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Biodiversity is vital for current and future human wellbeing. The United Nations declared 2010 to be the International Year of Biodiversity; a global campaign to encourage action to safeguard the irreplaceable natural wealth on which we all depend.

How we design, procure and build our stores has a direct impact on the environment and its fragile ecosystems. As a responsible retailer, we recognise the importance of protecting, and where possible, enhancing the environments in which we trade.

This guide has been developed to help us clarify our ambitions and priorities when considering biodiversity. It outlines a variety of solutions and explains the benefits and risks associated with them. Whilst it is not intended that this is an exhaustive list, it provides an overview for those who desire to learn more about the subject.

We recognise that many of these solutions will not offer a commercial payback. Having committed in Plan A to introduce biodiversity audits and action plans for major store building projects by 2011, we will need to assess the potential scope for each scheme.

We welcome your feedback and look forward to continuing to work together to protect our natural environment.

Steve Fuller
Head of Construction and Store Architecture
Foreword

Dusty Gedge

I welcome the opportunity to write a brief introduction to the M&S Sustainable Construction Biodiversity Guide.

Over the last few years, I have been in discussion with M&S regarding the mainstreaming of biodiversity as part of achieving a lower ecological footprint. There is always the potential for conflict between development and nature conservation, however, the built environment can provide real opportunities for a range of wildlife.

Market leaders such as M&S can be standard bearers to ensure that the whole business community steps up a gear and embraces the need for good ecological design. In doing so, both business needs and the needs of the natural world can be combined.

This guide is an important part of that process. The fact that M&S has taken this step will help to ensure that consultants, designers and employees have a tool that embeds biodiversity into the ecological fabric of all store developments and modernisations.

Businesses can deliver tangible benefits to biodiversity, whether this is through ecological landscaping, green roofs or habitat provision in other forms. I am certain that this guide will lead to the creation of many exemplar schemes over the coming years and will hopefully be another benchmark for companies and businesses who must wholeheartedly embrace the need to reduce their ecological footprint.

Dusty Gedge
President of the European Federation of Green Roof Associations
Director of Livingroofs.org

www.livingroofs.org
www.greenroofconsultancy.com
Introduction

What is biodiversity?
Biodiversity means the variety of life, in all its forms and at all levels. This ranges from genes to species to ecosystems - everything that collectively forms the biological diversity on Earth.

The term biodiversity, however, is often used to refer to the variety of plant and animal species.

Why is biodiversity important?
Biodiversity is essential in maintaining our quality of life and a healthy environment. The continuous decline of biodiversity has serious consequences and its protection and enhancement is essential if we are to achieve a sustainable future.

We depend on biodiversity for food, health, natural resources and a range of ecosystem services such as air and water purification, soil fertility and plant pollination. Maintaining biodiversity is also crucial to the development and discovery of new medicines.

There are many complex and interdependent relationships between species and the services they offer, and the loss or decline of one species can have profound consequences on other species and ecosystems. Biodiversity is necessary to continue these relationships and maintain what is often referred to as an ecological balance.

Moreover, many people believe that life on earth has an intrinsic value and that we have a moral responsibility to maintain biodiversity and protect species from extinction.

“Biodiversity loss is moving ecological systems ever closer to a tipping point beyond which they will no longer be able to fulfil their vital functions.”

UN Secretary-General Ban Ki-moon, International Day for Biological Diversity, 22 May 2010.
Biodiversity in decline – some UK statistics

- 39% of habitats and 27% of ‘priority species’ are in decline, with some showing accelerated deterioration.

- Butterfly populations have dropped by an average of 55% in the last 30 years.

- Bird numbers have depleted by an average of 6% in the last 30 years.

- A major decline of bees, arable plants and amphibians has also been recorded.

Biodiversity and the built environment

Increasing urbanisation is contributing to the decline of biodiversity due to the loss and division of natural habitats. Providing opportunities for biodiversity in our built environment is one way that it can be protected and enhanced.

The need for low carbon buildings has led to changes in construction techniques and materials and increasingly airtight buildings present fewer opportunities for many bird and bat species. Incorporating simple design features in our buildings can provide nesting and roosting potential that would otherwise be lost.

Specifying biodiversity design features can also offer a number of other benefits including:

- Helping a building meet local planning requirements.
- Enhancing opportunities to gain BREEAM credits.
- Improving building performance through insulation, shading and reduced stormwater runoff in some cases.
- Engaging the support of local communities and nature groups.
- Demonstrating corporate social and environmental responsibility.

Plan A targets

- Introduce biodiversity audits and action plans for major store building projects by 2011.

Our aim is to create new stores with a net positive biodiversity impact which means that the level of onsite biodiversity post-construction is higher than it was before we developed the site.
How to use this guide

The M&S Sustainable Construction Biodiversity Guide has been designed for all those involved in our store development programme and should be consulted from the start of each construction project. It is a requirement of our Prelims with our contractors and is a mandatory element of all our activities.

This guide should be read alongside our Sustainable Construction Manual, developer shell specifications, design guides and contractual arrangements. It is broken down into a number of key sections in order to enhance biodiversity in our construction activities.

The M&S biodiversity process identifies a clear step by step process to addressing biodiversity throughout our acquisition, design, construction and handover stages. It also contains guidance on how to create a Site Biodiversity Action Plan (SBAP) and the responsibilities for its completion.

The guide to biodiversity design features presents an overview of design features that can be used to maintain and enhance biodiversity at the building and building curtilage levels. It contains information which can be used to inform design decisions and identify the most relevant approach to enhancing biodiversity in a particular project.

The case study of Ecclesall Road, Sheffield is an example of how biodiversity has been addressed and enhanced in a recent M&S store development project. It includes detailed information regarding site plans and an extract from the Ecclesall Road SBAP to provide design teams with further guidance.

Legislation and key policy drivers provides an overview of biodiversity action plans, wildlife legislation, planning policy relevant to biodiversity and BREEAM Retail 2008 Land Use and Ecology credits.

Terms that are highlighted in green bold type are defined in the glossary at the back of the guide.
The M&S biodiversity process

The M&S biodiversity process establishes a mandatory procedure for addressing and enhancing biodiversity in the construction and operation of major store building projects.

This process is integral to delivering our Plan A commitment to biodiversity and design teams should ensure this process is implemented.

This section contains:

- The M&S biodiversity process diagram - outlines a process for addressing biodiversity throughout the construction stages.
- M&S SBAP requirements - identifies the actions required and assigns responsibility for completing the SBAP template.
The M&S biodiversity process

**PROJECT BRIEF**

**FEASIBILITY** (Stage A/B)

**CONCEPT DESIGN** (Stage C)

**SCHEME DESIGN** (Stage D)

**PROCUREMENT**

**DETAILED DESIGN** (Stage E)

**CONSTRUCTION**

**COMMISSIONING**

**IN USE**

**PLAN A ambition:** Net biodiversity gain

1. **Ecological Survey**
   - Identify opportunities for gain
   - Appoint a Biodiversity Champion eg Architect/Lead Designer

2. **Preparing the Action Plan**
   - Specify features to enhance biodiversity
   - Biodiversity Champion role transferred to Main Contractor

3. **Implementation**
   - Biodiversity Champion role transferred to RFM & Store Team

4. **Management and Monitoring**
   - No

5. **Education and Awareness**
   - Cost & Spec sign off including maintenance requirements
   - Biodiversity features acceptable for sign off?

6. **Review and Reporting**
   - Yes

**LESSONS LEARNED TO INFORM DESIGN TEAM FOR FUTURE PROJECTS**

**REVIEWS FEATURES**

**Net biodiversity gain achieved?**

**Key stages of the SBAP**

*Sustainable Construction Biodiversity Guide Marks & Spencer 09*
M&S SBAP requirements

An SBAP addresses biodiversity on a particular site and includes actions relating to the needs of specific habitats and species. The content of an SBAP will change depending on a site’s context.

An SBAP should be informed by the Local Biodiversity Action Plan (LBAP). LBAPs generally conform to county boundaries and identify local biodiversity resources and priorities. They usually include actions to address the needs of UK priority habitats and species as listed in the UK Biodiversity Action Plan (UK BAP).

More information on biodiversity action plans can be found on page 57.

The guidance outlined in this section details the actions that are required to complete the SBAP template which can be found on the M&S Questa system. Completion of this template will ensure compliance with our Plan A commitment.

This section should be read alongside the M&S biodiversity process diagram (page 9). Stages 1-6 of the M&S SBAP are identified in the biodiversity process diagram to show when specific SBAP stages should be completed during the construction process.

A number of people hold responsibility for completing the SBAP as clearly identified in this section.
# M&S SBAP

**Key: Responsibility for completing SBAP actions**

- M&S Construction Project Manager (CPM) or External Project Manager (EPM)
- Accredited Ecologist
- Biodiversity Champion
- Main Contractor
- Regional Facilities Manager (RFM)
- M&S Management

## Aims

**Actions**

These are the required actions which should be completed on the SBAP template

### 1. Ecological survey of site and surrounding area

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appoint an Accredited Ecologist</td>
<td>CPM/EPM to appoint an accredited ecologist (where relevant).</td>
</tr>
<tr>
<td>1.1 CPM/EPM</td>
<td>Extended phase one habitat survey (habitats are defined and mapped using a standard numerical and colour code system, specified by the Joint Nature Conservation Committee (JNCC) 1993. Phase one habitat surveys cover large areas of countryside. An extended phase one habitat survey is more site-specific and covers a small area in detail. Survey should be carried out by an accredited ecologist and conducted over one year. If this is not possible, the survey should be conducted over spring/summer.</td>
</tr>
<tr>
<td>1.2 Accredited Ecologist</td>
<td>Identify: - Habitats that exist onsite or in surrounding area. - Species of animals, birds, insects and plants existing onsite or in the surrounding area. - Species and habitats that could potentially be reintroduced to the site. - Any statutory sites of biological/scientific interest in the surrounding area. - BREEAM assessment requirements and opportunities for gaining BREEAM credits (where relevant).</td>
</tr>
<tr>
<td>1.3 Accredited Ecologist</td>
<td>Relate outcome of survey to statutory designations: - UKBAP national priority species and habitats. - LBAP local priority species and habitats.</td>
</tr>
<tr>
<td>1.4 Accredited Ecologist</td>
<td>CPM/EPM to appoint a Biodiversity Champion from the design team to oversee the protection and enhancement of biodiversity onsite. (Architect/Lead Designer best placed for this role at this point in the process).</td>
</tr>
<tr>
<td>1.5 CPM/EPM</td>
<td>Using the data collected, develop a list of species and habitats that will be supported by the SBAP.</td>
</tr>
<tr>
<td>1.6 Accredited Ecologist</td>
<td>Identify any resources that already exist onsite which support biodiversity.</td>
</tr>
</tbody>
</table>
# Biodiversity Champion

The Biodiversity Champion role is transferred as the construction stages progress. The following chain of responsibility should be followed:

1. The role is assigned at the start of the project to the Architect/Lead Designer until a minimum of two weeks before construction starts.
2. Transferred from the Architect/Lead Designer to the Main Contractor a minimum of two weeks before construction starts.
3. Transferred from the Main Contractor to M&S at PC minus two weeks during walk around.

