted to the site drainage system (i.e. shut-off valves) to prevent the escape of chemicals to natural watercourses (in the event of a spillage or bunding failure).<br>19. All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as Pollution Prevention Guideline 3 (PPG 3) and/or where applicable the SUDS manual. For areas where vehicle washing will be taking place, pollution prevention systems must be in accordance with Pollution Prevention Guidelines 13<br>20.A comprehensive and up-to date drainage plan of the site will be made available for the building/site occupiers.<br>21.Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place.<br>22.Where present, all external storage and delivery areas designed and detailed in accordance with the current best practice planning guidance. | The site is car-free, therefore with a low risk of watercourse pollution and an appropriate level of pollution prevention treatment is provided. Blue/Green roofs provide treatment for the water by filtration for all the rainfall on the roofs of the building, other treatment is provided by trapped gullies and catchpits.<br><br>This credit is however not expected to be achieved due to the requirement for no discharge from the developed site for rainfall up to 5mm, which is considered challenging in London.<br><br>**Confirmed at BREEAM workshop of 16/02/2016 and followjng review of the FRA (April 2016).** | 1 | | | | 1 | Conisbee |

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| **Pol 04 - Reduction of night time light pollution** | **One credit**<br>1. Where 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.<br>OR alternatively, where the building does have external lighting, one credit can be awarded as follows:<br>2. The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the ILP Guidance notes for the reduction of obtrusive light, 2011<br>3.All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00.<br>4.If 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.<br>5.Illuminated advertisements, where specified, must be designed in compliance with ILE Technical Report 5 – The Brightness of Illuminated Advertisements. | The external lighting will be designed to comply with the ILE Guidance Notes on the reduction of obtrusive light and will be provided with daylight and timer control.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | 1 | | | | ChapmanBDSP |
| | | **Total - Pollution:** | **6** | **5** | **0** | **0** | **1** | |
| | | **Credit value:** | **1.00%** | | | | | |
| **INNOVATION** | | | | | | | | |
| **Man 03 - Responsible construction practices** | **One innovation credit**<br><br>6. Where the principal contractor has used a 'compliant' organisational, local or national considerate construction scheme and their performance against the scheme has been confirmed by independent assessment and verification.The BREEAM credits can be awarded as follows:<br>a. where the contractor achieves compliance with the criteria of the compliant scheme to an exemplary level of practice. (a CCS score of 40 or more) – A score of at least 7 in each of the five sections must be achieved<br><br>At the final stage of the BREEAM assessment, the number of BREEAM credits awarded should therefore be based on the final visit and the subsequent Monitor's report and certified CCS score. | The contractor will be required to achieve a CCS score of ≥40 points.<br><br>This requirement will be included in the contractor prelims.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | 1 | | | Contractor |
| **Hea 01 - Visual Comfort** | **One innovation credit**<br>**Daylighting**<br>**Sales areas: 50% of sales area achieves a minimum point daylight factor of 2%.**<br><br>80% relevant area meet 4% DF<br>and (a) or (c)<br>(a) A uniformity ratio of at least 0.3 or a minimum point daylight factor of at least 1.6%. (2.8% for space with glazed roofs, such as atria) | Exemplary requirements considered too challenging for the scheme. Levels of daylight required are not achievable for the scheme.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | | | 1 | Piercy & Co / Daylighting consultant |
| **Ene 01 - Reduction in $CO_2$ emissions** | **Up to four innovation credits - Zero regulated carbon**<br>2. The building achieves an EPRNC≥ 0.9 and zero net regulated CO2 emissions .<br>3. An equivalent percentage of the buildings modelled 'regulated' operational energy consumption, as stipulated in Table - 26, is generated by carbon neutral on-site or near-site sources and used to meet energy demand from 'unregulated' building systems or processes.<br>Table 26: 10% ( 1 credit), 20% ( 2 credits), 50% (3 credits), 80% (4 credits), > 100% + un-regulated energy ( 5 credits) )<br>**Five innovation credits - Carbon negative**<br>4. The building is 'carbon negative' in terms of its total modelled operational energy consumption, including regulated and unregulated energy. | Exemplary requirements considered too challenging for the scheme. Innovation credits would require the scheme to be carbon negative which is not feasible for this scheme due to the constraints of the existing building and constraints of this constricted site.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 5 | | | | 5 | ChapmanBDSP /Piercy & Co/ Client |
| **Mat 01 - Life cycle impacts** | The following outlines the two exemplary level routes available to achieve **up to three innovation credits** for this BREEAM issue.<br>**Route 1: Using the Green Guide to Specification (elemental approach) - one credit**<br>4.Where assessing four or more applicable building elements, the building achieves at least two points in addition to the total points required to achieve maximum credits under the standard BREEAM criteria (as outlined in the table above) OR<br>5.Where assessing fewer than four applicable building elements, the building achieves at least one point in addition to the total points required to achieve maximum credits under the standard BREEAM criteria.<br>Where the assessed building does not specify an element listed above, regarding the exemplary level benchmark.<br>**Route 2: Using compliant life cycle assessment software tools (whole building approach) - two credits**<br>6.Where the design team has used an IMPACT compliant software tool (or equivalent) to measure the environmental impact of the building.<br>7.Where the design team can demonstrate how the use of an IMPACT compliant software (or equivalent) has benefited the building in terms of measuring and reducing its environmental impact.<br>8.Where the design team submit the building information model (BIM) from the IMPACT compliant software tool (or equivalent) for the assessed building to BRE Global (via the project's appointed BREEAM Assessor).<br><br>Please note a project can achieve all three innovation credits where it is complying with exemplary level criteria 4 to 8, i.e. one route is not necessarily exclusive of the other: a project can comply with both routes 1 and 2 or choose to comply with only route 1 or only route 2. | Exemplary requirements considered too challenging for the scheme. These credits will require confirmation that all materials will be A/A+ rated which is not considered feasible at this stage of the scheme. Please see notes for Mat 01 credit in the material section.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 3 | | | | 3 | Piercy & Co |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Mat 03 - Responsible sourcing of materials** | **One innovation credit where** Responsible sourcing of materials (RSM) points calculated in accordance with the BREEAM methodology is higher than 70%. | Exemplary requirements considered too challenging for the scheme. These credits will require confirmation that a majority of the materials specified for the scheme are sourced from manufacturers and suppliers holding the best tier of environmental certification, which is not considered feasible at this stage of the scheme. Please see notes for Mat 03 credit in the material section.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | | | 1 | Contractor |
| **Wst 01 - Construction Waste Management** | **One innovation credit** where:<br>6. Non-hazardous construction waste generated by the building's design and on-site construction and off-site manufacture or fabrication (excluding demolition and excavation waste) is no greater than the exemplary level resource efficiency benchmark : ≤ 1.6 m3/100 GIA or ≤ 1.9 tonnes/100 m2 GIA.<br>7.The percentage of non-hazardous construction (on-site and dedicated off-site manufacture/fabrication), demolition and excavation waste (if relevant) diverted from landfill meets or exceeds the exemplary level percentage benchmark:<br>Non demolition: 85% by volume, 90% by weight; Demolition: 85% by volume, 95% by weight; Excavation: 95% by volume, 95% by weight.<br>8. All key waste groups are identified for diversion from landfill in the RMP. | Exemplary requirements considered too challenging for the scheme. This credit would require the achievement of the exemplary levels of resource efficiency benchmarks which is not considered feasible for this scheme based on contractor's experience of similar scheme. Please see notes for Wst 01 credit in the waste section.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | | | 1 | Contractor |
| **Wst 02 - Recycled aggregates** | **One innovation credit** where:<br><br>4.The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the exemplary minimum levels (by weight or volume), as defined in the table above. Where this minimum level is not met, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified.<br>5.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. Where the minimum level in criterion 1 is not met for an application, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified.<br>6.The contributing secondary aggregate must not be transported more than 30 km by road transport. | Exemplary requirements considered too challenging for the scheme. Levels required of recycled aggregates cannot be practically achieved for the scheme due to the structural requirement of the buildings. Please see notes for Wst 02 credit in the waste section.<br><br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | | | 1 | Contractor |
| **Wst 05 - Adaptation to Climate Change** | A holistic approach to the design and construction of the current building's life cycle, to mitigate against the impacts of climate change, is represented by the achievement of these criteria.2.Achievement of the Structural and fabric resilience criterion in this issue and the following criteria points or credits: Hea 04 Thermal comfort (Link to Wst 05 issue:- to preventing increasing risks of overheating), Criterion 6 in the second credit of the Hea 04 issue has been achieved.Ene 01 Reduction of energy use and carbon emissions, (Link to Wst 05 issue: to maximise energy efficiency contributing to low carbon emissions resulting from increasing energy demands), At least eight credits in this issue have been achieved.Ene 04 Low carbon design, (Link to Wst 05 issue: to maximise opportunities to avoid unnecessary carbon emissions), The Passive design analysis credit in this issue has been achieved.Wat 01 Water consumption, (Link to Wst 05: to minimise water demands in periods of drought), A minimum of three credits in this issue have been achieved.Mat 05 Designing for durability and resilience, (Link to Wst 05 issue: to avoid increased risks of deterioration and higher maintenance demands), Criterion 2 relating to material degradation in this issue has been achieved.Pol 03 Surface water run-off, (Link to Wst 05: to minimise the risks of increased flood risk and surface water run-off affecting the site or others), Flood risk – a minimum of one credit has been achieved. Surface water run-off – two credits have been achieved | Exemplary requirements considered too challenging for the scheme. This credit will require among other things, the achievement of credits Ene 04 - Passive design analysis and Mat 05 -Designing for durability and resilience which are not targeted for the scheme. Please see notes for Ene 04 and Mat 05 in the energy and material sections respectively. **Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | | | 1 | Piercy & Co/Chapman BDSP/Conisbee |
| **Approved Innovation** | | No approved innovation is proposed for the scheme<br>**Confirmed at BREEAM workshop of 16/02/2016.** | 1 | | | | 1 | All |
| | | **Total - Innovation - Maximum credit: 10** | **10** | **0** | **1** | **0** | **9** | |
| | | **Credit value:** | **1.00%** | | | | | |
| | | | | **59.07** | **72.92** | **82.75** | **110.00** | |
| | | | | **Very Good** | **Excellent** | **Outstanding** | **Outstanding** | |

## 6.2 APPENDIX B – MIDDLEMARCH ENVIRONMENTAL LTD– BREEAM ECOLOGY REPORT

# 5-17 HAVERSTOCK HILL, CAMDEN, LONDON

# ECOLOGICAL ASSESSMENT
# BREEAM NEW CONSTRUCTION 2014

A Report to: Cambridge Gate Properties

Report No: RT-MME-122009-01

Date: April 2016

MIDDLEMARCH ENVIRONMENTAL

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## REPORT VERIFICATION AND DECLARATION OF COMPLIANCE

This study has been undertaken in accordance with British Standard 42020:2013 "Biodiversity, Code of practice for planning and development".

| Report Version | Date | Completed by: | Checked by: | Approved by: |
|---|---|---|---|---|
| Final | 12/04/2016 | Paul Roebuck MSc MCIEEM (Senior Ecological Consultant), Sophie Moy MSc (Ecological Project Officer) and Charles Hamilton (Ecological Project Assistant) | Joscelin Moran BSc (Hons) (BREEAM Manager) | David Smith MCIEEM (Ecology and Landscape Director) |
| Rev A | 26/04/2016 | Paul Roebuck MSc MCIEEM (Senior Ecological Consultant), Sophie Moy MSc (Ecological Project Officer) and Charles Hamilton (Ecological Project Assistant) | Joscelin Moran BSc (Hons) (BREEAM Manager) | David Smith MCIEEM (Ecology and Landscape Director) |

The information which we have prepared is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

## DISCLAIMER

The contents of this report are the responsibility of Middlemarch Environmental Ltd. It should be noted that, whilst every effort is made to meet the client's brief, no site investigation can ensure complete assessment or prediction of the natural environment.

Middlemarch Environmental Ltd accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

## VALIDITY OF DATA

The findings of this study are valid for a period of 24 months from the date of survey. If works have not commenced by this date, an updated site visit should be carried out by a suitably qualified ecologist to assess any changes in the habitats present on site, and to inform a review of the conclusions and recommendations made.

## NON-TECHNICAL SUMMARY

Cambridge Gate Properties are in the process of developing a residential building with ground floor retail at 5-17 Haverstock Hill, Camden, London.

At the time of survey the site was almost entirely covered by the existing building with associated hardstanding leading to Haverstock Hill (A502) and Adelaide Road. A small area of butterfly-bush was located in the north west of the site.

We recommend that a total of **5 credits** for ecology may be currently awarded. A further **5 credits** may be awarded if the recommendations in this report are followed:

- Ecological Credit LE01: The proposed development is located within the footprint of previously occupied land; we therefore recommend that **1 credit** may be awarded. It is understood that the site contains contaminated land which is to be remediated; we therefore recommend that **1 credit** may be awarded.

- Ecological Credit LE02: The site meets with the defined criteria for land of low ecological value; we therefore recommend that **1 credit** may be awarded. If the site relevant UK and EU legislation detailed in Section 5.2.2 is adhered to then the further 1 credit may be awarded.

- Ecological Credit LE03: There is a gain of 5.60 species and therefore we recommend that **2 credits** out of an available 2 credits may be awarded for the current site plans.

- Ecological Credit LE04: We recommend that **0 credits** may be awarded at present. A total of 2 credits are available within this section. One credit may be awarded if the site enhancement recommendations in Section 5.4.1 are implemented. The further credit is available under Section 5.4.2, and may be awarded if there is a positive increase in the ecological value of the site.

- Ecological Credit LE05: We recommend that **0 credits** are awarded at present. A total of 2 credits are available within this section. One credit may be awarded if all of the mandatory requirements and at least two of the additional requirements are met. Two credits may be awarded if the client meets all of the mandatory requirements plus at least four of the additional requirements.

# CONTENTS

# 1. INTRODUCTION

Cambridge Gate Properties commissioned Middlemarch Environmental Ltd to conduct a BREEAM ecological assessment for the development of a commercial and residential building in Camden, London.

The Building Research Establishment Environmental Assessment Method (BREEAM) UK New Construction 2014 was used to facilitate the ecological assessment of the development site.

Middlemarch Environmental Ltd is a member of the Association of Wildlife Trust Consultancies (AWTC) and is accredited to conduct BREEAM ecological assessments.

The ecological assessment aims to identify important ecological features of the site and measures taken to protect and enhance them. It also appraises the ecological diversity of the site before and after development.

