

Design Guidance for Biodiverse Green Roofs



Purpose of a biodiverse / wildlife roof:

- to replicate the habitat for a single or limited number of species
- OR to create a range of habitats to maximise the array of species which may inhabit the roof



Roofs aimed at replacing or replicating habitats are becoming more common in the UK. These roofs are sometimes referred to as: biodiverse; brown; rubble; brownfield; eco; habitat or even by the name of the species they are aimed at i.e. black redstart roof.

There is no question that well designed roofs of this nature are beneficial to the overall biodiversity of urban landscapes in the UK. In addition, a biodiverse roof still has most of the benefits of any other type of green roof of a similar depth.

However, choosing to create a wildlife roof is not necessarily a cheap option, and it is not an opportunity to simply recycle un-screened site-won waste on the roof of a new development. British Building Regulations outlaw the direct transfer of demolition waste to roof level, without adequate screening for potentially polluting elements within the materials. For a wildlife roof to be genuinely beneficial, it should be designed to support the intended insects, birds and plants to inhabit the roof.

The starting point for any wildlife roof should be: What is the desired population?

As with any green roof:

- the growing medium is the key to the success or failure of that roof
- the growing medium should be a designed and engineered mixture of minerals and nutrients to achieve that desired outcome

A wildlife roof should be made from known elements - demolition waste mixed with a percentage of organic matter does not represent a known chemical makeup. Such a mix would be highly risky to put on a roof. Demolition waste can be very fertile, or have had seed banks mixed into it at sometime, and may lead to the wildlife roof requiring an unexpected level of maintenance.

Basics

Many of the guidelines that apply to any green roof design also apply for a biodiverse roof.

Common to any green roof:

- A building structure designed to take the loads of the proposed green roof
- Root resistant waterproof membrane or roofing finish
- Suitable drainage system to allow excess water to leave the roof easily
- 300mm gravel or paving un-vegetated margin to all upstands and roof penetrations
- Upstands of a suitable height to prevent material being blown off the roof
- There should be a 1m wide, 300mm tall un-vegetated barrier every 40m on large areas of green roof
- Growing medium should be not more than 20% organic mater by volume

What makes a biodiverse green roof different is the design of the growing medium and the inclusion of features to attract particular species of plants, birds and insects.



Designing for biodiversity

Referring back to the original question is important:

What is the desired population? – i.e. what do you want to live, grow and thrive on your roof? Do you want a monoculture of one type of plant or creature or do you want a wide variety of general wildlife?

A green roof can be designed to mimic many habitats found in the UK, and therefore support many of our rare and disappearing species.

Either decide on the habitat you would like to create based on your personal preference, or consult the Habitat Action Plan (HAP) for the area in which the roof is to be built. HAP's for each area in the UK are available on the internet or from the local Wildlife Trust. The HAP will give you information about priority species that are being supported in your area and may also provide guidance on what makes a good habitat for them. HAP's apply to insects, birds, animals and plants.

Mosaic habitats

If the roof area is large enough and you feel there is space for more than 1 habitat, it is possible to merge 2 or 3 habitats of a similar character to widen the appeal to invertebrates and birds. One good way to do this on larger developments with different buildings is to have different habitats on different roofs, giving the whole site a mosaic of habitats. However, it can be easy to get drawn in to trying to cram a mass of varied habitats onto one roof. Generally this is not a good idea, as there may not be enough of any given habitat to attract the desired species.

Natural features

Natural features are not easy to specify, especially on large development projects where procurement needs to be simple and efficient. Often many of the materials which become natural features are on site before any work begins. Even existing sites which are being redeveloped may have some of the following items, which can be stored to be used on the roof.



Trees – dead, stripped of bark and laid on the roof to provide perches for birds (they may need securing or weighing down).

Piles of logs – trees sawn into logs of no more than 600mm in length, stacked on top of each other to provide nesting for insects and perches for birds. Stacks should be no more than 350mm high.

Piles of clean/cleaned bricks – full and half bricks dumped in a pile to provide shelter and habitat for spiders and insects. Stacks should be no more than 350mm high.

Piles of stones – use local stone cobbles or rocks to create mounds for insects to live in and birds to peck through. The stones should be no more than the size of a fist or in the case of flat stone about the size of a plate. Stacks should be no more than 350mm high.

Sand and sand mounds – ordinary sharp sand or builders ballast can be used to create either sand beds or sand mounds for species of insect and especially bees which nest in sand. Mounds should not be higher than the top of the nearest upstand.





Vegetation

The greening or vegetating of roofs designed for wildlife is dependant on the nature of the habitats that the roof aims to create. Many wildlife roof designers allow the roofs to self colonise, thereby allowing natural and local biodiversity to occur.

It is recommended that pre-grown vegetation mats are not used for wildlife and biodiverse roofs, due to the limited and prescriptive species groups that they hold, and the resistance they provide to insects burrowing into the substrates below.



Image 1, 2, 3, 4 & 7 - Sharrow School, Sheffield
Image 4 & 6 - Garage Roof, Derbyshire



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