## 2. Preparing the action plan

### Specification of action to enhance biodiversity

<table>
<thead>
<tr>
<th>Step</th>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Architect</td>
<td>With reference to the ecological survey and M&amp;S Sustainable Construction Biodiversity Guide, consult with the ecologist to identify which biodiversity design features will support the species and habitats that have been identified.</td>
</tr>
<tr>
<td>2.2</td>
<td>Architect</td>
<td>At the design stage, consider maximising existing resources that promote biodiversity.</td>
</tr>
</tbody>
</table>
| 2.3   | Architect | Develop a design specification for each feature in relation to the site - this will assist at the design stage. The guide to biodiversity design features (page 15) should be consulted for each relevant feature. Specification should detail:  
- Siting.  
- Planting.  
- Any specific detailing.  
- Maintenance requirements. |
| 2.4   | Architect | The design specification is fully briefed to all design team members during team updates. |
| 2.5   | Accredited Ecologist | Accredited Ecologist to provide a sense check of the design specification for each feature. |

### Biodiversity indicators

<table>
<thead>
<tr>
<th>Step</th>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
</table>
| 2.6   | Accredited Ecologist | Develop a set of flexible indicators relevant to the selected species, habitats and biodiversity design features. Indicators will inform:  
- Targets.  
- Progress.  
- Review.  
- Publication. |

### Biodiversity targets

<table>
<thead>
<tr>
<th>Step</th>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.7</td>
<td>Biodiversity Champion (Architect/Lead Designer)</td>
<td>With reference to the biodiversity indicators, develop a series of ongoing targets that will monitor design and construction and enhance and maintain biodiversity onsite.</td>
</tr>
</tbody>
</table>

### Directory of design and construction specialists

<table>
<thead>
<tr>
<th>Step</th>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
</table>
| 2.8   | Biodiversity Champion (Architect/Lead Designer) | In parallel to the design specification, compile a directory of ideally locally sourced:  
- Contractors.  
- Specialists.  
- Materials.  
To be consulted from the outset of the design stage. |
### Information distribution

<table>
<thead>
<tr>
<th>Section</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.9</td>
<td>Biodiversity Champion (Architect/Lead Designer)</td>
</tr>
</tbody>
</table>

It is important to ensure that every member of the project team receives a copy of the working SBAP (to this point), design specification and directory as part of the universal project file.

### Maintenance schedule

<table>
<thead>
<tr>
<th>Section</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.10</td>
<td>Architect (with RFM)</td>
</tr>
</tbody>
</table>

Outline a schedule of regular and recorded maintenance to support the individual biodiversity features and help maintain site-wide biodiversity.

### Cost & spec sign off including maintenance requirements

<table>
<thead>
<tr>
<th>Section</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.11</td>
<td>Architect</td>
</tr>
</tbody>
</table>

The cost and specification of all biodiversity design features should be signed off by all relevant design team members. If design features are not acceptable for sign off, they should be reviewed and re-specified.

### Biodiversity Champion transfer

At this point, the Biodiversity Champion role and responsibility for completing the SBAP should be transferred from the Architect/Lead Designer to the Main Contractor.

This should take place a minimum of two weeks before construction starts.

## 3. Implementation

### Design and construction stage

<table>
<thead>
<tr>
<th>Section</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Main Contractor</td>
</tr>
</tbody>
</table>

Ensure that adequate measures are in place to protect existing biodiversity onsite before construction commences. The contractor should refer to the ecological survey to identify any resources onsite that support biodiversity.

<table>
<thead>
<tr>
<th>Section</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2</td>
<td>Main Contractor</td>
</tr>
</tbody>
</table>

Incorporate the design and construction of biodiversity features into the project from the outset. Follow through until construction is complete.

### Progress review

<table>
<thead>
<tr>
<th>Section</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3</td>
<td>Biodiversity Champion (Main Contractor)</td>
</tr>
</tbody>
</table>

Review performance of the design and construction phases against the targets outlined in Section 2.

### Biodiversity Champion transfer

At this point, the Biodiversity Champion role and responsibility for completing the SBAP should be transferred from the Main Contractor to the RFM. M&S should sign off the implementation of the SBAP before it is transferred.

This should happen at approximately PC minus two weeks when the walk around takes place. This can be combined with BREEAM evidence gathering.
### 4. Management and monitoring

#### Monitoring schedule

**4.1 Accredited Ecologist**

Outline a monitoring schedule that will regularly record and analyse:
- The status of biodiversity: fluctuations and progress in the biodiversity of the site and specific features, with reference to supported species and habitats.
- New and additional data: ecological surveys at given intervals as recommended by the ecologist.
- Potential problems: includes disease, blockage or structural failure. Help ensure that these do not develop.

#### Maintenance schedule

**4.2 RFM (Biodiversity Champion)**

Implement a schedule of regular and recorded maintenance to support individual biodiversity features and help maintain site-wide biodiversity.

#### Management

**4.3 RFM (Biodiversity Champion)**

Develop a system of management that supports the monitoring and maintenance schedules.

#### Directory of maintenance specialists

**4.4 RFM (Biodiversity Champion)**

Maintain and enhance a directory of externally contracted maintenance providers and specialists. (Maintenance services are offered by the suppliers of some biodiversity design features eg living walls.)

### 5. Education and awareness

#### Staff/RFM training

**5.1 M&S Management**

Implement a staff/RFM training scheme that:
- Introduces the importance of biodiversity (overall and locally).
- Provides information about the SBAP and onsite features.
- Highlights the role of individuals in promoting biodiversity on and offsite.
- Enables staff to provide a confident source of information to the public.

#### Public education and awareness

**5.2 M&S Management**

Implement a customer awareness scheme that:
- Introduces the importance of biodiversity (overall and locally).
- Explains Plan A and the actions that M&S has taken.
- Draws attention to the biodiversity-enhancing features onsite.
- Is support by displays, leaflets, presentations, documentation etc.

Investigate the opportunity for an in-store surveillance system to monitor bird/bat boxes and bricks.
### 6. Reviewing and reporting

<table>
<thead>
<tr>
<th>Continuous development</th>
<th>6.1 RFM (Biodiversity Champion)</th>
<th>Use new data from site surveys to inform the development of management and maintenance schedules.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2 M&amp;S Management</td>
<td></td>
<td>Lessons learned to inform the design team and specification of biodiversity design features on future projects.</td>
</tr>
<tr>
<td>6.3 M&amp;S Management</td>
<td></td>
<td>Review and update the SBAP species and habitats list in relation to changes in the UKBAP and LBAP.</td>
</tr>
</tbody>
</table>
Guide to biodiversity design features

This section provides an overview of the design features which can enhance biodiversity. It contains information that can be used to inform design decisions and identify the most relevant approach to enhancing biodiversity in a particular project.

The section is split into two key areas:

- Biodiversity design features relevant at the building level.
- Biodiversity design features relevant at the building curtilage level.

Some design features are broken down into their most common types where appropriate. For example, climbing green walls and living walls are both types of green walls.

For each design feature, there is a table providing guidance on the levels of additional irrigation and maintenance typically required and whether the design feature is suitable for retrofitting existing stores and/or new build stores.
Building level design features

Green walls

**What?**
Green walls are walls which are completely or partially covered by plants and foliage.

There are two main types of green wall: climbing green walls and living walls.

**Why?**
Green walls can be used to add biodiversity value and attractiveness to vertical space.

In addition, green walls can provide other environmental and building performance benefits such as helping with the air filtration of a building.

**Type: Climbing green walls**

Climbing green walls are typically created using climbing plants rooted in the ground and grown directly on a building façade or onto trellis systems such as steel rods and cables.

Additional coverage and height can be gained through growing plants in irrigated containers attached at height to the building façade. It is possible to create an instant green wall or green screen using established climbing plants rooted in containers and grown onto frames.

Plants can also be hung from containers or troughs on the parapet or within the wall to create a hanging wall.

**Green façades**

<table>
<thead>
<tr>
<th>Additional irrigation</th>
<th>None/high*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>High</td>
</tr>
<tr>
<td>Retrofit</td>
<td>Yes</td>
</tr>
<tr>
<td>New build</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*Low/none - rooted in the ground. High - grown in containers

**Approximate costings**

Climbing or hanging plants for creating climbing green walls typically cost from £5 per plant.

A trellis system typically costs from £30 per m².

Steel frames accommodating established ivy plants that are rooted in containers cost approximately:

- £140-£165 per linear metre for a 1.8m high frame.
- £255-£280 per linear metre for a 2.3m high frame.
Type: Living wall

In contrast to climbing green walls which usually feature climbing plants rooted at the base of a wall, living walls consist of pre-planted modular panels or mats that are attached directly to the wall of a building and form part of the building fabric.