This report is divided into five chapters:

- Chapter 1 provides an explanation of the BREEAM.
- Chapter 2 provides a brief introduction to the development project.
- Chapter 3 describes the methodology used in the ecological assessment.
- Chapter 4 provides an ecological evaluation of the site.
- Chapter 5 describes the criteria that must be followed to achieve credits.

## 1.1 BREEAM NEW CONSTRUCTION 2014

BREEAM UK New Construction 2014 Scheme is an environmental performance standard against which new, non-domestic buildings in the UK can be assessed and achieve a BREEAM New Construction rating.

The primary aim of BREEAM UK New Construction is to mitigate the life cycle impacts of new buildings on the environment in a robust and cost effective manner. This is achieved through integration and use of the scheme by clients and their project teams at key stages in the design and construction process. This enables the client, through the BREEAM Assessor and the BRE Global certification process, to measure, evaluate and reflect the performance of their new building against best practice in an independent and robust manner.

The performance is quantified by a number of individual measures and associated criteria stretching across a range of environmental issues (including management, energy, water, waste, pollution, health and wellbeing, transport, materials, innovation and land use and ecology), which is ultimately expressed as a single certified BREEAM rating. The BREEAM rating benchmarks are: *Outstanding*, *Excellent, Very Good, Good, Pass and Unclassified*.

The BREEAM rating benchmarks enable a client and all other stakeholders to compare the performance of a newly constructed building with other BREEAM rated buildings, and the typical sustainability performance of a stock of new non-domestic buildings in the UK.

This report assesses the land use and ecology only. This category encourages sustainable land use, habitat protection and creation, and improvement of long term biodiversity for the building's site and surrounding land.

## 1.2 ECOLOGICAL CREDITS

There are ten potential ecological credits available, these are detailed below:

a) Ecological Credit LE01
This issue is split into two parts:

- **1 credit** is awarded where evidence is provided that "*at least 75% of the proposed development's footprint is on an area of land which has previously been occupied by industrial, commercial or domestic buildings or fixed surface infrastructure".*

- **1 credit** is awarded where *"evidence is provided to demonstrate that the land used for the new development has, prior to the development, been defined as contaminated, and where adequate remedial steps have been taken to decontaminate the site prior to construction*."

b) Ecological Credit LE02
This issue is split into two parts:
- **1 credit** is awarded where *"land within the site construction zone is defined as having low ecological value".*
- **1 credit** is awarded where *"all existing features of ecological value within and surrounding the construction zone and site boundary are adequately protected from damage during site preparation and construction activities".*

c) Ecological Credit LE03
To assess the impact of a building development on existing site ecology BREEAM measures the 'change in ecological value' using the number of plant species. Two credits may be awarded on the following basis:
- **1 credit** is awarded where "the change in ecological value is less than zero but equal to or greater than minus nine plant species i.e. a minimal change".
- **2 credits** are awarded where "the change in ecological value equal to or greater than zero plant species, i.e. no negative change".

d) Ecological Credit LE04
This issue is split into two parts:
- **1 credit** is awarded where *"a suitably qualified ecologist (SQE) has been appointed to provide appropriate recommendations for the enhancement of the site's ecology, and where they have been, or will be, implemented in the final design and build".*
- **2 credits** are awarded where *"there is an increase in ecological value of six plant species or greater calculated using actual plant species numbers".*

e) Ecological Credit LE05
- **1 credit** is awarded where "*the client has committed to achieving the mandatory requirements and at least two of the additional requirements."*
- **2 credits** are awarded if "*the client has committed to achieving the mandatory requirements and at least four of the additional requirements.*"

# 2. PROJECT INTRODUCTION

Cambridge Gate Properties are developing the site with the consultant team. The scheme consists of the demolition of the existing building and construction of a mixed use building comprising residential units and retail at ground floor with associated cycle parking, landscaping and amenity space.

# 3. METHODOLOGY

## 3.1 BREEAM ECOLOGICAL ASSESSMENT

In summary BREEAM Ecological Assessment methodology consists of:

- An ecological walkover survey of the site
- Recommendations for the protection and ecological enhancement of the site
- An appraisal of landscape proposals

Whilst every effort is made to notify the client of any plant species listed on Schedule 9 of the Wildlife and Countryside Act (1981, as amended) present on site, it should be noted that this is not a specific survey for these species.

## 3.2 BREEAM ECOLOGICAL ASSESSOR

A full site survey was conducted on the 22nd March 2016 by Paul Roebuck, Senior Ecological Consultant. This included an assessment of the habitat types, floral and faunal species and any features of ecological value.

Please see Appendix 1 for ecologist qualifications.

## 3.3 DOCUMENTATION PROVIDED

The documentation provided by the client and used in completion of this assessment report is outlined in Table 3.1.

| Document Name/Drawing Number | Author |
|---|---|
| Landscape Planning Statement / 6755-LD-REP-801_A | LUC |
| BREEAM 2014 Pre-Assessment Checklists / 54359 | Chapman BDSP |

**Table 3.1: Documentation Provided**

# 4. ECOLOGICAL EVALUATION OF THE SITE

## 4.1 SITE DESCRIPTION

The development site is located in Camden, London, at National Grid Reference TQ 281 844.

The site measures approximately 0.2 ha. At the time of survey the site was almost entirely covered by the existing building with associated hardstanding leading to the Haverstock Hill (A502) and Adelaide Road. A small area of butterfly-bush *Buddleja davidii* was located in the north west of the site.

A number of scattered trees were located offsite, which overhung the north-western boundary. These trees were semi-mature to mature and were approximately 10 to 25 m in height.

## 4.2 HABITATS

At the time of the site visit the area comprised the following habitats (listed in alphabetical order not that of ecological importance).

- Building
- Hardstanding
- Scattered scrub

**Building**
The site was almost entirely covered by the existing building which was vacant having previously been occupied by the MET police. The six-storey building was of brick construction and was deemed to have low potential for nesting birds and roosting bats; please see Preliminary Roost Assessment (Middlemarch Environmental Ltd Report Number RT-MME-122009-02) for more information. Generally buildings are deemed to be of low ecological value, however this is dependent on the presence or absence of protected species.

**Hardstanding**
An area of hardstanding was located in the west of the survey area that joined the Haverstock Hill (A502) and Adelaide Road. This habitat is deemed to have no ecological value.

**Scattered scrub**
A small area of scattered butterfly-bush scrub was located in the north-west of the survey area. Due to its small size, this area is deemed to have low ecological value.

# 5. ECOLOGY CREDITS

## 5.1 ECOLOGICAL CREDIT LE01

**2 credits** are available in this chapter; 1 credit is available for building on previously occupied land and 1 credit is available for decontaminating and building on a contaminated site.

### 5.1.1 Part 1: Previously Occupied Land

Over 75% of the proposed development footprint is utilising an area of previously occupied land. We therefore recommend that **1 credit** may be awarded.

### 5.1.2 Part 2: Contaminated Land

The invasive plants Japanese knotweed *Fallopia japonica* and giant hogweed *Heracleum mantegazzianum* were not recorded on site during the ecological walkover survey. However, it is understood that contamination has been found on the ground and a suitable remediation strategy will be implemented for the scheme. We therefore recommend that **1 credit** may be awarded.

## 5.2 ECOLOGICAL CREDIT LE02

**2 credits** are awarded for building on land of low ecological value and protecting all existing features of ecological value.

### 5.2.1 Part 1: Ecological Value of the Site

The site construction zone meets with the defined criteria for land of low ecological value. We therefore recommend that **1 credit** may be awarded.

### 5.2.2 Part 2: Protection of Ecological Features

In order to protect existing features of ecological value and to ensure compliance with site relevant UK and EU legislation, the client has received the following recommendations:

**Bats:** The recommendations provided within the Preliminary Roost Assessment (Middlemarch Environmental Ltd Report Number RT-MME-122009-02) must be adhered to.

**Nesting Birds:** The demolition of the building must be undertaken outside of the bird nesting season (this generally extends between March and September but is weather dependent). If this is not possible the area concerned should be checked immediately prior to removal by a suitably qualified ecologist. Nesting and nest building birds are protected under the Wildlife and Countryside Act WCA 1981 (as amended). Some species (listed in Schedule 1 of the WCA) are protected by special penalties.

**Existing Trees:** The trees adjacent to the north-western boundary must be protected in accordance with British Standard 5837: 2012, Trees in relation to design, demolition and construction – recommendations.

The contractor is required to construct ecological protection prior to any preliminary or preparation works on site. The client must provide written confirmation that these criteria have been followed, prior to Middlemarch Environmental Ltd recommending that this credit may be awarded.

### 5.3 ECOLOGICAL CREDIT LE03

**2 credits** are available for building to minimise the impact of a building development on existing site ecology.

The species diversity prior to the commencement of development is calculated within Table 5.1.

| Habitat Type | Area ($m^2$) | Plant Species Richness | Species x Area of Habitat Type |
|---|---|---|---|
| Buildings and hardstanding | 1,970 | 0 | 0 |
| Scattered scrub | 10 | 1 (Actual) | 10 |
| **Total** | **1,980** | **-** | **10** |

**Table 5.1: Pre-development Ecological Value**

**Ecological Value of Existing Site = 0.01**

From the information provided by the client a post-development score could be calculated, as shown in Table 5.2.

| Habitat Type | Area ($m^2$) | Plant Species Richness | Species x Area of Habitat Type |
|---|---|---|---|
| Amenity grassland | 22 | 4.6 | 101 |
| Buildings and hardstanding | 1,408 | 0 | 0 |
| Wildlife planting (including green roofs) | 550 | 20 (Actual) | 11,000 |
| **Total** | **1,980** | **-** | **11,101** |

**Table 5.2: Post-development Ecological Value**

**Ecological Value of Proposed Site = 5.61**

There is a gain of 5.60 species and therefore we recommend **2 credits** out of an available 2 credits may be awarded for the current site plans.

### 5.4 ECOLOGICAL CREDIT LE04

#### 5.4.1 Part 1: Ecological Enhancement Recommendations

**1 credit** is available for adopting the following ecological enhancement recommendations.

In order to obtain the credit for enhancing the site ecology the following compulsory measures (**A-C**) must be undertaken along with three of the six additional measures (**D-I**).

**A) Good Horticultural Practice**

It is important to implement good horticultural practice in any landscaping scheme, including the use of peat-free composts, mulches and soil conditioners. The use of pesticides (herbicides, insecticides, fungicides and slug pellets) should be discouraged to prevent fatal effects on the food chain particularly invertebrates, birds and/or mammals. Any pesticides used should be non-residual.

**B) Green Roofs**
In accordance with Camden Planning Guidance "CPG3 Sustainability – Section 10" and Development Policy "DP22", a green roof is to be incorporated on the roofs of the buildings which will provide biodiversity networks and allow continuity of green space within the London Borough of Camden. Green roofs also provide habitats for a variety of wildlife in the urban environments. A variety of plant types may be chosen. Extensive green roofs may have reduced soil depth (30-200mm) and planted with succulents or wildflowers. More intensive green roof spaces should have a greater depth of soil (>200mm) and may be planted with grass, herbaceous plants or even trees.

*The proposed soft landscaping plans indicate that this recommendation will be met.*

**C) Shrub Planting**
At least 50 $m^2$ of shrubs must be planted on site; this must consist of native or wildlife attracting species (see Appendix 2).

*The proposed soft landscaping plans indicate that this recommendation will be met.*

**In addition 3 of the following 6 measures should be undertaken**

**D) Tree Planting**
Plant ten trees, which must be native or wildlife attracting species (Appendix 2).

*The proposed soft landscaping plans indicate that this recommendation will not be met, as the following tree species are not native or wildlife attracting species: Liquidamber styraciflua "Worplesdon", Betula utilis jacquemontii and Prunus serrula "Tibetica".*

**E) Bat Boxes**
Six bat boxes or bricks should be installed on site. The bat boxes should be attached to the building (Appendix 3).

**F) Bird Boxes**
Six bird boxes should be erected; these should include a number of swift bricks and a raptor box (swifts and peregrine falcons are priority species within the Camden Biodiversity Action Plan). The remaining boxes should be either open-fronted, terraced, or hole-entrance nesting boxes (see Appendix 3 for further details).

**G) Green Walls**
In accordance with Camden Planning Guidance "CPG3 Sustainability – Section 10", a green wall strategy should be implemented on the southerly facing elevations of the building that may need to be supported by a trellis. Species used for wall greening must be native/wildlife attracting (Appendix 1).

**H) Green Roof Wildlife Features**
A number of simple features should be incorporated onto the green roof to maximise the value and suitability for invertebrates. These features should include:

- Log piles and other deadwood: Logs should vary in size between 100mm, 500mm and 1000 mm in length, stacked no more than 350mm high.
- Sand and shale mounds: Incorporate graded shingle, ordinary sharp sand and builders ballast into substrate elements to create raised mounds of varying height. Avoid fine sand on exposed sites.
- Gravel, stones and rocks: Incorporate these surface features across the roof area. Stones should be no greater than 100-150mm and boulders should be grouped together of sizes 400-600mm.
- Provision of one container capable of capturing rainwater would provide an important source of drinking water for birds within the area.

Creating such structural diversity can help to provide the basics that wildlife need including food, shelter and somewhere to breed.

**I) Planting for Bees**

Bees rely on an adequate supply of food throughout the year. Planting should consist of plants which flower from early March to October (as shown in Table 5.3). The plants should be rich in pollen and nectar (avoid over cultivated varieties).

| Winter / Spring Flowering | Early Summer Flowering | Late Summer Flowering |
|---|---|---|
| Winter heather *Erica carnea* | Foxglove *Digitalis purpurea* | Lavender *Lavandula* sp. |
| Pussy willow *Salix caprea* | Geranium *Geranium* sp. | Marjoram *Origanum majorana* |
| Comfrey *Symphytum officinale* | Thyme *Thymus vulgaris* | Scabious *Scabiosa* sp. |
| Pieris *Pieris* sp. | Allium *Allium* spp. | Verbena *Verbena bonariensis* |
| Rosemary *Rosmarinus officinalis* | Columbine *Aquilegia* sp. | Viper's bugloss *Echium vulgare* |
| Flowering currant *Ribes sanguineum* | Monkshood *Aconitum napellus* | Honeysuckle *Lonicera periclymenum* |
| Blackthorn *Prunus spinosa* | Oxeye daisy *Leucanthemum vulgare* | Borage *Borago officinalis* |
| Red campion *Silene dioica* | Cowslip *Primula veris* | Open-flowered dahlia *Dahlia* sp. |
| Crab apple *Malus sylvestris* | Everlasting sweet pea *Lathyrus latifolius* | Ivy *Hedera helix* |
| Flowering cherry *Prunus* sp. | Stachys *Stachys* sp. | Oregon-grape *Mahonia* |
| Viburnum *Viburnum tinus* | Red valerian *Centranthus ruber* | Cornflower *Centaurea cyanus* |
| Hawthorn *Crataegus monogyna* | Teasel *Dipsacus fullonum* | Wallflower *Erysimum* 'Bowles's Mauve' |

**Table 5.3: Planting Suitable for Bee-friendly Garden**

5.4.2 Part 2: Increase in the Ecological Value of the Site

**1 credit** is available where the above site enhancement recommendations have been met and there is a positive increase in ecological value of six plant species or greater.

Table 5.4 provides the number of additional plant species required to achieve this credit.

| Number of Credits | Species Change Required | Ecological Value Required | Number of Additional Plant Species Required* |
|---|---|---|---|
| 1 | +6 | 6.01 | 2 |

**Table 5.4: Ecological Value and Number of Plant Species required to gain Additional Credit**

* This calculation is based upon the area of wildlife planting as indicated on the soft landscape proposals (approximately 550 $m^2$). If this area of wildlife planting changes, the number of species required to plant will change accordingly. Please note that only native or wildlife attracting species count towards the totals.

### 5.5 ECOLOGICAL CREDIT LE05

**1 credit** may be awarded where all mandatory requirements and at least two of the additional requirements are met. **2 credits** may be awarded where all mandatory requirements plus at least four of the additional requirements are met.

**Mandatory Requirements**

1. A suitably qualified ecologist has been appointed prior to commencement of activities on site and confirms that all relevant UK and EU legislation relating to protection and enhancement of ecology has been complied with during the design and construction process.

*Middlemarch Environmental Ltd has been appointed prior to activities on site. The relevant UK and EU legislation regarding roosting bats and nesting birds must be adhered to; please see Section 5.2.2 for more information.*

2. A landscape and habitat management plan, appropriate to the site, is produced covering at least the first 5 years after project completion. This is to be handed over to the building occupants and includes:
    - Management of any protected features on site
    - Management of any new, existing or enhanced habitats
    - A reference to the current or future site level or local Biodiversity Action Plan.

*The client has appointed Middlemarch Environmental Ltd to produce the site management plan. This document will be written in accordance with the above requirements and therefore satisfy this requirement.*

**Additional Requirements**

1. The contractor is required to nominate a 'Biodiversity Champion' with the authority to influence site activities and ensure that detrimental impacts on site biodiversity are minimised in line with the recommendations of a suitably qualified ecologist.

*We recommend the use of the contractor's site manager for this role; they must provide advice in accordance with the site protection recommendations as detailed under Section 5.2.2 of this report. A letter of appointment should be provided as evidence to demonstrate compliance with this criterion.*

2. The contractor is required to train all relevant site work-force on how to protect site ecology during the project. Specific training should be carried out for the entire site workforce to ensure they are aware of how to avoid damaging site ecology. Training should be based on the findings and recommendations for protection of ecological features highlighted within a report prepared by a suitably qualified ecologist.

*This criterion will be satisfied through site inductions, which must include information on nesting birds, roosting bats and protection of the existing trees. This should be reinforced by toolbox talks when undertaking works within sensitive areas, at sensitive times of the year or before potentially damaging operations*.

3. The contractor is required to record actions taken to protect biodiversity and monitor their effectiveness throughout key stages of construction. The requirement commits the contractor to make such records available where publicly requested.

*This criterion may be satisfied through the production of monthly reports which are circulated at site meetings. These should detail mitigation measures taken and any upcoming ecological issues.*

4. The client requires that a new ecologically valuable habitat, appropriate to the local area, be created. This includes habitat that supports nationally, regionally or locally important biodiversity, and/or which is nationally, regionally or locally important itself; including any UK Biodiversity Action Plan (UK BAP) priority habitats, Local Biodiversity Action Plan (LBAP) habitats, those protected within statutory sites (e.g. SSSIs), or those within non-statutory sites identified in local plans.

*The installation of a green roof supports the aims of the Camden Biodiversity Action Plan to ensure that the built environment matches a positive contribution to biodiversity across the borough, and therefore satisfies this requirement. There are also opportunities to incorporate habitats for species listed on the UK and Local BAP; such as:*

- *Installation of bat boxes or bricks for pipistrelle bat (Pipistrellus pipistrellus)*
- *Installation of swift bricks for swifts (Apus apus)*
- *Installation of deadwood or log piles for stag beetles (Lucanus cervus)*

5. Where flora and/or fauna habitats exist on site, the contractor to programmes site works to minimise disturbance to wildlife. For example, site preparation, ground works, and landscaping have been, or will be, scheduled at an appropriate time of year to minimise disturbance to wildlife. Timing of works may have a significant impact on, for example, breeding birds, flowering plants, seed germination, amphibians etc. Actions such as phased clearance of vegetation may help to mitigate ecological impacts. This additional requirement will be achieved where a clear plan has been produced detailing how activities will be timed to avoid any impact on site biodiversity in line with the recommendations of a suitably qualified ecologist.

*A report must be compiled to highlight how the schedule of works was planned to minimise disturbance to wildlife; this must clearly indicate the types of operations and reasons for the timings of works. For example, the report could be formed by the timings of works in relation to the bird nesting season.*

## SUMMARY

We recommend that a total of **5 credits** for ecology may be currently awarded. A further **5 credits** may be awarded if the recommendations in this report are followed:

- Ecological Credit LE01: The proposed development is located within the footprint of previously occupied land; we therefore recommend that **1 credit** may be awarded. It is understood that the site contains contaminated land which is to be remediated; we therefore recommend that **1 credit** may be awarded.

- Ecological Credit LE02: The site meets with the defined criteria for land of low ecological value; we therefore recommend that **1 credit** may be awarded. If the site relevant UK and EU legislation detailed in Section 5.2.2 is adhered to then the further 1 credit may be awarded.

- Ecological Credit LE03: There is a gain of 5.60 species and therefore we recommend that **2 credits** out of an available 2 credits may be awarded for the current site plans.

- Ecological Credit LE04: We recommend that **0 credits** may be awarded at present. A total of 2 credits are available within this section. One credit may be awarded if the site enhancement recommendations in Section 5.4.1 are implemented. The further credit is available under Section 5.4.2, and may be awarded if there is a positive increase in the ecological value of the site.

- Ecological Credit LE05: We recommend that **0 credits** are awarded at present. A total of 2 credits are available within this section. One credit may be awarded if all of the mandatory requirements and at least two of the additional requirements are met. Two credits may be awarded if the client meets all of the mandatory requirements plus at least four of the additional requirements.

## APPENDICES

APPENDIX 1: Ecologist Qualifications

APPENDIX 2: List of Wildlife Attracting Plants

APPENDIX 3: Bird Box, Bat Brick and Invertebrate Box Details

## APPENDIX 1:

## ECOLOGIST QUALIFICATIONS

### Ecologist Details

Name: Paul Roebuck – Senior Ecological Consultant
Company: Middlemarch Environmental Ltd
Address: Triumph House, Birmingham Road, Allesley, CV5 9AZ
Contact Telephone Number: 01676 525880
Ecology Report Reference: RT-MME-122009-01

### Qualifications in ecology or related subject:

MSc Freshwater & Coastal Sciences
BSc (Hons) Geography

### Memberships:

Chartered Institute of Ecology and Environmental Management (MCIEEM) – Full Membership
Institute of Environmental Management & Assessment - Associate Membership

### Relevant Experience:

Paul's expertise includes the provision of green infrastructure and ecological enhancement recommendations with respect to construction and the built environment. An experienced ecologist with over 8 year's relevant employment, 3 of which are within the last 5 years. Well practiced at working in both multi-disciplinary environmental and ecological consultancy teams delivering a wide range of biodiversity services including management of large scale infrastructure projects.

## APPENDIX 2:
## LIST OF WILDLIFE ATTRACTING PLANTS

| Species | Height/Spread | Colours | Flowers/Berries | Wildlife benefits | Plant conditions and notes | Deciduous or Evergreen |
|---|---|---|---|---|---|---|
| **Native Trees** | | | | | | |
| **Field Maple** *Acer campestre* | To 25m | Leaves: Green then amber in Autumn. Flowers: Yellow/green. Seeds: Green then brown with wings. | Flowers May to June | 51 species of insects/mites and 24 species of lepidoptera. Fruits eaten by small mammals. | Calcareous or clay soils preferably in full sun. | Deciduous |
| **Alder** *Alnus glutinosa* | 6-15m | Leaves: Green, Catkins: Yellow/brown, Fruits: Cone-like, small and brown. | Catkins in March to April | 141 species of insects/mites and 71 species of lepidoptera. Seeds are good for birds such as siskins. | Damp soil. Plant hardwood cuttings in the open in late autumn. | Deciduous |
| **Silver Birch** *Betula pendula* | To 18m | Leaves: Green turning yellow in Autumn, Catkins: Yellow/brown then seeding, Bark: White. | Catkins open in April and break up in winter releasing it's seeds. | Excellent for insects and to attract inset eating birds. Best tree for moth larvae. Catkins good food source for birds such as redpolls and tits. | Dry acid best. | Deciduous |
| **Downey Birch** *Betula pubescens* | To 24m | Leaves: Green turning yellow in Autumn, Catkins: Yellow/brown then seeding, Bark: White. | Catkins open in April and break up in winter releasing it's seeds. | Excellent for insects and to attract inset eating birds. Catkins good food source for birds. | Favours wetter more peaty soil. | Deciduous |

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| **Hornbeam** *Carpinus betulus* | To 24m | Leaves: Green, Catkins: Green/crimson then seeding. | Flowers in May | 51 species of insects/mites and 32 species of lepidoptera. Seeds for birds. Can provide dense nesting cover. | Woods and copses on clay soils, will tolerate shade. Sow seeds or fruits in spring. | Deciduous |
| **Hazel** *Corylus avellana* | To 10m | Leaves: Green, Flowers: Long Yellow/Crimson tassels. Seeds: Brown nuts. | Flowers in February | 106 species of insects/mites and 68 species of lepidoptera. Nuts eaten by birds and mammals i.e. squirrels, mice and jays. | Hedgerows, scrub and woodland in well-drained soil. Full sun or light shade preferable. Remove and plant rooted suckers or offsets in autumn. | Deciduous |
| **Beech** *Fagus sylvatica* | To 46m | Leaves: Green then orange to red/brown in Autumn, Flowers: Green/white. Seeds: Brown nuts encased in a brown husk. | Flowers March to April. | 98 species of insects/mites and 51 species of lepidoptera. The masts are eaten by birds and mammals including wood mice and Jays. | Well-drained soils. Can survive in shallow soil. Sow seeds or fruits in autumn. | Deciduous. Can hold dead leaves through the winter. |
| **Ash** *Fraxinus excelsior* | To 37m | Leaves: Green, Flowers: Green/Purple prior to the leaves. Seeds: Green single seeds in bunches with a long wing. | Flowers: April-May | 68 species of insects/mites and 32 species of lepidoptera. Seeds eaten by birds and mammals. | Will survive on most soils with reasonable light. Sow seeds or fruits in autumn. | Deciduous |
| **Juniper** *Juniperus communis* | Shrub or tree to 7m | Leaves: Spiky Green needles, Flowers: Small green to yellow flowers, Berries: Green ripening to purple in the second year. | Flowers May to June. Berries take two years to ripen. | 32 species of insects/mites and 14 species of lepidoptera. | Well-drained limestone and acid sandstone. | Evergreen |

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| **Crab Apple** *Malus sylvestris* | To 10m | Leaves: Green, Flowers: White and pink. Fruits: Green/yellow/red apples. | Flowers: April to May. Fruits ripen in Autumn. | 118 species of insects/mites and 76 species of lepidoptera. Fruits are eagerly consumed by birds and mammals despite its bitter taste. | Well-drained soil in full sun. | Deciduous |
| **Scots Pine** *Pinus sylvestris* | To 36m | Leaves: Green needles, Flowers: Yellow and crimson, Cones: Short and brown. | | 172 species of insects/mites and 36 species of lepidoptera. Cones are a valuable food source for birds and other mammals. | Prefers sandy well-drained soil in full sun. | Evergreen |
| **Black Poplar** *Populus nigra* | 33m | Leaves: Green turning yellow in Autumn, Flowers: Green and crimson catkins, turning fluffy when fruiting. | Catkins produced in March. | 153 species of insects/mites and 69 species of lepidoptera found within all the poplar species. Good for larger moth species i.e. Hawk moths | Fertile soil near water. Remove and plant rooted suckers or offsets in autumn. Reduced in numbers due to easy hybridisation with other poplars | Deciduous |
| **Aspen** *Populus tremula* | To 24m | Leaves: Green turning yellow in Autumn, Flowers: Green and brown catkins, turning fluffy when fruiting. | Catkins arrive in March and set seed in May. | Good for invertebrates and birds. Food plant of the hairstreak butterfly. | Will survive on most soils with full sun or partial shade. | Deciduous |
| **Wild Cherry** *Prunus avium* | 9-12m | Leaves: Green turning crimson in Autumn, Flowers: White, Berries: Bright red. | Flowers: April, Berries: July | Birds feed on the cherries. | Prefers fertile soil, will tolerate some shade. | Deciduous |
| **Bird Cherry** *Prunus padus* | Shrub or tree to 19m | Leaves: Green, Flowers: White, Berries: Black cherries. | Flowers in May. | 9 species of lepidoptera. Berries eaten by birds | Woods and scrub. Well-drained soil with full sun or light shading. | Deciduous |

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| **Oaks** (native)<br>*Quercus spp.* | To 42m | Leaves: Green, Flowers: Slim yellow catkins, Seeds: Green acorns turning brown when ready to fall. | Flowers in May. Acorns produced in Autumn. | 423 species of insects/mites and 193 species of lepidoptera. Acorns eaten by a variety of birds and mammals. Very important for insect eating birds. | Variety of soils with reasonable depth and preferably in full sun, below 300m altitude. Sow seeds or fruits in autumn. | Deciduous |
| **Willows**<br>*Salix spp.* | To 25m (species dependent) | | Flowers February to March. | 450 species of insects/mites and 166 species of lepidoptera. | Damp areas. Plant hardwood cuttings in the open in late autumn. | Deciduous |
| **Goat Willow**<br>aka 'pussy willow'<br>*Salix caprea* | Shrubby tree to 10m | Leaves: Oval, dark grey/green on top with a hairy underside, Flowers; Green and yellow short catkins turning fluffy when seeding. | Flowers March to April | Early provider of pollen and nectar for insects. | Most soils as long as they are at least slightly damp. | Deciduous |
| **Grey Willow**<br>*Salix cinerea* | Shrubby tree to 6m | Leaves: Grey/green on top with a lighter hairy underside, Flowers; Yellow catkins turning fluffy when seeding. | Flowers March to April | Good for insects and birds. | Most soils as long as they are at least slightly damp. | Deciduous |
| **Crack Willow**<br>*Salix fragilis* | Can reach 25m | Leaves: Long, shiny green on top with a grey/green underside, Flowers; Green and yellow catkins turning fluffy when seeding. | Flowers in April with the catkins appearing in May and ripening in the summer. | Good for insects and birds. | Most soils as long as they are at least slightly damp. | Deciduous |
| **Bay Willow**<br>*Salix pentandra* | To 10m | Leaves: Long, shiny green on top with a grey/green underside, Flowers: Yellowish catkins,fluffy when seeding. | Flowers May to June | Good for insects and birds. | Wet ground by water. | Deciduous |