Modular systems containing plants can be connected to an irrigation system to create an instant green wall. As climbing plants are not essential, a wide variety of plants can be used.

Living walls can be either passive or active systems. Passive living walls are the most common type and are not integrated into a building’s air circulation system whereas active living walls are. They draw air through the roots of the living wall using an internal fan system. In this way, the living wall acts as a filter removing pollutants from the air before they reach the building interior.

The irrigation system required for a living wall can be linked to a rainwater harvesting system.

<table>
<thead>
<tr>
<th>Living walls</th>
<th>Approximate costings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional irrigation</td>
<td>High</td>
</tr>
<tr>
<td>Maintenance</td>
<td>High</td>
</tr>
<tr>
<td>Retrofit</td>
<td>Yes, but preferable to design and install as part of a new build project</td>
</tr>
<tr>
<td>New build</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Approximately £400-550 per m² for pre-planted modular panels incorporating an irrigation system to be installed.

Typically, separate maintenance schedule costs are in addition to those outlined above.
Biodiversity benefits of green walls
Planting will dictate the level of biodiversity and should include a variety of native species and reflect local habitats.

Green walls provide habitats for invertebrates which in turn provide a food source for larger animals such as birds and bats. They can act as a transit route for wildlife between habitats at ground level and green roofs.

Combined with other biodiversity features, a green wall can become part of a habitat system. It can reduce the impact of a new development on surrounding areas and local habitats.

The dense foliage of climbing green walls can provide a nesting habitat for a variety of birds including the robin, wren and blackbird.

Other advantages of green walls
- A green wall is a highly visible biodiversity/green feature that can contribute towards defining the image of an organisation and/or store. It can entice customers and provide a positive first impression.
- Can help a building meet local planning requirements.
- Green walls are self regenerating cladding systems that can transform an inanimate building into something which lives, breathes and changes with the seasons.
- Plants can provide shade, cooling the building in summer and providing insulation during winter by reducing the rate of convection at the outer surface of the wall. In this way, green walls can reduce energy demand and associated costs.
- Evapotranspiration occurring at the building surface can help to reduce the urban heat island effect. Plants can also absorb CO₂ and help remove other pollutants from the air whilst providing the potential for sound insulation.
- The water retention properties of some green walls enable them to be considered as part of a Sustainable Urban Drainage System (SUDS).
- Signage and company branding can be incorporated into green wall design.

Disadvantages of green walls
- Regular maintenance is required for irrigation, fertilisation and the removal of dead matter, however, this can be easily managed with a proper strategy. Living walls in particular require an irrigation system, therefore water and energy demand should be considered.
- Plants are subject to disease and destruction from animals and humans. They can also block internal access to natural light if allowed to overgrow.
- Climbing plants should not cause damage to well built solid walls, however, they may not be suitable for walls with cavities or crumbling mortar as roots can take hold and cause damage. Trellis systems can limit the contact that climbing plants have with a wall.
Siting of green walls

The location of green walls is largely site specific and will depend on location and aesthetic. They are most beneficial when located on the south and west facing walls of a building to reduce solar overheating and provide shading.

To provide bioshading, planting should be designed around windows but carefully maintained to ensure that windows are not obstructed and daylight levels are not compromised.

Green walls are commonly located outdoors. It is possible to have an indoor green wall, however, artificial lighting may be required to aid growth.

Green walls require security andanchoring to withstand harsh weather conditions. Access should be considered in line with maintenance requirements.

Existing standards and additional issues relevant to green walls

- Germany and Switzerland have best practice examples of existing standards. See German Landscape Development Research Society (FFL) Regulations for the Planning, Construction and Maintenance of Façade Greening with Climbing Plants (FFL, 2000) at http://www.f-l-l.de/english.html.

- The Publicly Available Specification (PAS) 100: Specification for composted materials standard allows compost produced on site to be sold. It specifies trading requirements and ensures that a baseline quality is met. Waste material from green walls is potentially compostable.

- When specifying a green wall and considering planting you should refer to the Local Biodiversity Action Plan (LBAP) for regional issues and considerations. See http://www.ukbap-reporting.org.uk.

The Westfield living wall, predominantly planted with native ferns and woodland wildflowers
Green roofs

What?
A green roof is typically a roof with plants growing on it. It can come in many different forms and may be characterised by rubble and gravel to provide habitat. Plants are grown in substrate which often includes crushed recycled brick and concrete and light expanded clay aggregate (LECA).

There are three main types of green roof: extensive, intensive and semi-intensive.

Why?
With urban development increasingly claiming areas of natural habitat, green roofs offer a great opportunity to enhance biodiversity in an otherwise wasted space. They provide both environmental and building performance benefits and are increasingly becoming a planning requirement for local authorities.

Type: Extensive green roof

Extensive green roofs are lightweight and designed to be low maintenance. They are built up in layers on top of the existing roof structure with substrate depths varying from 30mm to 150mm.

Extensive green roofs are low cost compared with intensive roofs. Although hybrids do exist, there are typically three main types: sedum mat, substrate based and biodiversity roofs.

Sedum mat roofs
Sedums are pre-grown on a mat which is then unrolled on to a growing substrate. They are wind, frost and drought resistant but have less biodiversity value than substrate based and biodiversity roofs.

Approximate costings
There are many variants that need to be considered when specifying a green roof and costs are dependent on specification. Sedum mat roofs are approximately £80-£105 per m² fully installed. Prices include the cost of waterproofing the roof.
Substrate based roofs

These have a greater depth of growing substrate than sedum mat roofs. The substrate is plug-planted to allow for natural colonisation.

Substrate based roofs can feature sedum, wildflowers, wild grasses, and/or herbs. They have more biodiversity value than sedum mat roofs but less than biodiversity roofs.

Substrate based roofs

Approximate costings

There are many variants that need to be considered when specifying a green roof and costs are dependent on specification.

Substrate based roofs are approximately £95-£112 per m² fully installed.

Prices include the cost of waterproofing the roof.
**Biodiversity or ‘brown’ roofs**

Similar to substrate based roofs, biodiversity or brown roofs are designed specifically to maximise biodiversity. They have the deepest substrate and are left to colonise naturally or seeded with an annual wildflower mix or local seed source.

Biodiversity roofs can include banks of sand, rough stone, tree limbs and nesting habitat. They have more biodiversity value than both sedum mat and substrate based roofs and can be geared towards the LBAP.

---

**Approximate costings**

There are many variants that need to be considered when specifying a green roof and costs are dependent on specification.

Biodiverse roofs are approximately £110-£125 per m² fully installed.

Prices include the cost of waterproofing the roof.
Type: **Intensive green roofs**

Intensive green roofs are typically recreational roof gardens featuring landscaped designs. They have a greater depth of growing medium than extensive green roofs, often incorporating trees and shrubs. As a result, they may require extra loading within the holding structure as they weigh more than other green roofs.

Intensive green roofs can cost more as they require irrigation systems and have higher maintenance requirements. Substrate depths usually vary from 150mm to 400mm.

### Intensive green roofs

<table>
<thead>
<tr>
<th>Additional irrigation</th>
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<tbody>
<tr>
<td>Maintenance</td>
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<tr>
<td>Retrofit</td>
<td>No - only suitable for new stand alone stores</td>
</tr>
<tr>
<td>New build</td>
<td>Yes</td>
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</tbody>
</table>

### Approximate costings

Due to the bespoke nature of intensive green roofs, there is a huge variation in their specification. As a result, it is difficult to provide approximate costings as these depend on the spec.

Costs starting from £140 per m² can be expected and may be significantly higher.
Type: **Semi-intensive green roof**

These are similar to intensive green roofs but may also incorporate elements found in extensive roofs. They are designed to be viewed rather than used for recreational purposes and can accommodate grass, herbs and shrubs.

Semi-intensive green roofs have less substrate depth than intensive green roofs, typically 120mm to 250mm.

<table>
<thead>
<tr>
<th>Semi-intensive green roofs</th>
<th>Approximate costings</th>
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<tbody>
<tr>
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<td>Retrofit</td>
<td>No - only suitable for new stand alone stores</td>
</tr>
<tr>
<td>New build</td>
<td>Yes</td>
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</tbody>
</table>

**Biodiversity benefits of green roofs**

Green roofs provide an opportunity to replicate habitat lost to urban development. They can be designed to enhance opportunities for insects, birds (e.g. foraging areas and nesting sites) and endangered species of plants, whilst reducing the impact of development on surrounding areas.

Planting will dictate the level of biodiversity and should reflect local habitats and species.

**Extensive sedum mat roof specific:** provides benefit for a limited range of invertebrate species as well as a foraging source for bees in late June and July.

**Extensive substrate based roof/biodiversity roof specific:** a substrate based approach incorporating a range of sedums, wildflowers and natural colonisation will provide greater opportunities for biodiversity than a sedum mat roof. Wildflowers will provide foraging opportunities throughout the summer.

**Semi-intensive/intensive green roof specific:** the planting scheme influences the potential for biodiversity. Native plants and flowering plants with foraging value should be considered. Tree limbs, water features and nesting boxes can increase the roof’s value to local wildlife.

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Due to the bespoke nature of intensive green roofs, there is a huge variation in their specification. As a result, it is difficult to provide approximate costings as these depend on the spec.

Costs starting from £140 per m² can be expected and may be significantly higher.
Other advantages of green roofs

- A highly visible biodiversity/green feature that can contribute towards defining the image of an organisation and/or store. It can entice customers and provide a positive first impression.
- Can transform a wasted space into something which lives, breathes and changes with the seasons. Green space can also encourage social cohesion.
- Can help a building meet local planning requirements.
- Provide thermal and sound insulation whilst helping to regulate internal temperatures throughout the year. They can also reduce energy demand and associated costs.
- Help reduce urban runoff after rainfall. Extensive roofs can retain between 40-60% potential runoff and intensive roofs between 60-100%. Water retention is dependant on planting, depth and saturation level of the substrate.
- Evapotranspiration at roof level can help to reduce the heat island effect.
- Can absorb CO₂ and help remove other pollutants from the air.