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| **Elderberry** *Sambucus nigra* | To 10m | Leaves: Green, Flowers: Small creamy white flowers in large numbers. Berries: Dark purple/black in bunches. | Flowers May to June | Berries for birds and nectar for insects. | Sun or partial shade. | Deciduous |
| **Whitebeam** *Sorbus aria* | 10 to 24m | Leaves: Green with white hairy underside turning yellow/crimson in Autumn, Flowers: White, Berries: Green ripening to bright red. | Flowers: May | Flowers attract insects and the fruits are eaten by birds. | Prefers calcareous soil. | Deciduous |
| **Rowan** *Sorbus aucuparia* | 18m | Leaves: Pinnate green leaves turning crimson in Autumn, Flowers: Small white flowers in clusters, Berries: Bright red. | Flowers in May. Produces berries in autumn. | 58 species of insects/mites and 28 species of lepidoptera. The ripe berries attract birds such as redwings and field-fares. | Will tolerate most soils apart from very heavy soils. | Deciduous |
| **Wild Service Tree** *Sorbus torminalis* | To 20m | Leaves: Shiny green with a lighter coloured underside, turning purple/red in Autumn, Flowers: Creamy white in clusters, Seeds: Brown speckled seeds in clusters. | Flowers: May or June Fruit: September | Good for insects. Fruits eaten by birds | Withstands shade. Prefers clay and limestone soil. | Deciduous |
| **Lime** *Tilia europaea* | To 46m | Leaves: Green heart-shaped with slightly hairy underside, Flowers: Greenish/ yellow flowers, Seeds: Small round and hairy with a grey-brown colour. | Flowers June to July. | 57 species of insects/mites and 31 species of lepidoptera. The nectar is highly sought by bees. | Needs well-drained soil with full or partial sun. | Deciduous |

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| **Wych Elm** *Ulmus glabra* | To 37m | Leaves: Green turning yellow in autumn , Flowers: very small purplish flowers, Seeds: Circular winged fruits with the seed in the centre. | Flowers produced in spring prior to the leaves, with winged fruits produced in July. | Good tree for insects and birds. | Full sun or light shade on most soils especially limestone. This species is less suseptable to Dutch elm disease. | Deciduous |
| **Dutch Elm** *Ulmus hollandica* | To 32m | Leaves: Green, Seeds: Circular winged fruits with the seed in the centre. | Winged fruits produced in July. | Good tree for insects and birds. | A native tree which has occurred naturally as a hybridisation between two other elms. Full sun or light shade. This species is less suseptable to Dutch elm disease. | Deciduous |
| **English Elm** *Ulmus procera* | To 33m | Leaves: Green, Flowers: Small crimson flowers, Seeds: Circular winged fruits with the seed in the centre. | Crimson flowers produced in spring with winged fruits produced in July. | 124 species of insects/mites and 24 species of lepidoptera are associated with elm trees. | Full sun or light shade. 1 in 5 trees have caught Dutch elm disease which the English elms are suseptable to. | Deciduous |

| Species | Height/Spread | Colours | Flowers/Berries | Wildlife benefits | Plant conditions and notes | Deciduous or Evergreen |
|---|---|---|---|---|---|---|
| **Introduced Trees** | | | | | | |
| **Sweet Chestnut** *Castanea sativa* | To 35m | Leaves: Green, Flowers: Long yellow tassels. Seeds: Brown nuts encased in a green spiky husk. | Flowers July. Seeds produced in autumn decreasing in size the further north the plants are situated. | 11 species of insects/mites and 1 species of lepidoptera. Seeds eaten by a variety of mammals. | Well-drained soil, in full or partial sun. Sow seeds or fruit in spring. | Deciduous |
| **European Larch** *Larix decidua.* | To 46m | Leaves: light green needles, Flowers Yellow/dull-red small globes, Cones: Light brown | Spring | 38 species of insects/mites and 15 species of lepidoptera. Cones provide food for tits and finches. | Likes plenty of space in full sun. | Deciduous |
| **Magnolia** *Magnolia* | | | | Early source of nectar for insects | | |
| **Apple** *Malus domestica* | To 11m | Leaves: Green, Flowers: Deep pink. Fruits: Reddish-purple. | Flowers: April to May. Fruits ripen in Autumn. | Good for invertebrates. Fruits are eagerly consumed by birds and mammals. | Well-drained soil in full sun. | Deciduous |
| **Purple Crab** *Malus purpurea* | To 10m | Leaves: Green, Flowers: White and pink. Fruits: Green/yellow/red apples. | Flowers: April to May. Fruits ripen in Autumn. | Good for invertebrates. Fruits are eagerly consumed by birds and mammals. | Well-drained soil in full sun. | Deciduous |

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| **Norway Spruce** *Picea abies* | To 46m | Leaves: Green needles, Flowers: Yellow and pink, Cones: Long and brown. | Flowers open in May. Cones ripen in autumn. | 70 species of insects/mites and 13 species of lepidoptera. The cones are eaten by birds and mammals which include crossbills, treecreepers and red squirrels. | Any reasonable soil, preferably in good sun. | Evergreen |
| **White Poplar** *Populus alba* | 24m | Leaves: Dark green upper with pale hairy underside, Flowers: Green catkins, turning fluffy when fruiting. | Catkins produced in March. | Good for invertebrates and birds especially larger moth species. | Full sun or partial shade. Remove and plant rooted suckers or offsets in autumn. Can tolerate pollution well, but the roots can damage pipelines and paving. | Deciduous |
| **Wild Plum** *Prunus domestica* | To 8m | Leaves: Green, Flowers: White, Fruits: Small purple plums. | Flowers: March to May. Fruits ripen in Autumn. | Nectar and fruits for invertebrates. Fruits are eagerly consumed by birds and mammals. | Well-drained soil in full sun. | Deciduous |
| **Peach** *Prunus persica* | 6m | Leaves: Dark green, Flowers: Deep pink, Fruits: Usual peach. | Flowers: April to May. Fruits ripen in Autumn. | Nectar and fruits for invertebrates. Fruits are eagerly consumed by birds and mammals. | Well-drained soil in full sun. | Deciduous |
| **Pear** *Pyrus communis* | To 15m | Leaves: Dark glossy green, Flowers: White, Fruits Yellow-green to brown. | Flowers: April to May. Fruits ripen in Autumn. | Good for invertebrates. Fruits are eagerly consumed by birds and mammals. | Well-drained soil in full sun. | Deciduous |
| **Wild Pear** *Pyrus pyraster* | To 15m | Leaves: Dark glossy green, Flowers: White, Fruits Yellow-red to brown, 1-4cm. The tree/shrub is usually spiny. | Flowers: April to May. Fruits ripen in Autumn. | Good for invertebrates. Fruits are eagerly consumed by birds and mammals. | Well-drained soil in full sun. | Deciduous |

| **Native Shrubs** | | | | | | |
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| **Box** *Buxus sempervirens* | To 3m | Leaves: Small, dark green and glossy, Flowers: Small green/yellow, Seeds: Black encased in blue green capsules turning brown in September | Flowers April to May | Provides good nesting cover and winter roosting cover for birds. | Calcareous soils in full sun or partial shade. | Evergreen |
| **Heather** *Calluna vulgaris* | 50-100cm | Leaves: Green and minute, Flowers: Pink/purple, Seeds: Very small replacing flowers. | Flowers in July to November | Good for invertebrates with a late supply of nectar | Well-drained acid soil in full sun. | Evergreen |
| **Dogwood** *Cornus sanguinea* | To 4m | Leaves: Green and hairy turning crimson an Autumn, Flowers: Greenish white in groups, Berries: Black in clusters. | Flowers in June. Produces bitter black berries in August-September. | 17 species of lepidoptera. Larval food plant of the green hairstreak butterfly. Flowers produce an unpleasant smell which is attractive to insects. Some birds manage to eat the berries. | Woods and scrub on limestone or base rich clays. | Deciduous |
| **Hawthorn** *Crataegus monogyna* | 6m | Leaves: Small and green, Flowers: Bright yellow, Seeds: In green pods. | Flowers: White – mid May. Berries: Red/orange in Autumn | Nectar. Berries good food source for thrushes, redwings and fieldfares. Good nesting if dense. Excellent for moth larvae. | Any soil. | Deciduous |
| **Broom** *Cytisus scoparius* | 2.5m | Leaves: Small green and deeply lobed, Flowers: White, Berries: Red. | Yellow flowers April-June | Good for 39 species of lepidoptera. Food plant of the hairstreak butterfly. | Calcifuge, heathland, sandy banks, open woodland and rough ground. Well drained soil in full sun. Plant semi-ripe cuttings in a cold frame in summer. | Semi-evergreen |

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| **Spurge Laurel** *Daphne laureola* | 1m | Leaves: Light green, Flowers: White/green, Berries: Black. | Flowers in February to April | Early source of nectar for insects. Berries for birds which are poisonous to man. | Well-drained humus-rich or chalky soil in full sun or deep shade. | Evergreen |
| **Mezereon** *Daphne mezereum* | 1m | Leaves: Light green with cream tinged edges, Flowers: Bright pink, Berries: Red. | Flowers in February to April | Early source of nectar for insects. | Well-drained humus-rich soil in full sun or light shade. | Deciduous |
| **Heath 'Bell'** *Erica cinerea* | To 50cm | Leaves: Green and minute, Flowers: Pink/purple, Seeds: Very small replacing flowers. | Flowers July to August. | Provides nectar for invertebrates. | Well-drained acid soil in full sun. | Evergreen |
| **Heath 'Cross-leaved'** *Erica tetralix* | To 50cm | Leaves: Green and minute, Flowers: Pink/purple, Seeds: Very small replacing flowers. | Flowers July to August. | Provides nectar for invertebrates. | Damp acid soil in full sun | Evergreen |
| **Spindle** *Euonymus europaeus* | 5m (8m max) | Leaves: Light green turning to crimson in Autumn, Flowers: Greenish yellow, Seeds: encased in a four lobed pink capsule. | Fruit October to December. | 10 species of lepidoptera. Nectar is good for insects. Berries are good for birds but induce vomiting in people. | Woods, hedgerows and scrub on calcareous or base rich clays. Plant semi-ripe cuttings in a cold frame in summer | Deciduous |
| **Alder Buckthorn** *Frangula alnus* | 2.5m | Leaves: Shiny green, Flowers: very small greenish flowers, Berries: Green berries turning red then purple. | Flowers: Early summer. Berries: Autumn | Berries for birds. Important food plant for brimstone butterfly larvae. | Damp acidic soil/peat | Deciduous |
| **Tutsan** *Hypericum androsaemum* | 80cm | Leaves: Green turning red in autumn, Flowers: Yellow, Berries: Black | Flowers June to October followed by berries. | Flowers attract insects especially bees. Berries are eaten by birds and small mammals. | Full sun or light shade in damp soil. Plant semi-ripe cuttings in a cold frame in summer. | Deciduous |

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| **Holly**<br>*Ilex aquifolium* | 300 x 150+ cm | Leaves: spiky glossy green, Flowers: Small pink/white, Berries: Bright red. | Flowers: May. Berries: (only on female trees) October to December. | Berries good for birds and small mammals. Caterpillars of the holly blue butterfly feed on the leaves. Holly leaf miner provides winter food for birds. | Not wet. Layer stems in spring. Need male and female plants near each other to produce berries. | Evergreen |
| **Privet**<br>*Ligustrum vulgare* | 3m | Leaves: Green, Flowers: White, Berries: Small black berries | Flowers: July. | 24 species of insects/mites, nectar for the butterflies. Berries eaten by birds. | Hedgerows and scrub, especially on base rich soil. Plant hardwood cuttings in the open in late autumn. | Deciduous or semi-evergreen in mild areas. |
| **Shrubby Cinquefoil**<br>*Potentilla fruticosa.* | 1m | Leaves: Green, Flowers: Yellow. | Flowers May to September. | Nectar source for bees and butterflies | Well-drained soil in full sun or light shade. Semi-ripe cuttings in a cold frame in summer. | Deciduous |
| **Blackthorn**<br>*Prunus spinosa* | 4m | Leaves: Green, Flowers: White, Berries: Blue/black. | Flowers: spring. | Good for nesting birds if grown as thicket or in hedge. Rich in insects. Fruit for birds. Black hairstreak butterfly lays its eggs mainly on blackthorn. | Well-drained soil preferably in a sunny location. | Deciduous |
| **Buckthorn**<br>*Rhamnus catharticus* | 5m | Leaves: Yellow green, Flowers: Yellow/green, Berries: Black. Stems with spines. | Flowers: May to June | Larval food plant for brimstone butterfly. | Damp, peat or base-rich soils. | Deciduous |
| **Dog Rose**<br>*Rosa canina* | 3-4m | Leaves: Green , Flowers: Pink/white, Hips: Red. | Flowers: June to July. Hips: autumn | Provides nectar for bees and butterflies. Hips good for small birds and mammals. | Dislikes wet or exposed sites Can tolerate poor fertility. | Deciduous |
| **Sweet Briar**<br>*Rosa rubiginosa* | 240 x 240cm | Leaves: Green , Flowers: Pink, Hips: Red/orange. | Flowers: mid summer. Berries: autumn | Hips food source for small mammals and birds. Good nesting cover. | Prefers sun and well drained soil. | Deciduous |

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| **Raspberry** *Rubus idaeus* | 1.5-2.5m | Leaves: Green with thorns on underside, Flowers White, Berries: Red, Stems also have thorns. | Flowers May to August with berries following. | Nectar source for bees and butterflies. Berries for birds and mammals. | Any reasonable soil in full sun or partial shade. | Deciduous shrub |
| **Gorse** *Ulex europaeus* | 2-2.5m | Leaves: Thin and spiky, green in colour, Flowers: Yellow. | Autumn flowers, can flower throughout the year. | 29 species of insect. Provides good protection for birds nests frequently used by linnets, whinchats and stonechats. | Sandy or peaty well-drained soil in full sun. Grassland, heathland and open woods. Plant semi-ripe cuttings in a cold frame in summer. | Evergreen |
| **Wayfaring Tree** *Vibernum lantana* | 3m | Leaves: Green, Flowers: Whitish yellow, Berries: Red then becoming black. | Flowers in June to July. | Berries for birds and nectar for insects. | Most soils especially base rich. | Deciduous |
| **Guelder Rose** *Viburnum opulus* | 300 x 250cm | Leaves: Green, Flowers: White, Berries: Bright red. | Flowers: May to June. Berries: autumn | Nectar for insects, particularly hoverflies. Fruits for birds and small mammals, especially liked by woodmouse. Note: leaves, bark and berries are all poisonous. | Plant semi-ripe cuttings in a cold frame in summer. | Deciduous |
| **Introduced Shrubs** | | | | | | |
| **Juneberry** *Amelanchier lamarkii* | To 6m | Leaves: Pink when unfolding, turning green then yellow-brown in Autumn, Flowers: White in large quantities, Berries: Round red fruits turning purple when ripe. | Flowers April to May with berries in the summer. | Nectar source for bees and butterflies. Berries for birds. | Full sun or partial shade on light acid soils. | Deciduous |

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| **Spotted Laurel** *Aucuba japonica* | 2-3m | Leaves: Dark green with yellow speckles, leathery in texture, Flowers: Small and white, Berries: Green, ripening to red the following spring | Berries: October-January | Berries for birds. | Sun or deep shade, all soils. | Evergreen |
| **Darwin's Barberry** *Berberis darwinii* | To 3m | Leaves: Sharp holly-like green leaves, Flowers: Orange in small clusters, Berries: Blue berries in bunches, Stems: with spines. | Flowers in spring. Berries in autumn. | Berries for birds and nectar for insects. Can provide good nesting cover for small passerines. | Sun or light shade. Various propagation methods. Note: this shrub is a winter host for wheat rust - agricultural fungal pest. | Evergreen |
| **Hooker's Barberry** *Berberis hookeri* | To 3m | Leaves: Sharp green leaves, Flowers: Yellow in small clusters, Berries: Black berries in bunches, Stems: with spines. | Flowers in spring. Berries in autumn. | Berries for birds and nectar for insects. Can provide good nesting cover for small passerines. | Sun or light shade. Various propagation methods. Note: this shrub is a winter host for wheat rust - agricultural fungal pest. | Evergreen |
| **Hedge Barberry** *Berberis stenophylla* | To 3m | Leaves: Small sharp green leaves, Flowers: Yellow in small clusters, Berries: Blue/black berries in bunches, Stems: with spines. | Flowers in spring. Berries in autumn. | Berries for birds and nectar for insects. Can provide good nesting cover for small passerines. | Sun or light shade. Various propagation methods. Note: this shrub is a winter host for wheat rust - agricultural fungal pest. | Evergreen |
| **Thunberg's Barberry** | To 1.5m | Leaves: Bright red in Autumn, Flowers: Yellow in small clusters, Berries: Red berries in bunches, Stems: with spines. | Flowers in spring. Berries in autumn. | Berries for birds and nectar for insects. Can provide good nesting cover for small passerines. | Sun or light shade. Various propagation methods. Note: this shrub is a winter host for wheat rust - agricultural fungal pest. | Deciduous |

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| **Thunberg's Barberry** *Berberis thunbergii 'Atropurpurea'* | To 2m | Leaves: Bronze leaves bright red in Autumn, Flowers: Yellow in small clusters, Berries: Red berries in bunches, Stems: with spines. | Flowers in spring. Berries in autumn. | Berries for birds and nectar for insects. Can provide good nesting cover for small passerines. | Sun or light shade. Various propagation methods. Note: this shrub is a winter host for wheat rust - agricultural fungal pest. | Deciduous |
| **Thunberg's Barberry** *Berberis thunbergii 'Atropurpurea Nana'* | 60cm | Leaves: Bronze leaves bright red in Autumn, Flowers: Yellow in small clusters, Berries: Red berries in bunches, Stems: Almost spineless. | Flowers in spring. Berries in autumn. | Berries for birds and nectar for insects. Can provide good nesting cover for small passerines. | Sun or light shade. Various propagation methods. Note: this shrub is a winter host for wheat rust - agricultural fungal pest. | Deciduous |
| **Barberry** *Berberis vulgaris* | To 3m | Leaves: Green leaves, Flowers: Yellow in small clusters, Berries: Red berries in bunches, Stems: with spines. | Flowers in spring. Berries in autumn. | Berries for birds and nectar for insects. Can provide good nesting cover for small passerines. | Sun or light shade. Various propagation methods. Note: this shrub is a winter host for wheat rust - agricultural fungal pest. | Deciduous |
| **Alternate-Leaved Butterfly-Bush** *Buddleia davidii* | Willow like shrub to 8m | Leaves: Green , Flowers: Lilac found on long drooping stems covered in globular shaped flower bunches, Seeds: Found in the flower heads which stay on the plant for most of the winter. | Flowers July to September | Nectar for bees and butterflies. The best bush available for butterflies especially if planted in a sun trap. | Dryish soil in full sun or partial shade. Plant semi-ripe cuttings in a cold frame in summer or plant hardwood cuttings in the open in late autumn. | Deciduous |

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| **Buddleia** (butterfly-bush) *Buddleia davidii* | 300 x 180cm | Leaves: Dark green above with a lighter hairier underside, Flowers: Long spikes with a lavender colour, Seeds: Found in the flower heads which stay on the plant for most of the winter. | Flowers July to September | Nectar for bees and butterflies. The best bush available for butterflies especially if planted in a sun trap. | Dryish soil in full sun or partial shade. Plant semi-ripe cuttings in a cold frame in summer or plant hardwood cuttings in the open in late autumn. | Deciduous |
| **Orange Ball Tree** *Buddleia globosa* | To 5m | Leaves: Dark green above with a lighter hairier underside, Flowers: Orange in a globular shape, Seeds: Found in the flower heads which stay on the plant for most of the winter. | Flowers May to June | Nectar for bees and butterflies. | Dryish soil. | Deciduous to semi-evergreen |
| **Weyer's Butterfly-Bush** *Buddleia weyeriana* | 300 x 180cm | Leaves: Green, Flowers: Yellow found on inflorescence which is interrupted with spaces slightly globular in shape, Seeds: Found in the flower heads which stay on the plant for most of the winter. | Flowers May to June | Nectar for bees and butterflies. Flowers slightly later then *davidii* attracting the butterflies from these bushes. | Dryish soil in full sun or partial shade. Plant semi-ripe cuttings in a cold frame in summer or plant hardwood cuttings in the open in late autumn. | Deciduous to semi-evergreen |
| **Blue Spiraea** *Caryopteris clandonensis* | 1m | Leaves: Blue/green, Flowers: Blue in clusters. | Flowers, September to October. | Provides a late source of pollen and nectar. | Requires well-drained soil in full sun. | Deciduous |
| **Californian Lilac** *Ceanothus 'Autumnal Blue'* | 1.8 x 1.8+m | Leaves: Green and shiny, Flowers: Purple in clusters. | Flowers in July to October. | Nectar for bees and butterflies. | Fertile soil in a sunny location. | Evergreen |

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| **Californian Lilac** *Ceanothus 'Gloire de Versailles'* | 1.8 x 1.8m | Leaves: Dark green and shiny, Flowers: Light blue in clusters. | Flowers in July to October. | Nectar for bees and butterflies. | Fertile soil in a sunny location. | Deciduous |
| **Japanese Quince** *Chaenomeles japonica* | 1m | Leaves: Green , Flowers: Red, Fruits: Large, golden brown. | Flowers March-May followed by fruits which ripen in October. | Berries for birds and mammals. | Full sun | Deciduous |
| **Quince variety** *Chaenomeles speciosa* | Bush to 1.5m or train as a Climber to 3m x 30cm thick | Leaves: Green sparser then *japonica* , Flowers: depends on variety, Fruits: Large, golden brown. | Flowers March-May and the fruits ripen in October. | Nectar source for bees and butterflies. Berries for birds and mammals. Good for birds to nest in as branches are sturdy with spines to deter cats. | Sun or shade. | Deciduous |
| **Smoke Bush** *Cotinus coggygria* | 3m | Leaves: Green turning orange or red in autumn, Flowers: Light pink feathery flowers. | Flowers June - July | Good for bees and birds | Sandy infertile soil best, full sun preferred. | Deciduous |
| **Cotoneaster 'Coral Beauty'** *Cotoneaster conspicuous 'Decorus'* | Spreading shrub To 1.5m | Leaves: Small green, Berries: Red. | Berries October to January. | Berries good for birds and small mammals. Nectar for invertebrates. | Any reasonable soil, preferably in good sun. Plant semi-ripe cuttings in a cold frame in summer. | Evergreen |
| **Francchet's Cotoneaster** *Cotoneaster franchetii* | To 3m | Leaves: Small green and glossy with silvery hairy underneath, Flowers: Light Purple, Berries: Orange. | Berries October to January. | Berries good for birds and small mammals. Nectar for invertebrates. | Any reasonable soil, preferably in good sun. Plant semi-ripe cuttings in a cold frame in summer. | Semi-evergreen |

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| **Cotoneaster** *Cotoneaster frigidus* | To 8m | Leaves: Small green and glossy, Flowers: White, Berries: Red. | Berries October to January. | Berries good for birds and small mammals. Attracts waxwings and pheasants. | Plant semi-ripe cuttings in a cold frame in summer. | Deciduous to semi-evergreen |
| **Daphne** *Daphne odora* | 1m | Leaves: Dark green, Flowers: Bright pink. | Flowers in February to April | Early source of nectar for insects. | Well-drained humus-rich soil in full sun or light shade. | Evergreen |
| **Broad-leaved Oleaster** *Elaeagnus macrophylla* | To 3m | Leaves: Silvery when unfolding turning dark glossy green, Flowers: Creamy yellow bell shaped, Berries: Red | Flowers in October to November. | Provides a late source of pollen and nectar. | Any reasonable soil, preferably in good sun. | Evergreen |
| **Spreading Oleaster** *Elaeagnus umbellata* | 2-6m | Leaves: Silvery when unfolding turning bright green, Flowers: Creamy yellow bell shaped, Berries: Red | Fragrant flowers in May to June. Berries in October to December. | Provides nectar for bees and butterflies, and food for wild birds | Any reasonable soil, preferably in good sun. | Deciduous |
| **Escallonia** *Escallonia macrantha* | 1-3m (Species dependent) | Leaves: Dark green and glossy, Flowers: Pinkish red, Berries: | Flowers June to September | Provides nectar for bees and butterflies. | Full sun or light shade. | Evergreen |
| **Fuchsia** *Fuchsia magellancia* | 2-3m | Leaves: Dark green leaves, Flowers: Purple and red. | Flowers: July to October | Attracts bees. | Full sun or light shade. | Deciduous |
| **Hebe** *Hebe spp.* | 80cm | | Flowers May-September (depending on variety). | Food source for 26 species of butterfly including the Speckled Wood | Well-drained soil in full sun. Plant semi-ripe cuttings in a cold frame in summer. | Evergreen |
| **Hebe** *Hebe albicans.* | 30cm x 90cm | Leaves: Small and Green, Flowers: White | Flowers in June to July. | Nectar for bees and butterflies. | Well-drained soil in full sun. Plant semi-ripe cuttings in a cold frame in summer. | Evergreen |

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| **Hebe** *Hebe andersonii 'variegata'.* | To 2m | Leaves: Small and Green, Flowers: Mauve | Flowers in August to September. | Good for invertebrates with a late supply of nectar | Well-drained soil in full sun. Plant semi-ripe cuttings in a cold frame in summer. | Evergreen |
| **Hebe** *Hebe brachysiphon.* | To 2m | Leaves: Small and Green, Flowers: White | Flowers in June to July. | Nectar for bees and butterflies. | Well-drained soil in full sun. Plant semi-ripe cuttings in a cold frame in summer. | Evergreen |
| **Hebe** *Hebe salicifolia.* | 90-150cm | Leaves: Small and Green, Flowers: White | Flowers in June to September. | Nectar for bees and butterflies. | Well-drained soil in full sun. Plant semi-ripe cuttings in a cold frame in summer. | Evergreen |
| **Shrubby Helichrysum** *Helichrysum italicum* | 60cm | Leaves: Grey-green silvery leaves, Flowers: Yellow. | Yellow flowers in June to August. | Nectar source for bees and butterflies | Well-drained sandy soil in full sun. | Evergreen |
| **Hydrangea** *Hydrangea spp.* | 1-2.5m | Leaves: Green, Flowers: Depends upon species/varieties. | Flowers July to September | Provides nectar for bees and butterflies. | Well-drained fertile soil in full sun. needs watering through dry spells. | Deciduous |
| **St. John's Wort** aka 'Rose of Sharon' *Hypericum calycinum* | To 1m | Leaves: Green turning red in autumn, Flowers: Yellow, Berries: Red | Flowers June to October. | Flowers attract insects especially bees. Berries are eaten by birds and small mammals. | Full sun or light shade. Plant semi-ripe cuttings in a cold frame in summer. | Semi-evergreen |
| **Hyssop** *Hyssopus officinalis* | 60cm | Leaves: Green, Flowers: Small blue flowers on spikelets. | Low evergreen shrub | Attractive for some butterflies | Well-drained fertile soil in full sun. | Semi-evergreen |
| **Holly 'Golden King'** *Ilex altaclerensis* | 300 x 150+ cm | Leaves: Glossy green with yellow borders and small spines, Flowers: Small pink/white, Berries: Bright red. | Flowers: May. Berries: (only on female trees) October to December. | Berries good for birds and small mammals. Holly leaf miner provides winter food for birds. | Any reasonable soil in full sun or partial shade. Need male and female plants near each other to produce berries. | Evergreen |
| **Lavender** *Lavandula angustifolia* | 75 x 75 cm | Leaves: Greyish-green, Flowers: Blue/purple. | Flowers: July to September | Attracts butterflies | Plant semi-ripe cuttings in a cold frame in summer. | Evergreen |