Disadvantages of green roofs

- Higher maintenance requirements than traditional roofs. Intensive green roofs in particular require more maintenance and irrigation than extensive green roofs which need little additional support after installation.
- Plants are subject to disease and destruction from animals and humans, however, this can be controlled through management and care.

Siting of green roofs

Green roofs can be installed on any flat roof or roof with a pitch of up to 30°. A pitch between 30° and 45° increases costs as restraining boards are required. A pitch over 45° has even more technical and cost implications.

The type and design of a green roof will depend on roof structure and whether the building is in existence or at the design stage.

Existing standards and additional issues relevant to green roofs

- Germany and Switzerland have best practice examples of existing standards. See the current construction standard: German Landscape Development Research (FFL) Guidelines for the Design and Construction of Green Roofs (FFL, 2002) at http://www.f-l-l.de/english.html.
- http://www.livingroofs.org provides UK-based information on green roofs.
- The Publicly Available Specification (PAS) 100: Specification for composted materials standard allows compost produced on site to be sold. It specifies trading requirements and ensures that a baseline quality is met. Waste material from green roofs is potentially compostable.
What?
Bat and bird boxes and bricks are attached to the building façade or incorporated into the fabric of the building. They are usually either designed for bats or birds (but sometimes both) and provide a place for them to nest, roost, hibernate and rear their young.

A wide variety of bat and bird boxes and bricks are available to meet the requirements of different species.

Why?
Many species of bats and birds are in decline throughout the UK and the lack of suitable sites to nest, roost, hibernate and rear their young is a key factor influencing this decline.

Modern methods of construction and increasing airtightness requirements for buildings has resulted in fewer features for bat and bird species to inhabit compared with more traditionally designed buildings.

Installing bat and bird boxes and bricks can mitigate this lack of opportunity.

Type: **Bat and bird boxes**

Bat and bird boxes can be attached to the building façade, under the eaves or to suitable locations on trees or walls within the building curtilage. It is essential that they are sited in a suitable location.

<table>
<thead>
<tr>
<th>Bat and bird boxes</th>
<th>Approximate costings</th>
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<tbody>
<tr>
<td>Additional irrigation</td>
<td>N/A</td>
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<tr>
<td>Maintenance</td>
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<tr>
<td>Retrofit</td>
<td>Yes</td>
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<td>New build</td>
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Prices vary from approximately £20-£120 per box.
Type: Bat and bird bricks

Bat and bird bricks are available in a range of shapes and sizes and replace conventional bricks in specific locations around the building. They are easily integrated into the design and construction of new builds and can be installed ‘flush’ with the outside wall, however, they take more effort to retrofit.

Biodiversity benefits of bat and bird boxes and bricks
Bat and bird boxes and bricks provide opportunities for bats and birds to nest, roost, hibernate and rear their young.

Preliminary research can help to ascertain which species are native to the area, whether or not a species might thrive within a particular development and what type and size of space they require.

Other advantages of bat and bird boxes and bricks

- Provide a visible commitment to enhancing biodiversity.
- Bird boxes and bricks need little or no maintenance after installation (dependant on the box/brick type). Maintenance usually involves checking that any fixings are secure and sometimes cleaning out old nesting material, however, this is often not essential. Bat boxes and bricks generally require no maintenance.
- Can accommodate cameras to help involve building users and raise awareness of the importance of biodiversity.
- Bricks can be ‘hidden’ in walls.

Disadvantages of bat and bird boxes and bricks

- It can take several years for bricks or boxes to be used. Usage is not guaranteed, especially if there are many other roosting/nesting sites in the area or the species has already become locally extinct.
- Bat boxes in use must not be disturbed at any time. All 17 UK bat species are protected by law: it is illegal to kill, injure or disturb a bat or to damage, destroy or obstruct access to a roost.
- If in use, bird boxes must not be disturbed during the nesting season - it is an offence to do so.
- Maintenance/cleaning where required will involve working from height to access the box or brick.

Bat and bird boxes

<table>
<thead>
<tr>
<th>Additional irrigation</th>
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<tr>
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Approximate costings
Prices vary from approximately £30-£60 per unit.

Black Redstart nesting in a Schwegler bird brick
Siting of bat and bird boxes and bricks

Ecological surveys can be carried out to ensure boxes/bricks are situated in optimum locations (eg. taking into account flight paths and foraging grounds etc). Siting guidelines are also issued by retailers. In addition, Swift Conservation www.swift-conservation.org, the RSPB www.rspb.org.uk and the Bat Conservation Trust www.bats.org.uk offer siting advice.

Both boxes and bricks should be sheltered and away from direct night-time lighting. Artificial lighting can affect the biodiversity in an area. If external lighting is necessary, the type of bulb, wattage and direction of the light source should be carefully considered to ensure that boxes, bricks and foraging grounds are not in direct light.

Bat boxes and bricks should be installed at a height of 3-6m, facing from south-east to south-west where possible and sheltered from strong winds. It is important to install a mix of colony and individual boxes.

Bat boxes and bricks should be located close to a linear vegetation feature such as a tree line or hedgerow as some bats will use this for navigation.

Bat roosts should not be disturbed as use varies throughout the year.

Bird bricks and boxes should be sited between 2.8 - 6m high, usually facing south-east (this direction is not always necessary if the site is sheltered from the wind). They can also be installed under the eaves of buildings or in surrounding trees. Swift boxes and bricks need to be higher, at least 5 metres above ground level and only on the shaded sides of buildings, ideally under the eaves.

Bird bricks and boxes are only used for breeding during spring and summer months. If maintenance is required, it can be done during autumn and winter, unless the boxes are being used by birds as winter roosts. A quick check at dusk can easily establish their presence.

Existing standards and additional issues relevant to bat and bird boxes and bricks

- Bricks must meet construction requirements outlined by British Standards.
- Ibstock bricks are Shield-Marked to BS EN 771-1 European Standard Specification for clay masonry units, through CICS (Complete Integrated Certification Services Ltd.)
The conservation of Swifts

Swifts return to the UK from Africa during summer and nest in our buildings. It is estimated that the number of Swifts has almost halved over the last 15 years and it is now on the ‘amber’ list of birds at risk in the UK.

One reason for the decline is the loss of nesting places due to the refurbishment and demolition of older buildings. Modern buildings present fewer nesting opportunities, however, installing Swift bricks/boxes can create new places for Swifts to nest.

Swift bricks and boxes should be installed:

- Out of direct sunlight or under eaves where they will be shaded all day.
- At a minimum of 5 metres above the ground, ideally in the top course of blockwork.
- In an area that is unobstructed by trees or anything else that will hinder access.
- Away from windows and places where they will be disturbed.
- Next to each other in a straight line.

Swift bricks should be favoured over boxes where possible as these are longer lasting, require less maintenance and are often more aesthetically pleasing.

Most new build M&S stores will be of a suitable size for 4-10 swift bricks/boxes.

Nesting swifts are very clean and do not usually create problems with droppings unlike some other birds. They are legally protected and must not be disturbed.

As an additional measure, it may be possible to attract Swifts by playing recorded Swift calls though speakers close to brick or box entrances.

At M&S, we actively support Swift Conservation. Further guidance on installing Swift bricks and boxes is available free of charge from www.swift-conservation.org.
Insect chambers

What?
Insect chambers vary in shape and size to suit the habitat needs of different species. They can be integrated into the building fabric or curtilage in the form of boxes, paving, holes and frames.

They can also be located on green roofs and amongst soft landscaping to enhance biodiversity and form part of a habitat system.

Why?
Insects provide many vital ecosystem services such as pollination and are also a source of food for other wildlife such as birds and bats.

<table>
<thead>
<tr>
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<th>Approximate costings</th>
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<tr>
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Prices cost approximately £10-£60 per chamber.

Biodiversity benefits of insect chambers
Insects are fundamental to enhancing biodiversity as they perform a vast number of important ecosystem functions.

Insect populations also provide a vital food source for larger wildlife such as birds and bats.

Other advantages of insect chambers
- Low cost relative to other biodiversity design features.
- Can be incorporated into other features such as green roofs/walls and SUDS.
- Can be on display or subtly incorporated into landscaping designs.

Disadvantages of insect chambers
- In the interest of customer safety, insects such as bees, wasps and hornets should not be encouraged to populate highly used public areas.

Siting of insect chambers
Siting depends entirely on the species of insect and type of chamber. Manufacturers provide detailed guidance.

Boxes for bees, wasps, hornets should be located away from public areas. If a beehive is sited on a roof, it will need suitable vegetation nearby to prevent stress to the bees.

There are many different types of insect chamber including paving slabs, hives, underground chambers and boxes.
Building curtilage level design features

Sustainable Urban Drainage Systems (SUDS)

**What?**

SUDS are designed to reduce the risk of flooding compared to the conventional practice of routing water runoff through a pipe to a **watercourse**.

The SUDS approach to drainage incorporates a wide variety of techniques to drain surface water in a manner that manages flow rates and protects or enhances water quality.

Certain types of SUDS can also provide amenity value.

**Why?**

SUDS are widely used to reduce the impact of urban runoff on watercourses. This can help to protect and enhance biodiversity within the aquatic environment.

Certain types of SUDS such as strips, swales, basins, ponds and rain gardens can create new wetland habitat.

**Type: Swales**

Swales are vegetated banks and drainage channels that allow runoff to collect and soak away into the ground. They can also transport remaining runoff to a specified landscaped area.

**Approximate costings**

Due to the wide range of SUDS available, it is difficult to provide approximate costings. The costs of purchasing and installing permeable surfaces, ground works and planting need to be considered before choosing a SUDS.