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| **Oregon Grape** *Mahonia aquifolium* | 1m | Leaves: Green and glossy with small spikes, Flowers: Yellow. | Flowers March to April | Nectar for bees and butterflies. | Thrives best in partial shade. | Evergreen |
| **Daisy Bush** *Olearia haastii* | 1-2m | Leaves: Green and glossy, Flowers: White. | Flowers white, July to August | Nectar for bees and butterflies. | Well drained soil in full sun. | Evergreen |
| **Russian Sage** *Perovskia atriplicifolia* | 1m | Leaves: Greyish-green, Flowers: Blue/purple. | Flowers: August to October | Good for bees | Full sun essential | Deciduous |
| **Mock Orange** *Philadelphus coronarius* | 1.5-3m | Leaves: Yellow and green, Flowers: White. | Flowers June to July. | Nectar for bees and butterflies. | Full sun. | Deciduous |
| **Firethorn** *Pyracantha atalantioides* | 3m | Leaves: Dark green, Flowers: White, Berries: Red/orange | Berries: October-January | Good for nesting thrushes and a site or an open robin box. Nectar for bees, berries for birds. | Thrives in most good soils. | Evergreen |
| **Firethorn** *Pyracantha coccinea* | To 3.5m | Leaves: Dark green, Flowers: White, Berries: Red/orange | Berries: October-January | Good for nesting thrushes and a site or an open robin box. Nectar for bees, berries for birds. | Thrives in most good soils. | Evergreen |
| **Black Current** *Ribes nigrum* | 2m | Leaves: Green , Flowers: Pink, Berries: Black. | Flowers: April. | Good for bees, birds and small mammals | Thrives in full sun or partial shade. | Deciduous |
| **Ornamental Current** *Ribes odoratum* | 2m | Leaves: Green turning purple in Autumn, Flowers: Yellow, Berries: Black. | Flowers: April. | Good for bees and birds | Thrives in full sun or partial shade. | Deciduous |
| **Flowering Currant** *Ribes sanguineum* | 2m x 1.5m | Leaves: Green , Flowers: Pink, Berries: Black. | Flowers March to April | Provides nectar for bees and butterflies. | Full sun or light shade. | Deciduous |

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| **Rosemary** *Rosemarinus officinalis* | 1.5m | Leaves: Green and thin, Flowers: Lilac. | Flowers April to May. | Nectar source for bees and butterflies | Well-drained soil in full sun. | Evergreen |
| **Blackberry** *Rubus fruticosus* | Sprawling plant 1.5-2.5m | Leaves: Green with thorns on underside, Flowers White, Berries: Red turning black when ripening | Flowers May to September with berries following the flowers until mid September. | Nectar source for bees and butterflies. Berries for birds and mammals. | Any soil in full sun or partial shade. Can be very invasive. | Deciduous shrub |
| **Loganberry** *Rubus loganobaccus* | 1.5-2.5m | Leaves: Green with thorns on underside, Flowers White, Berries: Dark red, Stems also have thorns. | Flowers May to August with large berries following. | Nectar source for bees and butterflies. Berries for birds and mammals. | Any reasonable soil in full sun or partial shade. | Deciduous shrub |
| **Shrubby Ragwort** *Senecio greyi* | 1m | Leaves: Bluish green upper with silvery hairy underside, Flowers: Yellow. | Flowers in June. | Nectar source for bees and butterflies | Well-drained soil in full sun. | Evergreen |
| **Skimmia** *Skimmia japonica* | To 1m | Leaves: Dark glossy green, Flowers: White, Berries: Red (but only if male and female trees are located near each other). | Flowers in April to May. | Nectar source for bees and butterflies | Well-drained, neutral to acid soil in full sun or partial shade. | Evergreen |
| **Bridal Wreath** *Spiraea arguta* | 2m | Leaves: Green, Flowers: Masses of white flowers. | Flowers April to May | Nectar for bees and butterflies. | Full sun on most soils | Deciduous |
| **Snowberry** *Symphoricarpos albus* | 1-2m | Leaves Green, Flowers: Small and pink in terminal spikes, Berries: White. | Flowers: June to September. | Caterpillars of the death's head hawk moth feed on the leaves. Good ground cover. Birds may feed on the berries when other food is scarce. | Forms dense thickets unless regularly pruned. | Deciduous |

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| **Lilac** *Syringa vulgaris* | 150 x 300cm | Leaves Green, Flowers: Colour depends on variety, in terminal spikes. | Flowers May to June | Nectar for bees and butterflies. | Best in full sun. | Deciduous |
| **Viburnum** *Viburnum bodnantense* | 1-2.5m | Leaves: Green, Flowers: Pink. | Flowers January to March. | Provides early nectar source for invertebrates and berries for birds. One of the most valuable winter flowering shrubs. | Sun or shade in most soils. | Deciduous |
| **Laurustinus** *Viburnum tinus* | 2-6m | Leaves: Green, Flowers: White to pink, Berries: Blue/black. | Flowers November - February | Provides late nectar source for invertebrates and berries for birds. | Sun or shade in most soils. | Evergreen |
| **Weigela** *Weigela florida* | 1.2m x 1.2m | Leaves: Green or green with yellow tinges (variety dependant), Flowers: Pink. | Flowers May to June | Provides nectar for bees and butterflies. | Rich, moist soils in full sun or partial shade. | Deciduous |
| **Native Herbaceous** | | | | | | |
| **Teasel** *Dipsacus fullonum* | 2m | Leaves: Green, Flowers: Light purple. | Flowers: July to August. | A food source of the Brimstone butterfly. Attracts other insects for its nectar and birds for its seeds. | Well-drained soil in full sun or light shade. | Biennial |
| **Purple Loosestrife** *Lythrum salicaria* | To 1.8m | Leaves: Green, Flowers: Purple. | Flowers in June to September. | Provides nectar for bees and butterflies. | Humus-rich soil in full sun or light shade with plenty of water, preferably boggy. | Border perennial |
| **Musk Mallow** *Malva moschata* | 60cm | Leaves: Green Flowers: Pink | Flowers between July and August. | Provides nectar for bees and butterflies. | Well-drained soil in full sun. | Border perennial |
| **Cat-mint** *Nepeta cataria* | 60-90cm | Leaves: Green above, white below. Flowers: White | Flowers July to September | Berries for birds and nectar for insects. | Well-drained soil in full sun. | Perennial |

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| **Wild Marjoram** *Origanum vulgare* | 50-70cm | Leaves: Green Flowers: Pale pink | Flowers July to September | Good plant for butterflies and bees | Dry soil preferably on calcareous soil. | Perennial |
| **Tormentil** *Potentilla erecta* | 30-45cm | Leaves: Green, Flowers: Yellow. | Flowers June to September | Good plant for butterflies and bees | Well drained soil preferably acidic. | Perennial |
| **Goldenrod** *Solidago virgaurea* | 70-100cm | Leaves: Green. Flowers: Yellow | Flowers July to September | 27 species of lepidoptera. | Open woodland, grassland and hedgerows. Well-drained soil. Full sun or light shade. | Perennial |
| **Betony** *Stachys officinalis* | To 60cm | Leaves: Green. Flowers: Pink/purple | Flowers June to September | Nectar source for bees and butterflies | Well-drained soil in full sun or partial shade. | Border perennial |
| **Common Valerian** *Valeriana officinalis* | Stems to 1m | Leaves: Green. Flowers: Pink/white. | Flowers June to September | Provides nectar for bees and butterflies. | Dry or damp grassy or rough ground. | Perennial |
| **Introduced Herbaceous** | | | | | | |
| **Rockery Alyssum** *Alyssum saxatile* | 20cm | Leaves: Green, Flowers: Bright yellow. | Flowers April to June | Provides nectar for bees and butterflies. | Grows well in poor, well-drained soil in full sun. It can soon spread if left unchecked. | Perennial |
| **Michaelmas Daisy** *Aster novae-belgii* | To 75cm | Leaves: Green, Flowers: Dark pink. | Dark pink flowers in September to October. | Good for invertebrates with a late supply of nectar. | Well-drained soil in full sun. Needs watering in dry weather. | Border perennial |
| **Perennial Wallflower** *Erysimum 'Bowles Mauve'* | To 75cm | Leaves: Dark green, Flowers: Mauve. | Blooms nearly all year round. | Provides nectar for insects. | Well-drained non-acid soil in full sun. | Evergreen perennial |
| **Dame's-violet** *Hesperis matronalis* | 60-100cm | Leaves: Green Flowers: Pink | Flowers May to July. | Very good nectar source for bees and butterflies. | Well-drained soil in full sun or partial shade. | Border perennial |

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| **Candytuft** *Iberis sempervirens* | 20cm high with 60cm spread. | Leaves: Dull yellowish green, Flowers: White. | Flowers May to June | Very good nectar source for bees and butterflies. | Well-drained soil in full sun. | Rocky perennial |
| **Golden Rays** aka Leopardplant *Ligularia dentata* | To 1m | Leaves: Bluish green, Flowers: Yellow. | Flowers July to September | Provides nectar for bees and butterflies. | Humus-rich soil in light shade with plenty of water, preferably boggy. | Border perennial |
| **Ice Plant** *Sedum spectabile* | 60 x 30cm | Leaves: Grey/green. Flowers: Pink | Flowers, June to October. | Provides nectar for bees and butterflies. The plant is extremely good for butterflies. | Average garden soil in full sun | Perennial |
| **Nasturtium** *Tropaelumm majus* | 1.8m | Leaves: Green. Flowers: Red, orange and yellow. | Flowers: June-October | Good for bees and beetles. Seeds eaten by birds and small mammals. Good insect plant. | Plant in sun or partial shade. Likes poor soil. | Climbing annual |
| **Native Climbers** | | | | | | |
| **Clematis 'Old Mans Beard'** *Clematis vitalba* | Climber to 30m | Leaves: Green. Flowers: White/green | Flowers in July | Provides nectar for bees and butterflies. | Prefers calcareous and alluvial soils | Deciduous |
| **Ivy** *Hedera helix* | Climber | Leaves: Dark green, shiny. Flowers: Green/yellow. Berries: Black | Flowers October to November. | Provides late nectar source and cover/hibernating sites for invertebrates. Food source for the Holly Blue butterfly larva. | Trees, banks, rocks and crawling over the floor. Thrives in shade. Remove and plant rooted runners in spring. | Evergreen |
| **Hop** *Humulus lupulus* | Climber to 8m | Leaves: Yellowish-green, Flowers: Small yellowish brown. | Flowers July to August | Provides nectar for bees and butterflies. | Well-drained soil in full sun or light shade. | Perennial |
| **Honeysuckle** *Lonicera periclymenum* | Climber to 6m | Leaves: Dark green on top and bluish underneath. Flowers: red outside cream within Berries: Bright red. | Flowers July to August | Excellent food source for invertebrates including the Speckled Wood butterfly. Berries eaten by birds. | Woods, scrub and hedges. Sun or light shade. Plant semi-ripe cuttings in a cold frame in summer or Layer stems in spring | Deciduous |

| **Introduced Climbers** | | | | | | |
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| **Everlasting Pea** *Lathyrus latifolius* | Spreading climber to 1.8m. | Leaves: Green, Flowers: Pink-purple. Has long thin seed pods. | Flowers in July to September. | Provides nectar for bees and butterflies. | Well-drained soil in full sun or light shade. | Border perennial |
| **Japanese Wisteria** *Wisteria floribunda* | Climber (needs tying) | Leaves: Yellowish-green Flowers: Blue-purple in large drooping clusters. | Flowers early to mid summer but may not flower for the first year or two. | Provides nectar for bees and butterflies. | Well-drained soil in full sun or light shade. Needs plenty of space. | Evergreen |

## APPENDIX 3:
## BIRD BOX, BAT BRICK & LADYBIRD/LACEWING BOX DETAILS

# BIRD BOXES

### ATTRACTING BIRDS TO GARDENS

Initially to entice birds to an area, a good source of food must be available, so to attract birds to a garden provision of a bird table may be a good idea. The choice of plants within the garden must also be considered.

Plants producing large seed heads such as Sunflowers or Michaelmas Daisies are recommended, as are berry producing plants and shrubs such as Cotoneaster, Honeysuckle, Holly and Hawthorn. Larger shrubs also provide branches for birds to perch on and roosting sites. A source of water, not only for drinking but also for bathing, is also of an advantage.

In many new developments there may be a plentiful supply of food, however there may be nowhere for birds to nest. Provision of nesting boxes is therefore also vital to minimise the net biodiversity loss.

### MATERIALS

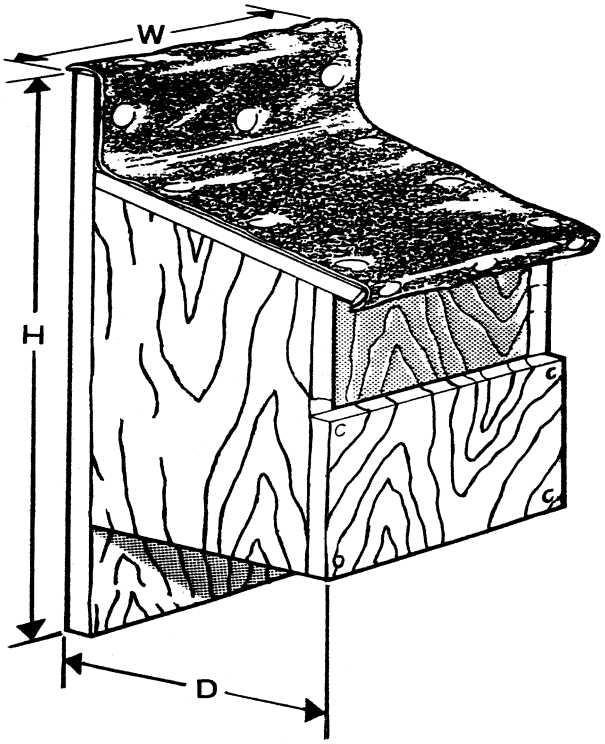
Bird boxes are generally constructed from wood or woodcrete (a concrete and wood paste). Any wood may be used, however it should be at least 15 mm thick, 20mm is ideal. Wood preserver should never be used on the inside of the nesting box.

### TIME TO ERECT BOXES

Boxes should be erected by March, but the earlier the better, as most birds seek out suitable nest sites some time before they start to construct their nest.

### POSITIONING THE BOX

Position the entrance facing away from the midday sun (south), ideally facing east to take advantage of the early morning sun. Boxes should not be positioned on the north of buildings. Angle the box slightly forward to keep out sun and rain. All boxes should have a clear flight path to the entrance. Most boxes should be positioned at a height of 2–3 metres however this varies between bird species. The optimum density for boxes depends on the species and habitat.



## HOLE ENTRANCE BOXES

Hole entrance boxes will attract a variety of birds, including the following species which are detailed further below:

- Barn Owl
- Nuthatch
- Jackdaw
- Starling
- All Tit species

**BARN OWLS**

Size: 450mm wide, 450mm high, 750mm Deep. Entrance: 150mm wide by 200mm high. The bigger the box the better! But allow for an extended floor for the young birds to exercise on. Siting: Boxes can be placed in trees, inside buildings or in straw stacks. Density: Two boxes sited in one territory would be of an advantage as they require both roosting and nesting sites. Barn owls are sensitive to disturbance. Try to position boxes at least 5 metres above ground level. Boxes sited on the edge of existing owl strongholds will bring the best results. Clean out the box every year, leaving a thin layer of pellets, new boxes should be lined with bark chippings.