**Siting of swales**

Swales are sited at the edge of roads, car parks and paths to provide drainage from hard impermeable surfaces. Swales should not be sited where there is a high risk of pollution or where rainwater can become heavily contaminated.
**Type: Permeable surfaces**

Permeable surfaces such as permeable paving allow water to pass through the surface, either through gaps between paving blocks or through permeable material such as gravel. Water is able to soak away into the ground, thereby reducing runoff.

<table>
<thead>
<tr>
<th>Permeable surfaces</th>
<th>Additional irrigation</th>
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<th>Retrofit</th>
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<tbody>
<tr>
<td></td>
<td>N/A</td>
<td>High</td>
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</table>

**Siting of permeable surfaces and filter drains**

Permeable surfaces can be used for minor roads, paths, pavements and car parks.

**Type: Infiltration devices**

Infiltration devices such as filter strips and filter drains/trenches are a means of draining runoff directly into the ground. Filter strips are a strip of ground that allows runoff to soak away. Filter drains have a stone fill for runoff to flow into and then soak away.

<table>
<thead>
<tr>
<th>Infiltration devices</th>
<th>Additional irrigation</th>
<th>Maintenance</th>
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<tbody>
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<td>Medium</td>
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</table>

**Siting of infiltration devices**

Infiltration devices such as filter strips or filter drains are sited next to impermeable surfaces including roads and car parks where runoff can flow into them.

**Approximate costings**

Due to the wide range of SUDS available, it is difficult to provide approximate costings.

The costs of purchasing and installing permeable surfaces, ground works and planting need to be considered before choosing a SUDS.
Type: **Ponds and basins**

Ponds and basins can be designed to store water at surface level either permanently or temporarily during and after rainfall.

<table>
<thead>
<tr>
<th>Additional irrigation</th>
<th>N/A</th>
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<tbody>
<tr>
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<tr>
<td>Retrofit</td>
<td>Yes</td>
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**Siting of ponds and basins for water storage**

Ponds and basins are usually located within a landscaped area although this will depend on the geographical nature of the site. New ponds should be created to deal with runoff. Existing ponds should not be used as this can damage or disturb existing biodiversity.

**Approximate costings**

Due to the wide range of SUDS available, it is difficult to provide approximate costings.

The costs of purchasing and installing permeable surfaces, ground works and planting need to be considered before choosing a SUDS.
Type: Rain gardens

Rain gardens are landscaped areas next to impermeable surfaces for the purpose of storing and absorbing runoff during rainfall. They are typically used to intercept rainwater runoff from roofs and car parks, reducing the amount of runoff entering a conventional drainage system. Rain gardens often take the form of planted depressions in the ground.

### Rain gardens

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<td>New build</td>
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</table>

### Approximate costings

Due to the wide range of SUDS available, it is difficult to provide approximate costings.

Excavating a rain garden usually costs more than if the site is simply adjusted to accommodate a garden.

The costs of purchasing and installing permeable surfaces, ground works and planting need to be considered before choosing a SUDS.

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**Siting of rain gardens**

Rain gardens are usually sited to intercept the flow of runoff. Planting should be hardy in order to withstand sudden influxes of water. Rain gardens can also act as traffic calming measures and provide an attractive landscaped area for wildlife habitats and visual amenity.
Biodiversity benefits of SUDS
SUDS can help to protect and enhance biodiversity by reducing the impact of urban runoff on watercourses. Certain SUDS types can provide a range of habitats for native plants and wildlife including reeds, fish, amphibians, birds and invertebrates.
Although the primary function of SUDS is to manage surface runoff, strategic planting within SUDS can support an increase in local biodiversity.

Other advantages of SUDS
■ Can provided attractive landscaped areas and a long term solution to urban drainage.
■ Water flow is managed locally which protects against pollution at the source.
■ Can help to recharge ground water.
■ Can reduce the pressure on conventional drainage systems.
■ Have minimal or no use of chemical treatments.
■ Blockages are easily dealt with as the majority of the system is above ground.

Disadvantages of SUDS
■ A SUDS system involving open water such as a swale or pond may present a health and safety issue.
■ Water can become contaminated with oil and fuel from car parks and/or litter in public spaces. This can have a detrimental effect on plants and wildlife that live in the system.
■ Blockages can cause flooding of access routes and car parks. Blockages and neglect can also result in stagnant water.
■ Maintenance of plant life and water channels is required to ensure the system functions at full capacity and water remains aerated.
■ Care must be taken with the use of fertilisers and other chemicals to prevent contamination and eutrophication.

Existing standards and additional issues relevant to SUDS
■ SUDS need formal approval from the following authorities:
  - Sewerage Undertaker.
  - Highway Authority.
  - Local Authority.
  - Environment Agency.
■ The Publicly Available Specification (PAS) 100: Specification for composted materials standard allows compost produced on site to be sold. It specifies trading requirements and ensures that a baseline quality is met. Waste material from SUDS planting is potentially compostable.
■ Different SUDS will apply to different land uses.
Curtilage features
An opportunity to educate and raise awareness of biodiversity

What?
Curtilage features are biodiversity features located in the area surrounding a building.

Why?
Curtilage features offer an opportunity to educate building users and the local community on the importance of biodiversity. They provide further scope for enhancing and promoting biodiversity beyond the building level.

Type: Sustainable trolley and cycle shelters
Trolley shelters located within the building curtilage can provide a means of displaying information and biodiversity features on a smaller scale. These include green roofs and green walls.
Sustainable trolley and cycle shelters

<table>
<thead>
<tr>
<th>Additional irrigation</th>
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</thead>
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<td>New build</td>
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</table>

Approximate costings

This is a development item. Costs are higher than a conventional shelter.

Biodiversity benefits of sustainable trolley and cycle shelters
Refer to specific biodiversity feature, eg:
- Green roofs.
- Green walls.

Other advantages of sustainable trolley and cycle shelters
- Can provide a powerful brand message.
- Can become an interesting and informative feature of the building curtilage.
- Can provide habitat for invertebrates.

Disadvantages of sustainable trolley and cycle shelters
- Higher cost and maintenance requirements compared to conventional shelters.
- As trolley shelters are typically low and accessible, they can be subject to vandalism. Additional measures may need to be taken to secure features.

Siting of sustainable trolley and cycle shelters
Siting needs to take into account operational considerations such as customer flow into the store, access and visibility as well as requirements of the biodiversity features incorporated (see relevant siting requirements, eg green roofs).

Prototype sustainable cycle shelter with ivy screen – under M&S design review
Type: **Wildlife stacks**

Wildlife stacks can be built out of any clean waste objects, building materials and natural materials. Materials are stacked to create nooks and crannies and replicate natural dark, sheltered spaces of different sizes for wildlife to live in.

<table>
<thead>
<tr>
<th>Wildlife stacks</th>
<th>Approximate costings</th>
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<tbody>
<tr>
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<td>N/A</td>
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<tr>
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<td>None</td>
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</table>

**Biodiversity benefits of wildlife stacks**

Wildlife stacks provide additional habitat for invertebrates.

**Other advantages of wildlife stacks**

- Can be a visible commitment to enhancing biodiversity which can be replicated by customers.
- Can be built out of building materials wastage and internal store finishings that are no longer used.
- Can become design features, sculptures and education tools.
- Opportunity to engage with local schools and nature groups.

**Disadvantages of wildlife stacks**

- Stacks should be sited away from openly accessible spaces to avoid any risk of injury or interference with wildlife.
- May not always be aesthetically pleasing as they are made from waste materials. Can however become features with some imaginative design work.
- Wildlife stacks located in public spaces may be subject to vandalism.

**Existing standards and additional issues relevant to wildlife stacks**

- It is important to ensure that no potentially polluting materials are used.

**Siting of wildlife stacks**

Wildlife stacks have most value when sited in vegetated areas which are not accessible to the public. They may also become features within landscaped areas in car parks to raise awareness of the importance of biodiversity.
Type: **Dry stone walling**

Dry stone walling is a traditional technique which does not use mortar or cement. Cracks between stones provide shelter for animals and promote plant growth on a wall.

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<thead>
<tr>
<th>Dry stone walling</th>
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**Biodiversity benefits of dry stone walling**

Dry stone walls provide space for habitat development.

**Other advantages of dry stone walling**

- Stones can be reclaimed and reused.
- Raises awareness of traditional trades.
- Materials are cheap if they come from a reclaimed source.

**Disadvantages of dry stone walling**

- Requires a skilled tradesman which can be expensive and hard to find.
- Stones are not fixed and can be removed, therefore walls may be subject to vandalism.

**Siting of dry stone walling**

- Dry stone walls can create barriers and separations within customer reception, car park and curtilage areas.
- Walls can be used to retain areas of plant growth and wildlife.
Type: **New landscape planting**

New landscape planting offers an opportunity to create an ecologically valuable habitat to enhance biodiversity. This can include specifying native species of plants (and species of wildlife value) in accordance with the recommendations of an ecological survey.

<table>
<thead>
<tr>
<th>New landscape planting</th>
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<tbody>
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**Biodiversity benefits of new landscape planting**

New ecologically valuable habitats can be created through using native species (and species of wildlife value) in landscape planting.

Diverse planting of native species and species of wildlife value to enhance biodiversity

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Sustainable Construction Biodiversity Guide Marks & Spencer 41
New landscape planting and the conservation of butterflies

In line with our commitment to butterfly conservation, the following guidelines should be followed when specifying new landscape planting and maintenance.

- Landscape plans should specify plants that provide a source of nectar for butterflies. These should be located in a sunny area.
- Landscape plans should specify larval foodplants (plants that provide food and shelter for caterpillars).
- Landscape plans should specify shrubs and small tree species that provide shelter for butterflies.
- Piled logs and wildlife stacks can also provide shelter for butterflies.
- The landscape maintenance schedule should consider the needs of caterpillars and butterflies. Planting should be trimmed and pruned accordingly.
- Pesticides should not be used as these can be fatal to butterflies and caterpillars.