**BLUE TIT**

Size: 100mm wide, 100mm deep and 150mm high, 25mm diameter entrance hole. Siting: 2-6 metres high. Density: Up to 6 per Ha. prefer a small box (see Blue tit) but still with a 28mm diameter entrance hole. Density: Up to 4 per Ha.

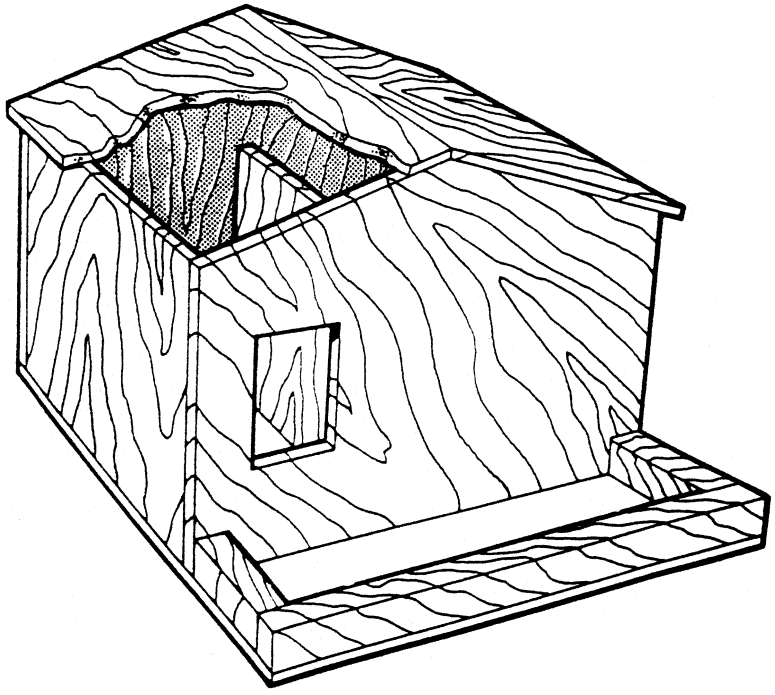
**MARSH TIT**

Size: 100mm wide, 100mm deep and 150mm high, 25mm diameter entrance hole. Sited: Up to 2 metres high. Density: No more than 1 box every 2 Ha.

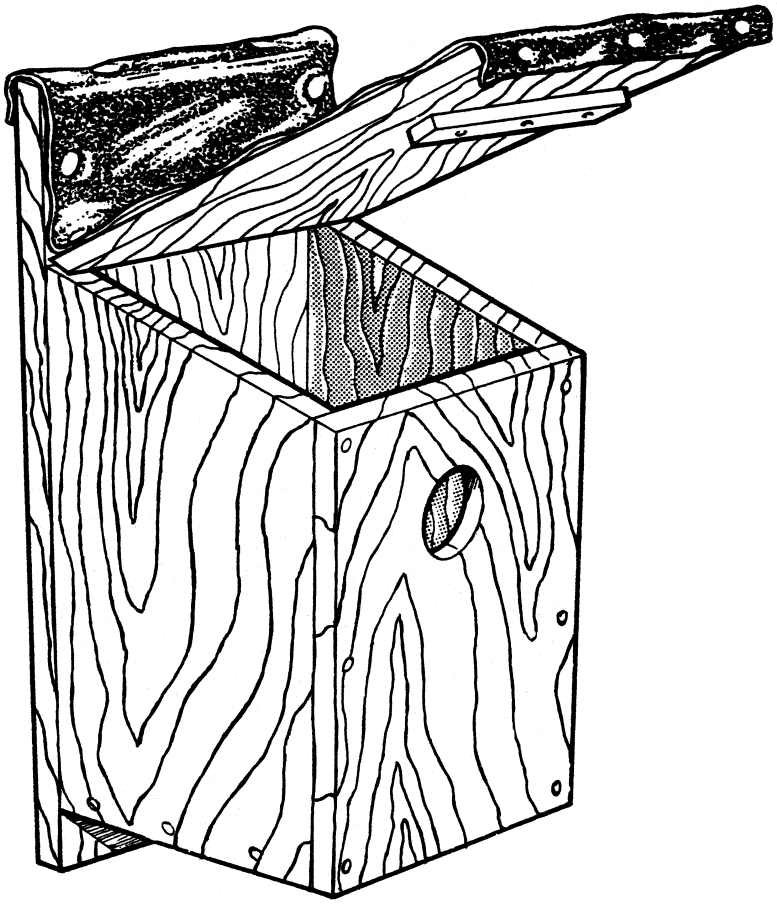
**GREAT TIT**

Size: 130mm wide, 130mm deep and 500mm high, 28mm entrance hole. Siting: 2-6 metres high. For roosting these birds

## BARN OWL BOX



**BASIC HOLE ENTRANCE BOX**



**COAL TIT**

Size: 100mm wide, 100mm deep and 150mm high, 25mm diameter entrance hole. Siting: Up to 2 metres in deciduous woodland or on an isolated conifer tree. Density: No more than 1 box every 2 Ha.

**WILLOW TIT**

Size: 100mm wide, 100mm deep and 150mm high, 25mm diameter entrance hole. Siting: Up to 2 metres high in thick cover. Will only colonise new areas if existing population is located near by. Fill box with wood shavings. Density: No more than 1 box every 2 Ha.

**NUTHATCH**

Size: 130mm wide, 130mm deep and 200mm high, 32mm diameter entrance hole. Siting: 2-6 metres high. Density: 1 box per hectare

**JACKDAW**

Size: 200mm wide, 200mm deep and 450mm high, 150mm diameter entrance hole. Siting: 6+ metres high. These birds are very secretive and need an inconspicuously placed entrance. Density: May nest colonially, therefore several boxes can be placed close together.

**STARLING**

Size: 200mm wide, 200mm deep and 450mm high, 45mm diameter entrance hole. Siting: Boxes can be located on trees or high up in the eaves of houses. Density: May nest colonially; can erect boxes on adjacent trees or buildings.

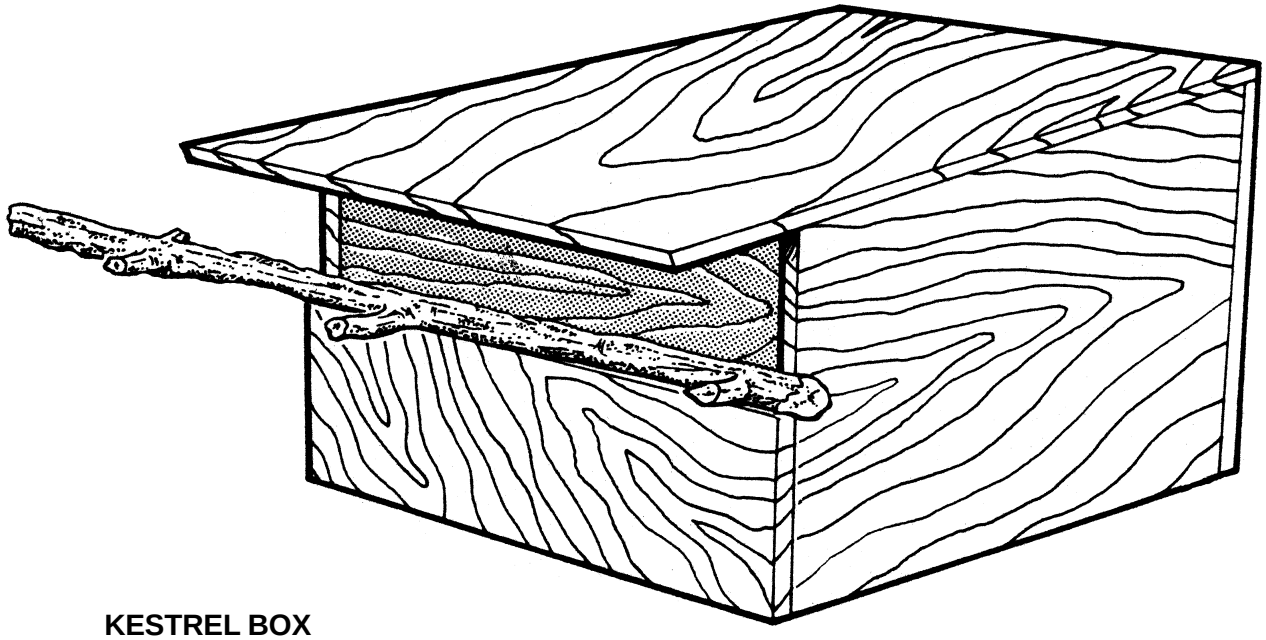
## OPEN FRONTED BOXES

These boxes will attract a number of species, including the following birds:

- Kestrel
- Robin
- Wren
- Black Redstart
- Blackbird
- Pied Wagtail
- Spotted Flycatcher

**KESTREL**

Size: 300mm wide, 500mm deep, 300mm high, front 150mm high. Siting: Box should be mounted at least 5 metres above the ground, sloping slightly backwards to keep the eggs and young at the rear of the box. The opening should be south-east facing with a clear flight path to the entrance. The box can be tree or pole mounted. The pole needs to be fixed firmly in the ground, using concrete, extending to a height of 3 metres or more, enabling the use of a ladder for maintenance purpose. Fix a strong perch along the top of the entrance, extending to one side, to allow both the adult and young to sit outside the box. Density: 1 box per 100 Ha.



**KESTREL BOX**

**SPOTTED FLYCATCHER**

Size: 150mm wide, 100mm high, 100mm deep, front 25mm high. Siting: These boxes should be erected on walls covered in ivy or honeysuckle overlooking a glade or lawn, positioned at a medium height (2-6 metres). Ensure a perch is available close by, a simple stick stuck in the ground a couple of metres from the box will suffice. Density: 1 box per ha.

**ROBIN**

Size: 100mm wide, 100mm deep and 150mm high. Siting: Boxes should be sited up to 2 metres high in a well hidden location, protected by thorny shrubbery. Density: No more than 1 box per 0.5 Ha.

**WREN**

Size: 100mm wide, 100mm deep and 150mm high. Sited: Up to 2 metres high. Wren will use both open fronted and hole entrance nesting boxes. A 30mm entrance is required in a small or very small box (see Blue tit). Siting: The box needs to be mounted low, up to 2 metres in thick undergrowth. Density: Clusters of 2 or 3 boxes per 0.5 Ha will cater for successive broods by the resident pair.

**PIED WAGTAIL**

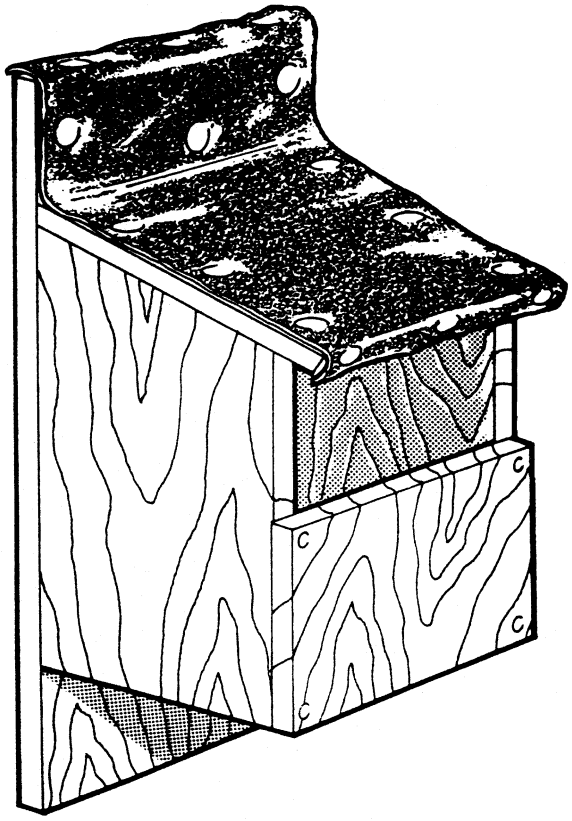
Size: 100mm wide, 100mm deep and 150mm high. Siting: These birds are very adaptable and the box can be sited in almost any situation – walls overlooking lawns, farm outbuildings, under bridges etc. Density: 1 box per 5 Ha.

**BLACK REDSTART**

Black redstarts are rare in Britain, with its populations concentrated in urban centres. They prefer complex vertical structures which provide them with high singing posts.

Size: 100mm wide, 100mm deep and 150mm high. Nest box entrance should not allow access to larger birds like feral pigeons. Siting: Boxes should be placed on tall buildings underneath structures like overhangs, balconies and escape routes. Density: A large number of nest boxes should be erected to give pairs some selection.

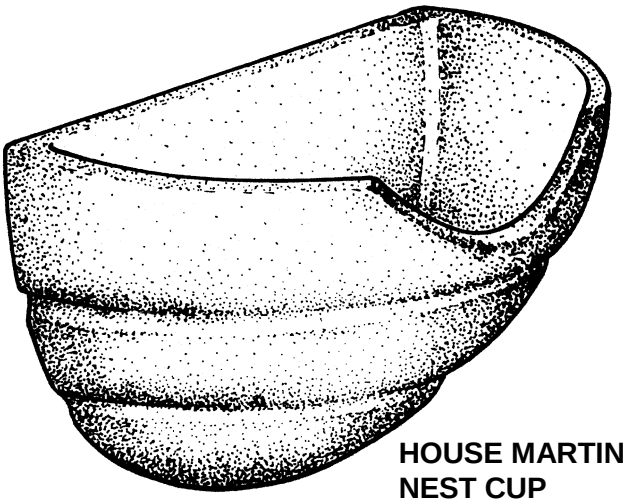
**BASIC OPEN FRONTED NEST BOX**



## SPECIAL BOXES

### HOUSE MARTIN

Internal dimensions: 70mm high, 120mm wide at back, 90mm deep.
Material: Concrete.
Siting: Boxes should be mounted under eaves, at least 2 metres high. Eaves should have an overhang of at least 150 mm to provide sufficient shelter. Ensure water cannot trickle into box. Density: House martins nest colonially; therefore nest cups should be grouped to encourage colonisation.



**HOUSE MARTIN NEST CUP**

### HOUSE SPARROW

Size: 555 mm wide, 210 mm high (front) and 265 mm high (back), 170 mm deep. 32mm entrance hole. House sparrows prefer to nest communally in boxes called terraces. Each box has three discreet nesting compartments, with entrance holes (one or two per compartment) located just under the lid. Siting: Boxes should be positioned at least 3 m above ground level; placing boxes under the eaves is ideal.
Density: This species nests colonially, but individual nest entrances should be at least 150mm apart.

### SWALLOW

Size: This simple bowl shaped nest is 110 mm high, 250 mm wide and 14 cm deep.
Siting: Nesting bowls should be sited as high as possible on ledges or rafters within buildings. Nest should be mounted with at least 100 mm of headroom.
Density: Swallows are sociable birds, however, nests should be placed no closer than 1 m apart.


HOUSE SPARROW BOX Photo by Dr Roger Chittock

## BAT BOXES & BAT BRICKS

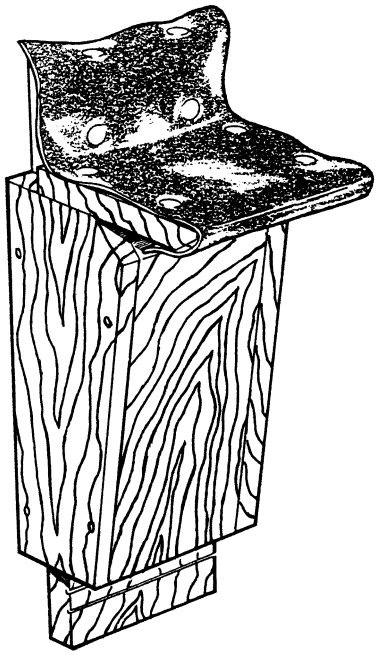
All British bat species present are protected by law, as their numbers have decreased rapidly within recent years. Bats, along with birds and spiders, are important insect predators, and are a vital part of the biological control of pests. An individual bat can eat up to 3,000 midges per night. For these reasons it is vital to incorporate features suitable for bats into developments.

### BAT BOXES

Most British species of bats will use bat boxes, to varying degrees, but those most commonly found include pipistrelles, leisler's, noctules and *Myotis* species. Bat boxes should be positioned in sunny locations, on trees or walls, mainly to the south or west, but a variety of different positions would provide a range of climatic conditions. Boxes should be placed as high as possible, at heights of between 3 to 6 metres. The entrance should be free from obstruction. As bats use a number of different roosts throughout the year, it is best to erect them in groups of 3 to 5 boxes across the site, to include a range of different aspects.

#### WOODEN BAT BOXES

Size: 100mm wide, 80mm deep and 400mm high.
The entrance should be a narrow slot at least 20mm wide underneath the box, allowing the animal to crawl up into the roost
Wood should be rough and at least 20mm thick. The thickness of the wood helps to protect the bats from changes in temperature. Most importantly, wood should be left untreated internally as some wood treatments are toxic to bats and smell unpleasant.



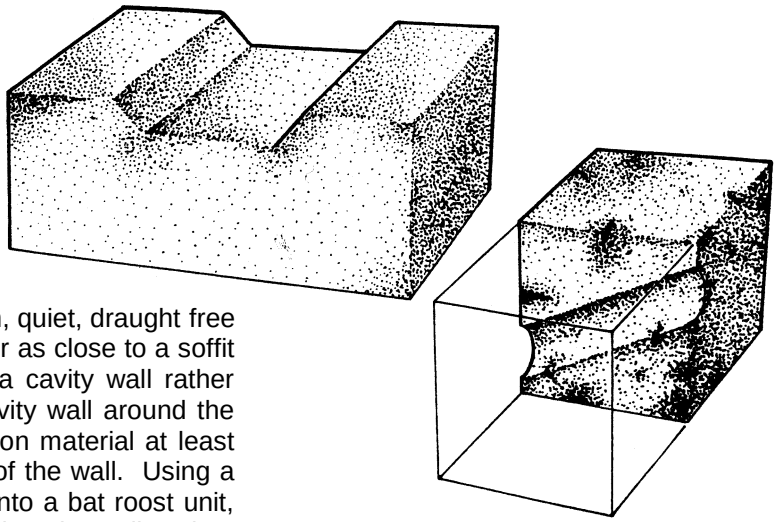
#### WOODCRETE BAT BOXES

Commercially made bat boxes, such as Schwegler boxes, are available in a number of designs for use in many of different locations, including trees, buildings and bridges. Certain models can also be designed into the fabric of buildings or bridges. The advantage of these boxes is that woodcrete is much longer lasting and more weather resistant than wood.

**WOODCRETE BAT BOXES SUITABLE FOR PIPISTRELLES (L) AND NOCTULES (R)**

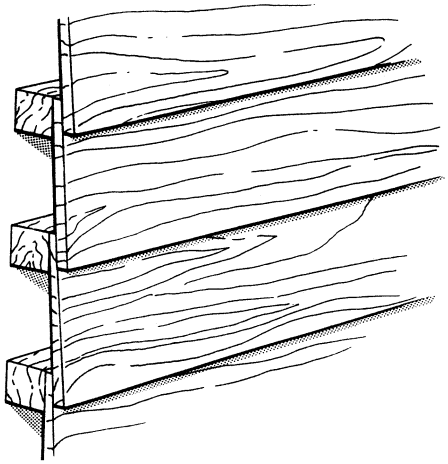

**OTHER ROOSTING FEATURES**

An alternative to bat boxes is to incorporate roosting features into the buildings structure.



**BAT BRICKS**

Bat bricks should be placed in a clean, quiet, draught free environment, ideally on a gable end or as close to a soffit as possible. Most bats will roost in a cavity wall rather than in a loft or large space. The cavity wall around the bat brick should be free from insulation material at least from the level of the brick to the top of the wall. Using a good quality bat brick, which enters into a bat roost unit, can prevent bats from gaining access into the wall cavity.



**OUTSIDE WALLS**

Battens and overlapping boards positioned on the outside of a building can also provide a roosting location. Fix 30mm battens to the upper part of a gable end wall, ideally facing south or west, and nail on horizontal overlapping boards or hanging tiles making sure to leave holes of sufficient size (at least 20mm x 100mm) allowing the bats to enter the roosting site.

# Bat Access and Bat Roost Bricks

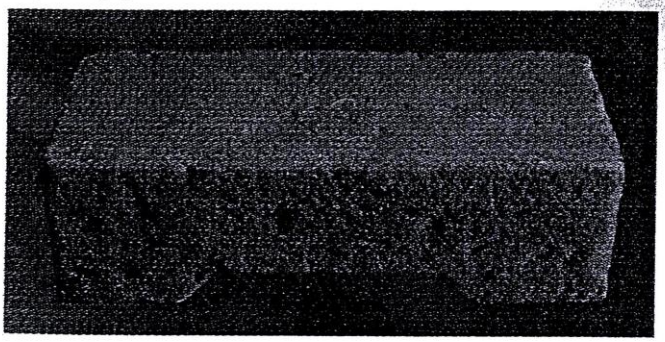
**Approved by the Bat Conservation Trust**

Over recent years Marshalls Clay Products has become almost as well known for the success of its award winning environmental work as it is for the quality of its brick products. Our land restoration and nature conservation schemes, first developed by Yorkshire Brick Company, have become an integral part of our activities over the years and have been recognised as some of the most successful of their kind anywhere.

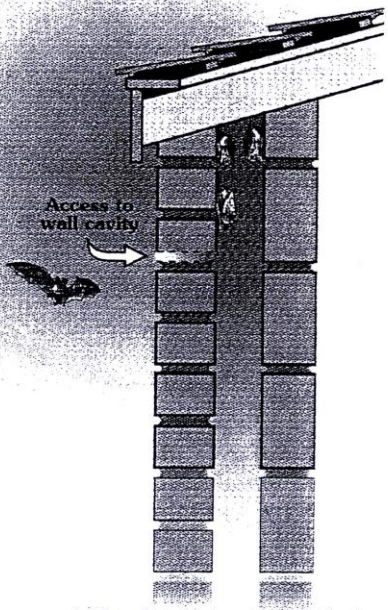
As part of this ongoing philosophy, Marshalls Clay Products have been producing a special Bat Access Brick, specially designed to help the country's badly depleted bat population by providing access to wall cavities or roof spaces where most bat colonies tend to be. *(see diagram)*

In recent years bats have been declining at an alarming rate, (estimates suggest as much as 60%) loss of habitat being a key factor in this decline. Nearly all colonies tend to be on the outside of houses, in wall cavities, under slates, flashing or tiles, etc.

Contrary to popular opinion bats do not make nests and do absolutely no damage to buildings or roof timbers, indeed many people encourage bat colonies in their area because of the large number of insect pests, woodworm, etc. which they eat. Most colonies will use a house for only a few weeks in summer before dispersing by the autumn.



*Marshall's Bat Access Brick, which is now also available in stone*

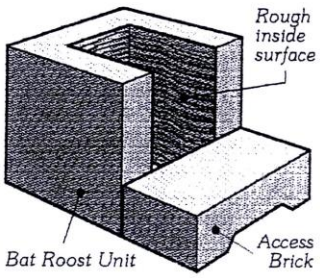



*A Bat Brick should ideally be placed as high as possible, at the gable apex or close to the soffit.*

## Bat Roost Unit

A recent survey of bridges in Yorkshire found that 25% were being used by bats. Other reports showing similar findings suggest that large number of tunnels and bridges are occupied by bats. As bats are protected under the 1981 Wildlife and Countryside Act, engineers should attempt to preserve the bat habitat while carrying out essential maintenance to these structures. If bats are known to use the structure, the Country Agency for Nature Conservation should be consulted.

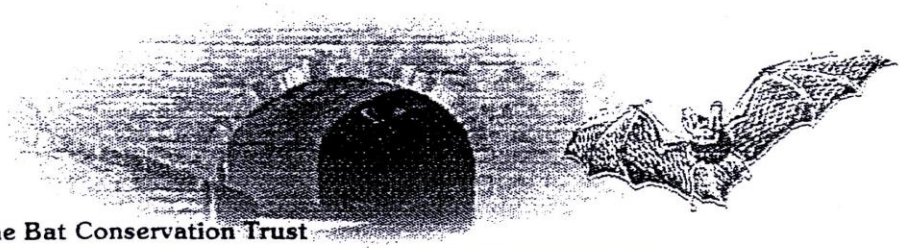
Following a meeting with The Bat Conservation Trust and British Waterways Technical Services Department, Marshalls Clay Products have developed an elegant solution in the form of their Bat Roost Unit. Used in conjunction with the Bat Access Brick, the unit provides a rough surfaced cavity of 110 X 150 X 215 mm. The module can be used in repairs to bridge arches and abutments as well as in many new construction projects.




**Marshalls**

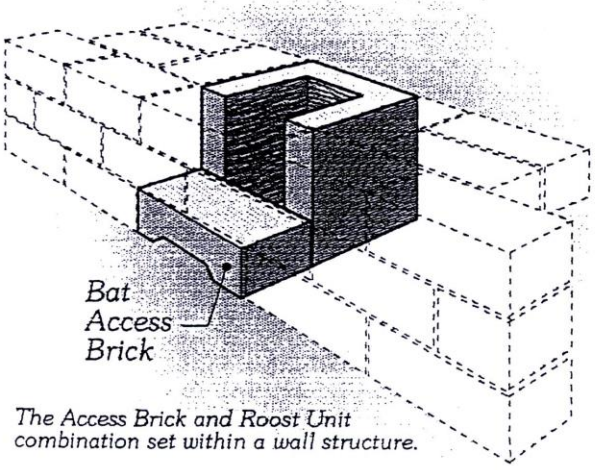
CLAY PRODUCTS
Quarry Lane, Howley Park, Woodkirk, Dewsbury, West Yorkshire WF12 7JJ
Tel (01132) 203535 Fax (01132) 203555

# Bat Roost Unit

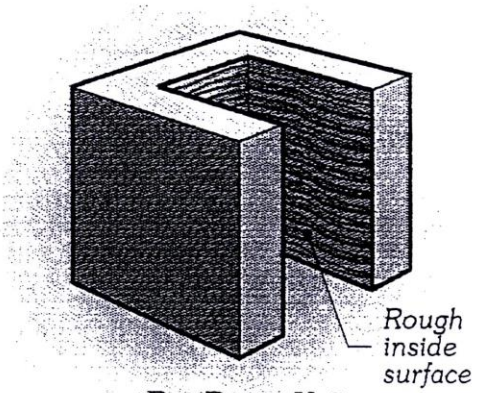


**Approved by The Bat Conservation Trust**

The preservation of bat habitats is very important to help maintain the diversity of bat species in this country. Engineers and specifiers can now play a significant role by specifying Bat Access Bricks and Bat Roost Units in repair and maintenance work. The Access Unit/Roost Unit combination has been carefully designed to work not just in new or existing walls but also within brick and stone arch structures.




*The Access Brick and Roost Unit combination set within a wall structure.*




**Bat Roost Unit**

Bat Access Bricks have been supplied in significant numbers to large organisations such as British Waterways and British Rail, who operate continuous maintenance programmes on bridges and tunnels.

Other organisations are ordering smaller numbers for incorporation into building works and some private individuals are using Bat Access Units in their own homes.

Marshalls Bat Access and Roost Units are approved by the Bat Conservation trust.

For more information on these innovative products contact **Julie Cull** at **Marshalls Clay Products**.
Telephone 01132 203535 ext. 3458

**Marshalls**

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Dewsbury, West Yorkshire WF12 7JJ
Tel (01132) 203535 Fax (01132) 203555

## The Bat Conservation Trust

The Bat Conservation Trust is Britain's only organisation solely devoted to the conservation of bats and their habitats. The BCT aims to prevent further declines in bat populations and to encourage the recovery of threatened species.

If you would like more information about bats or would like to become a bat supporter please contact us at the address

**The Bat Conservation Trust**
15 Cloisters House
8 Battersea Park Road
London
Tel 0171 627 2629
Fax 0171 6272628

## LADYBIRD & LACEWING BOX

### Introduction

Ladybirds and Lacewings are natural predators and valuable consumers of common garden pests such as aphids (greenfly and blackfly etc.). By encouraging these natural predators, a greater number of garden pests are consumed, reducing the need for chemical pesticides.

Ladybird and Lacewing boxes provide a number of locations where these insects can spend the winter, ready to consume the common garden pests the following spring.

As most people are familiar with ladybirds and happy to have them in their garden, they make an ideal natural pest control method.

### Materials

Cedar or Deal at least 20mm thick should be ideal. Never use wood preserver on the inside of the box. Inside the box, various diameters of hollowed bamboo canes should be used; canes should be a minimum of 100 mm long.

### Positioning the Box

The boxes should be placed in sunny positions in hedgerows, shrubs, on tree trunks, fence and garden sheds.