Landscaping can be zoned to create a ‘butterfly garden’, therefore, the above specifications can be applied to one particular area.

Further information on butterfly conservation, nectar plants and larval foodplants can be found at www.butterfly-conservation.org.

Other advantages of new landscape planting

- Can be a highly visible biodiversity/green feature that can contribute towards defining the image of an organisation and/or store. It can entice customers and provide a positive first impression. Many customers will have an interest in gardening and will appreciate new landscape planting.
- Specifying sufficient native species in landscape planting can enable a project to increase its BREEAM score.
- A zoned ‘butterfly garden’ can provide a powerful brand message.

Disadvantages of new landscape planting

- In some cases, native species of plants can require increased maintenance and be less visually attractive than some decorative non-native species.

Existing standards and additional issues relevant to new landscape planting

- Planting can be specified to meet the recommendations of the ecological survey and LBAP.

Siting of new landscape planting

Dependant on planting specified.
Type: **Buffer zones and wildlife links**

These are areas that allow the movement of wildlife around and through the site, particularly between biodiversity features, curtilage and the building itself.

<table>
<thead>
<tr>
<th>Buffer zones and wildlife links</th>
<th>Approximately costings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional irrigation</td>
<td>N/A</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Low/none</td>
</tr>
<tr>
<td>Retrofit</td>
<td>Yes</td>
</tr>
<tr>
<td>New build</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Biodiversity benefits of buffer zones and wildlife links**

Buffer zones and wildlife links create a ‘wildlife web’ throughout a site, encouraging the movement of wildlife. They can be planted with native wildflowers and plants as well as allowing natural colonisation.
Advantages of buffer zones and wildlife links
- Aesthetically appealing to customers and can raise awareness of the importance of biodiversity.
- Can help control the movement of traffic around the curtilage of a building.

Disadvantages of buffer zones and wildlife links
- Some additional maintenance may be required to maintain these areas.
- Natural colonisation may not be aesthetically appealing to everyone.

Existing standards and additional issues relevant to buffer zones and wildlife links
- Buffer zones and wildlife links should offer shelter and protection for wildlife to encourage use.

Siting of buffer zones and wildlife links
- Buffer zones and wildlife links can be implemented throughout the curtilage of a site.
Case study of M&S Ecclesall Road store, Sheffield

This section provides a case study of an M&S store building project on Ecclesall Road, Sheffield. This is one of our sustainable learning stores and will be our first store building project with a major focus on enhancing biodiversity.

Ecclesall Road is the first project to meet our Plan A target to introduce biodiversity audits (ecological survey) and action plans (SBAP) for major store building projects by 2012. In line with our Plan A ambitions, this store is also aiming to have a net biodiversity gain.

This section reflects the design aspirations that are proposed for this project and includes:

- An aerial photo of the site, pre-acquisition.
- Photos of the vacated site, pre-demolition.
- Extracts from the ecological survey – contents page, ecological features and photographs.
- A BREEAM habitat comparison from the ecological survey illustrating the existing situation and proposed layout.
- An extract from the ecological survey – recommendations and ecological enhancements.
- Landscape plans for the site.
- Proposed biodiversity design features – annotated diagram and store perspective showing living wall.
- Extract from the Ecclesall Road SBAP.
An aerial photo of the site, pre-acquisition
Photos of the vacated site, pre-demolition

An aerial photo of the site as a car sales showroom and forecourt, pre-acquisition

Photos of the vacated site, pre-demolition (July 2010)
Ecological survey
Sample contents page

The contents page below identifies the information found in a typical ecological survey. A full copy of the Ecclesall Road ecological survey can be found on the M&S Questa system.

Ecclesall Road ecological survey costs (September 2009)
- Ecological survey of current situation - £950.00 plus VAT and expenses.
- BREEAM Retail assessment - £850.00 plus VAT and expenses.

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<td>4. HABITATS &amp; ECOLOGICAL FEATURES ..............6</td>
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<td>5. FAUNAL USE OF THE SITE .................9</td>
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<td>6. ECOLOGICAL EVALUATION &amp; ENHANCEMENTS ....12</td>
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<td>7. POLICY REVIEW ................................19</td>
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<td>9. SUMMARY AND CONCLUSIONS ...............30</td>
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<tbody>
<tr>
<td>PLAN 2014/ECO1 Site Location and Ecological Designations</td>
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<tr>
<td>PLAN 2014/ECO2 Ecological Features and Photographs</td>
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<tr>
<td>PLAN 2014/ECO3 BREEAM Habitat Comparison</td>
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<tr>
<th>APPENDICES</th>
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<tbody>
<tr>
<td>APPENDIX 1 Extracts from BREEAM Retail 2006 Guidance Notes</td>
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<td>APPENDIX 2 Information obtained from Multi-Agency Geographic Information for the Countryside (MAGIC) and ‘Nature on the Map’ (Natural England) online databases</td>
</tr>
<tr>
<td>APPENDIX 3 Information obtained from the National Biodiversity Network database</td>
</tr>
<tr>
<td>APPENDIX 4 List of suitable native species for inclusion within wildlife planting</td>
</tr>
<tr>
<td>APPENDIX 5 Habitat Management Plan</td>
</tr>
</tbody>
</table>
Extract from the ecological survey
Ecological features and photographs, November 2009, pre-acquisition
Extract from ecological survey
BREEAM habitat comparison

The extract below compares the existing site layout (pre-acquisition) with the proposed layout for the site. The proposed layout identifies recommended new planting of wildlife value and amenity planting. The landscape plans on page 51 follow the recommendation for new planting of wildlife value along the northern boundary of the site.
6.6. Recommendations and Ecological Enhancements

6.6.1. Planning Policy Statement 9 (PPS9) requires developments to maximise the opportunities for biodiversity by building-in enhancement measures. The proposals present the opportunity to deliver ecological enhancements at the site for the benefit of local biodiversity, thereby making a positive contribution towards the broad objectives of the national and local Biodiversity Action Plans (BAPs).

6.6.2. Given the types of habitats and ecological features within and adjacent to the site, the following recommendations and ecological enhancements would be appropriate in the local context:

**Vegetation**

6.6.3. **Landscape Planting.** Under the current proposals areas of new landscape planting are proposed, particularly including an area along the northern site boundary, at the base of the existing retaining wall along the boundary itself. It is recommended that, where possible planting be comprised of native species, common to the local area including trees and shrubs, along with native climbing and or trailing species which could extend up the retaining wall to provide additional, vertical habitats. The introduction of native planting at the site would represent an ecological benefit for invertebrates and birds, forming a continuous corridor along the northern boundary and potentially linking with the offsite residential gardens to the north. In order to maximise the biodiversity value within this area, it is recommended that the use of fertilisers and pesticides be kept to a minimum and that a suitable management regime be employed to ensure that biodiversity is maximised in the long term throughout the new habitats.

**Fauna**

6.6.4. **Birds.** The habitats currently within the site are unlikely to offer more than very minor potential opportunities for common urban bird species. Nonetheless, to avoid any potential offence under the Wildlife & Countryside Act, any clearance work undertaken on site should be undertaken outside of the bird nesting season (March – August inclusive). If this is not practicable, any vegetation to be removed should first be checked by a professional ecologist in order to determine the location of any nests prior to removal. Any nests identified should then be cordoned off and protected until the end of the nesting season or until the birds have fledged.

6.6.5. In addition, it is recommended that a small number of bird boxes be incorporated into the proposals, particularly associated with the taller areas of retaining wall at the rear (north) of the site, thereby increasing nesting opportunities for birds at the site.

6.7. Summary of Recommendations and Enhancements

- New landscape planting to include native species common to the local area.
- Bird sensitive timing of vegetation clearance and retention of deadwood on site for invertebrates
- Provision of new bird boxes
Landscape plans

A landscape architect was commissioned with the objective of producing a landscape plan that would enhance biodiversity and opportunities for biodiversity. It was requested that the planting scheme focused on native species common to the local area and species of wildlife value. The landscaping was also designed in line with the requirements of BREEAM Retail 2006 LE5: Enhancing Site Ecology.

The landscape architect was also asked to consider the biodiversity that surrounds the site outside of the site boundaries in order for biodiversity opportunities to be maximised.
Ecclesall Road, Sheffield
Proposed biodiversity design features

- New landscape planting - native species shrub mix
- Climbing plants grown on the retaining wall
- Sedum mat green roof
- 6 x bird boxes on the retaining wall at 5m above floor level
- M&S sustainable cycle shelter with green roof
- M&S sustainable trolley shelter with green roof
- New landscape planting - pleached trees to provide bioshading
- New landscape planting

Image ©Lewis & Hickey Ltd
Ecclesall Road, Sheffield
View of proposed living wall

Living wall

New landscape planting - pleached trees to provide bioshading

Image ©Lewis & Hickey Ltd
## Extract from the Ecclesall Road SBAP

Below is an extract from the M&S SBAP for Ecclesall Road. A complete copy of this document can be found on the M&S Questa system.

<table>
<thead>
<tr>
<th>Aims</th>
<th>Responsibility of</th>
<th>Actions</th>
<th>Target completion date</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data collection</td>
<td>1.3 Accredited Ecologist</td>
<td>Using the above method, the site was classified into areas of similar botanical community types, with a representative species list compiled for each habitat identified. All of the species that occur in each habitat would not necessarily be detectable during survey work carried out at any given time of the year, since different species are apparent at different seasons. Although survey work was conducted outside the optimal survey season, the vegetation types present allowed a satisfactory survey and assessment of the habitats present to be undertaken. General faunal activity, such as mammals or birds observed visually or by call during the course of the surveys was recorded. Specific attention was also paid to the potential presence of any protected, rare or notable or Biodiversity Action Plan (BAP) species. <strong>Buildings and hardstanding</strong> Their loss to the proposals would be of no ecological importance. <strong>Former amenity planted beds</strong> These areas are of negligible ecological value and their loss would be of no importance. <strong>Trees</strong> 2 small, ornamental trees are present within the site; their loss to the proposals would be of little ecological value. <strong>Bats - roosting</strong> Roosting bats are unlikely to be present within the site. <strong>Bats - foraging</strong> Foraging or commuting bats are unlikely to utilise the site. <strong>Other mammals</strong> No evidence for the presence of any other protected, rare or notable mammal species was recorded during the survey work, whilst the habitats present offer negligible potentially suitable opportunities for mammals.</td>
<td>4/12/09</td>
<td>✓</td>
</tr>
</tbody>
</table>


Birds
The habitats present within the site are likely to offer few potential opportunities for bird species, with no birds recorded within the site during the surveys. Albeit, the taller areas of boundary wall, particularly in association with vegetation trailing over may provide some minor nesting potential for common urban bird species.

Amphibians and reptiles
The habitats present within the site do not appear to offer potentially suitable opportunities for amphibian or reptile species. Accordingly these groups do not appear to represent a constraint on any proposals at the site.

Invertebrates
There is no evidence to suggest that the site supports any protected, rare or notable invertebrate species.

The habitats within the site are likely to support a very limited range of common invertebrates, many of which would likely re-colonise the site on completion of construction works.

BREEAM assessment
The ecological assessment included specific consideration of the proposals against ecological criteria (LE3 – LE6) of the BREEAM Retail 2006 Assessment

Accordingly, under the current proposals and subject to the recommendations and measures set out within this report, it is considered that a total of 7 credit points can be awarded to the proposals from the 8 available, under headings LE3 to LE6.
Legislation and key policy drivers

This section provides an overview of:

- Biodiversity action plans.
- Wildlife legislation.
- Planning policy relevant to biodiversity.
- BREEAM Retail 2008: Land Use and Ecology credits.

House sparrow numbers have significantly declined. They are now on the red list for birds of highest conservation priority.
Biodiversity Action Plans

The UK Biodiversity Action Plan (UK BAP)
The UK BAP was published in 1994 as the UK Government’s response to signing the Convention on Biological Diversity (CBD) at the 1992 Rio Earth Summit. The UK BAP set out a programme for conserving the UK’s biodiversity.

The current list of UK BAP priority species and habitats was published in August 2007 and identifies 1150 species and 65 habitats as priorities for conservation action.

For up-to-date information on national biodiversity action plans for all four UK countries, visit the Biodiversity Action Reporting System (BARS) website: http://www.ukbap-reporting.org.uk/

The UK BAP website contains detailed information on its development and identifies who is involved: http://www.ukbap.org.uk/

Local Biodiversity Action Plans (LBAP)
LBAPs normally conform to county boundaries and identify local biodiversity resources and priorities. They translate national targets for species and habitats into effective action at a local level and identify habitats and species that are of local importance.

LBAPs aim to stimulate local working partnerships to ensure that programmes for biodiversity conservation and enhancement are successful.

Up-to-date LBAPs can be found on the BARS website: http://www.ukbap-reporting.org.uk/

The Starling is identified as a priority species in the UK BAP
Wildlife legislation

There is a range of legislation relevant to protecting wildlife that may be adversely affected by a proposed development.

**Wildlife and Countryside Act 1981 (as amended)**
The Wildlife and Countryside Act 1981 (as amended) is the principle mechanism for the legislative protection of wildlife in Great Britain. The Act stipulates that it is an offence to intentionally kill, injure or take any wild bird or its eggs or to take, damage or destroy a nest while it is in use or being built (with the exception of a small number of birds listed under Schedule 2).

The maximum penalty that can be imposed for an offence in respect of a single bird, nest or egg is a fine of up to £5,000 and/or six months’ imprisonment.

Details of the Wildlife and Countryside Act 1981 and its amendments are available at [http://www.jncc.gov.uk/page-1377](http://www.jncc.gov.uk/page-1377)

**Conservation of Habitats and Species Regulations 2010 (‘Habitat Regulations’)**
These regulations consolidate amendments to the Conservation (Natural Habitats & Conservation) Regulations, 1994. They afford protection to a range of ‘European Protected Species’ (EPS) which includes all bat species. It is an offence to intentionally kill, injure or take any wild bat or to damage or destroy any place that is used by bats for shelter or as a breeding site.

The potential fine for each offence is £5000. If more than one bat is involved, the fine is £5000 per bat. In England and Wales, an offender can also be imprisoned for six months.

Details of the Conservation of Habitats and Species Regulations 2010 are available at [http://www.jncc.gov.uk/page-1379](http://www.jncc.gov.uk/page-1379)

**Countryside and Rights of Way Act, 2000**
This Act applies to England and Wales only and strengthens existing legal protection for threatened species. The Act places a duty on Government Departments and the National Assembly for Wales to have regard for the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted: [http://www.jncc.gov.uk/page-1378](http://www.jncc.gov.uk/page-1378)
Planning policy

Local planning authorities must ensure that all proposed planning applications take into account the potential effect of development on biodiversity. Planning policy enables local planning authorities to influence planning decisions based on how a development may impact on biodiversity.

The Biodiversity Planning Toolkit is an online resource that includes guidance on how biodiversity is addressed through the planning system: http://www.biodiversityplanningtoolkit.com/

Planning policy and terminology differs slightly across the UK, however, the principles are similar.

England

**PPS 9 Biodiversity and Geological Conservation (ODPM 2005b)**
Planning Policy Statement 9 (PPS9) sets out planning policies on the protection of biodiversity and geological conservation through the planning system. PPS 9 can be downloaded from: [http://www.communities.gov.uk/publications/planningandbuilding/pps9](http://www.communities.gov.uk/publications/planningandbuilding/pps9)

**Circular 06/2005 Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System (ODPM 2005a)**
This circular provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England. It can be downloaded from: [http://www.communities.gov.uk/publications/planningandbuilding/circularbiodiversity](http://www.communities.gov.uk/publications/planningandbuilding/circularbiodiversity)

**Planning for Biodiversity and Geological Conservation: A Guide to Good Practice (ODPM 2006)**
This guide provides good practice guidance on ways that regional planning bodies and local planning authorities can help deliver the national policies in PPS9 and comply with legal requirements set out in Circular 06/2005. It can be downloaded from: [http://www.communities.gov.uk/publications/planningandbuilding/planningbiodiversity](http://www.communities.gov.uk/publications/planningandbuilding/planningbiodiversity)

Wales

**Technical Advice Note (TAN) 5: Nature Conservation and Planning**
TAN5 provides guidance for local planning authorities on:

- The key principles of positive planning for nature conservation.
- Nature conservation and Local Development Plans.
- Nature conservation in development management procedures.
- Development affecting protected internationally and nationally designated sites and habitats.
- Development affecting protected and priority habitats and species.

It can be downloaded from: [http://wales.gov.uk/topics/planning/policy/tans/tan5/?lang=en](http://wales.gov.uk/topics/planning/policy/tans/tan5/?lang=en)

Scotland

**Scottish Planning Policy**
The Scottish Planning Policy is a statement on Scottish Government’s land use planning matters. In particular, subject policies on ‘Landscape and National Heritage’ (paragraphs 125 – 148) require planning authorities to take into account the ecosystems and natural processes in their area and to take a strategic approach to the maintenance and enhancement of biodiversity.

This statement can be viewed and downloaded from: [http://www.scotland.gov.uk/Publications/2010/02/03132605/0](http://www.scotland.gov.uk/Publications/2010/02/03132605/0)

Northern Ireland

**PPS2 Planning and Nature Conservation**
This PPS sets out land use planning policies for the conservation of natural heritage. It includes Northern Ireland Planning Service policies for conserving the diversity of habitats and wildlife and can be downloaded from: [http://www.planningni.gov.uk/index/policy/policy_publications/planning_statements/pps02.htm](http://www.planningni.gov.uk/index/policy/policy_publications/planning_statements/pps02.htm)
BREEAM Retail 2008
Land Use and Ecology

An overview of the aims and assessment criteria of BREEAM Land Use and Ecology credits relevant to biodiversity is outlined below. It is essential that the compliance requirements, schedule of evidence required and additional information for each credit are consulted and understood.

<table>
<thead>
<tr>
<th>Issue ID</th>
<th>Issue Title</th>
<th>No. of credits available</th>
<th>Minimum standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE3</td>
<td>Ecological Value of Site and Protection of Ecological Features</td>
<td>1</td>
<td>No</td>
</tr>
</tbody>
</table>

Aim

To encourage development on land that already has limited value to wildlife and to protect existing ecological features from substantial damage during site preparation and completion of construction works.

Assessment Criteria

1. Land within the construction zone is defined as ‘land of low ecological value’ using either:
   a) BREEAM checklist A4 OR
   b) A suitably qualified ecologist who has identified the land as being of ‘low ecological value’ within an ecological assessment report, based on a site survey.

2. All existing features of ecological value surrounding the construction zone and site boundary area are adequately protected from damage during clearance, site preparation and construction activities as listed below:
   - Trees of over 100 mm trunk diameter, and/or of significant ecological value, are protected by barriers. Barriers must prohibit construction works in the area between itself and the tree trunk. Minimum distance between tree trunk and barriers must be either the distance of branch spread or half tree height, whichever is the greater.
   - In all cases trees must be protected from direct impact and from severance or asphyxiation of the roots.
   - Hedges and natural areas requiring protection must either have barriers erected and be protected, or, when remote from site works or storage areas, be protected with a prohibition of construction activity in their vicinity.
   - Watercourses and wetland areas are to be protected by cut-off ditches and site drainage to prevent run-off to natural watercourses (as this may cause pollution, silting or erosion).

3. In all cases, the contractor is required to construct ecological protection prior to any preliminary site construction or preparation works (e.g. clearing of the site or erection of temporary site facilities).
It should be noted that a minimum standard is applicable to LE4 (below). In order to achieve a BREEAM Very Good rating or above, it is necessary to achieve a minimum of 1 credit for LE4.

<table>
<thead>
<tr>
<th>Issue ID</th>
<th>Issue Title</th>
<th>No. of credits available</th>
<th>Minimum standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE4</td>
<td>Mitigating Ecological Impact</td>
<td>2</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Aim**

To minimise the impact of a building development on existing site ecology.

**Assessment Criteria**

The following demonstrates compliance:

1. One credit where the change in ecological value of the site is less than zero and equal to or greater than minus nine plant species i.e. a minimal change.

2. Two credits where the change in ecological value of the site is equal to or greater than zero plant species i.e. no negative change.

The change in ecological value of the site is calculated using **EITHER** of the following:

3. Determine the following information and input this data in to Ecology calculator 1 within the spreadsheet tool:
   a. Plot type(s) that define the landscape of the assessed site, in its existing pre-developed state and proposed state (see additional guidance)
   b. Areas (m²) of the defined existing and proposed plot types.

   **OR**

4. Where a **suitably qualified ecologist** has been appointed and, based on a site survey, they confirm the following and the assessor or ecologist inputs this data in to the Ecology calculator 2:
   a. Actual plot/habitat types that define the landscape of the assessed site in its existing pre-developed state and proposed state
   b. Area (m²) of each plot/habitat type
   c. Number of different plant species found within each plot type.
### Issue ID | Issue Title | No. of credits available | Minimum standards
---|---|---|---
LE5 | Enhancing Site Ecology | 3 | No

**Aim**

To recognise and encourage actions taken to maintain and enhance the ecological value of the site as a result of development.

**Assessment Criteria**

The following demonstrates compliance:

**First credit**

1. A suitably qualified ecologist (SQE) has been appointed to report on enhancing and protecting the ecology of the site.
   a. The SQE provides an Ecology Report with appropriate recommendations for protection and enhancement of the site’s ecology.
   b. The report is based on a site visit/survey by the SQE prior to the commencement of initial site preparation works.

2. The general recommendations of the Ecology Report for enhancement and protection of site ecology have been, or will be, implemented.

**Second credit**

1. The recommendations of the Ecology Report for enhancement and protection of site ecology have been implemented, and the suitably qualified ecologist confirms that this will result in an increase in ecological value of the site up to (but not including) 6 plant species.

2. The increase in plant species has been calculated using Ecology calculator 2, using actual species numbers.

**Third credit**

1. The recommendations of the Ecology Report for enhancement and protection of site ecology have been implemented, and the suitably qualified ecologist confirms that this will result in an increase in ecological value of the site of 6 plant species or greater.

2. The increase in plant species has been calculated using Ecology calculator 2, using actual species numbers.
Aim

To minimise the long term impact of the development on the site’s, and surrounding area’s, biodiversity.

Assessment Criteria

One credit can be awarded where there is a commitment to achieve the mandatory criteria and at least two of the additional criteria (listed below).

Two credits can be awarded where there is a commitment to achieve the mandatory criteria and at least four of the additional criteria (listed below).

The following demonstrates compliance:

Mandatory Criteria

1. A suitably qualified ecologist (SQE) has been appointed prior to commencement of activities on site.

2. The suitably qualified ecologist 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.

3. A landscape and habitat management plan, appropriate to the site, is produced covering at least the first five 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.

Additional Criteria

1. The contractor nominates 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.

2. The contractor trains the site workforce 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.

3. The contractor records 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.
4. Where a new ecologically valuable habitat, appropriate to the local area, is created. This includes habitat that supports nationally, regionally or locally important biodiversity, and/or which is nationally, regionally or locally important itself, including any habitat listed in the UK Biodiversity Action Plan (UK BAP)\(^*,\) Local Biodiversity Action Plan (LBAP), those protected within statutory sites (e.g. SSSIs), or those within non-statutory sites identified in local plans.

5. Where flora and/or fauna habitats exist on site, the contractor 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.
Useful websites

Association of Local Government Ecologists
www.alge.org.uk

Association of Wildlife Trust Consultancies
www.awtc.co.uk

Biodiversity Action Reporting System (BARS)
www.ukbap-reporting.org.uk

Bat Conservation Trust
www.bats.org.uk

Biodiversity Planning Toolkit
www.biodiversityplanningtoolkit.com

British Trust for Conservation Volunteers
www.btcv.org

Buglife
www.buglife.org.uk

Business and Biodiversity Resource Centre
www.businessandbiodiversity.org

Butterfly Conservation
www.butterfly-conservation.org

ENDS Directory
www.endsdirectory.com

Institute of Ecology and Environmental Management
www.ieem.net

Institute of Environmental Management and Assessment
www.iema.net

Joint Nature Conservation Committee (JNCC)
www.jncc.gov.uk

Landscape Institute
www.landscapeinstitute.org

Living Roofs
www.livingroofs.org

National Biodiversity Network
www.nbn.org.uk

Natural England
www.naturalengland.org.uk

Royal Society for the Protection of Birds
www.rspb.org.uk

Scottish Natural Heritage
www.snh.gov.uk

Swift Conservation
www.swift-conservation.org

UK BAP Website
www.ukbap.org.uk

UK Green Building Council
www.ukgbc.org

Wildlife Trusts
www.wildlifetrusts.org
Biodiversity
The variety of life, in all its forms and at all levels. This ranges from genes to species to ecosystems - everything that collectively forms the biological diversity on Earth. The term biodiversity, however, is often used to refer to the variety of plant and animal species.

Bioshading
Plants and trees used as a natural solution to prevent buildings overheating in summer. The natural cycle of plant growth provides shading in summer and enables sunlight to provide passive heating in winter.

BREEAM
BREEAM (BRE Environmental Assessment Method) is the leading and most widely used environmental assessment method for buildings.

Colonisation
The spreading of a species into a new habitat. Plant species are often transported as airborne seeds or via bird droppings.

Curtilage
Describes the area of land around a building that is within the site boundaries.

Ecological survey
Carried out by an ecologist and assesses the ecological interest of a site as a whole. Evaluates the importance of habitats and species present on a site and in the surrounding area. Proposes opportunities for ecological enhancement where appropriate, with reference to national and local Biodiversity Action Plans (BAPs). Can also include specific consideration of development proposals against ecological criteria (LE3 – LE6) of BREEAM Retail.

Ecosystem services
Resources and processes that are supplied by the natural environment. Includes products such as food, natural fibre and fuel, and processes such as soil formation and plant pollination. These services are often taken for granted, however, they directly or indirectly affect human wellbeing.

Eutrophication
Occurs when the concentration of chemical nutrients in an ecosystem is increased. Can cause a reduction in water quality and algal blooms in lakes and rivers which can disrupt the normal functioning of an ecosystem and harm other species. Often the result of man-made pollution such as fertiliser runoff entering natural waters.

Evapotranspiration
Describes the sum of evaporation and plant transpiration from the Earth’s land surface to the atmosphere. Evaporation transports water from surfaces such as soil and plant leaves. Transpiration is the loss of water from plants as vapor.

Glossary
**H/I/J/K**

**Habitat**
The area or environment where an organism or ecological community normally lives or occurs.

**Invertebrates**
Animals which do not have a backbone. This includes insects, worms and spiders.

**Irrigation**
The artificial supply of water to assist in the growing of plants and maintenance of landscapes. Allows plants to grow successfully in circumstances where they would ordinarily struggle.

**L/M/N/O/P**

**Local Biodiversity Action Plan (LBAP)**
An LBAP generally conforms to county boundaries and identifies local biodiversity resources and priorities. Typically includes actions to address the needs of UK priority habitats and species as listed in the UK BAP.

**Pollination**
The process by which pollen is transferred in plants, enabling fertilisation and reproduction.

**Q/R/S/T**

**Rainwater harvesting**
The collection and storage or rainwater (often harvested from the roofs of buildings) for an intended purpose such as irrigation or toilet flushing.

**Site Biodiversity Action Plan (SBAP)**
Addresses biodiversity on a particular site and includes actions relating to the needs of specific habitats and species. Content changes depending on a site's context.

**Substrate**
Refers to the growing medium for plant species in the context of green roofs. Can include crushed recycled brick and concrete and light expanded clay aggregate (LECA).
Substrates must be free draining yet able to hold sufficient water to enable healthy growth.

**Sustainable urban drainage system (SUDS)**
Reduce the risk of flooding compared to the conventional practice of routing water runoff through a pipe to a watercourse. Types of SUDS include swales, basins, ponds, rain gardens, permeable surfaces and infiltration devices.
UK Biodiversity Action Plan (UK BAP)
Published in 1994 as the UK Government’s response to signing the Convention on Biological Diversity (CBD) at the 1992 Rio Earth Summit. Sets out a programme for conserving the UK’s biodiversity.

The current list of UK BAP priority species and habitats was published in August 2007 and identifies 1150 species and 65 habitats as priorities for conservation.

Urban heat island effect
Causes urban areas to be hotter than surrounding rural areas, primarily due to materials such as concrete, brick and asphalt absorbing and retaining heat.
Infrastructure such as green spaces featuring trees and green roofs can help reduce the urban heat island effect.

Urban runoff
Surface runoff of rainwater caused by urbanisation.
Impermeable surfaces such as roofs, roads, pavements and public spaces do not allow rainwater to drain into the ground. It must therefore runoff into drainage systems which increases the risk of flooding and water pollution.

Watercourse
Any channel through which water flows. Can be open, such as a river or stream, or enclosed underground as a culvert. Can also be a dry channel in the ground that only flows with water after rainfall.
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You can find further information about Plan A at: www.marksandspencer.com/PlanA

As this process becomes embedded into how we do business, this guide will continue to be updated to reflect best practice.

We welcome your feedback: construction@marksandspencer.com