



Wallbarn Green roof definitions and FAQ's

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1.0 Green roof definitions

- 1.1 Extensive: A lightweight, low maintenance green roof system typically with succulents or other hardy low growing species planted into a thin (typically less than 100mm) substrate that is low in nutrients
- 1.2 Intensive: A green roof more akin to a small domestic garden, often referred to as a 'roof garden.' Intensive roofs can provide a wide range of benefits generally for physical and visual human benefit. Often constructed using nutrient rich soils typically over 200mm deep. Regular maintenance and permanent irrigation is often required.
- 1.3 Bio-diverse: Similar in construction to an extensive roof but designed specifically to re-create the footprint of the new building or to enhance the previous habitat. Vegetation and features are **specifically designed** to attract a particular flora and fauna.
- 1.4 Brown: Similar to a bio-diverse roof but where vegetation is allowed to develop naturally from wind-blown or lime dropped seed.
- 1.5 Semi intensive/extensive: An intermediate green roof that has both the characteristics of both extensive and intensive roofs.
- 1.6 Recreational: A term used to describe a varied function roof which may or may not have vegetation or any water retention capabilities. Smoking areas, barbeque or sports/play facilities could be described as recreational as could hard landscape or even artificial landscape areas.
- 1.7 Retro/refurb: Generally a simple modular system using succulent or other hardy low growing species. Low maintenance and minimal irrigation required.

2.0 Green roof essentials

ALL vegetated green roofs need appropriate levels of the following in order to flourish:-

Sunlight

Drainage

Nutrients

Moisture

Aeration to the plants root systems

Plant selection

Typically green roofs consist of the following build up layers

- 2.1 Root barriers: Often are encompassed or a characteristic of the waterproof membrane otherwise a membrane that **PERMANENTLY** prevents penetration of plant roots and rhizomes either due to its density and manufacture or by its chemical properties.
- 2.2 Protection fleece: Generally consists of a geotextile layer but can be formed from semi rigid plastic sheets. It is important that the protection layer is non abrasive and free from sharp edges and burs etc but should be strong enough to prevent damage from foot traffic and loading out etc **(Re-cycled polyester geotextile 300gsm GE-PE-PECT-0300-Z)**
- 2.3 Drainage layer: Often provided by three dimensional moulded plastic sheets **(Protectodrain)**. Granular materials can also be used. It is essential to allow free drainage throughout the whole vegetated area to prevent water logging which in turn restricts aeration and turns substrates acidic killing off vegetation.
- 2.4 Filter fabric: A geotextile layer that prevents fines and sediments from being washed out of the substrate which could reduce or block the drainage capacity of the roof. **(Re-cycled polyester geotextile 300gsm GE-PE-PECT-0300-Z)**
- 2.5 Substrates: Generally an engineered soil or growing medium replacement to provide a specific ratio of organic, in-organic and nutrient content, air to particle balance and moisture retention combination to support specific plant growth and welfare. Resistance to compaction and erosion as well as consideration to weight are also vital characteristics. **(We produce different blends to suit the vegetation type)**
- 2.6 Vegetation: Many factors will influence the type of vegetation.

- Design objectives – what is the roof to be used for?
- Plant characteristics – shade /drought tolerance
- Regional climate – certain plants will thrive in different geographic regions
- Microclimate – the orientation of the building and aspect etc
- Maintenance – what maintenance or aftercare regime is planned?

Vegetation can be delivered in many forms and these forms can be determined by cost, availability and speed of establishment.

Pre-grown sedum blankets and Wildflower blankets are delivered to site as semi mature plants that have a strong root and stem development. These blankets do not travel well. They are prone to overheating and ‘boiling’ while they are rolled up during transport and as such it is imperative that the minimal amount of time from the farm to being rolled out on site is given. In the summer this must be no more than 48 hours. Blankets should rest and cool before watering. Instant vegetation is provided with this method.

Plugs plants at around 16 – 20 per m² is the next commonly used option. Being smaller plants the supply cost is somewhat cheaper but this saving is reduced when labour costs are taken into account as plug planting is slow and laborious and the plants are often pulled up by birds after installation.

Seeds are the cheapest method of establishing vegetation (unless of course a Brown roof is being left to vegetate naturally) and these can be broadcast by hand directly onto the substrate or by Hydra-seed, which is where the seed is mixed with water and a gel tackifier (resembles wall paper paste) and mechanically sprayed onto the surface. Seeded roofs are slow to develop taking 3 years+ and the underlying soils are more prone to erosion and scour during the development period.

2.7 Features: In particular biodiverse roofs should include a range of physical features to mimic nature, to encourage biodiversity and in particular **SUSTAINABLE** biodiversity.

3.0 Products and materials

GRO (Green Roof Organisation) recognises that the FLL (Landscape Research, Development and Construction Society) *guidelines for the planning, execution and upkeep of green roof sites* is a sound base from which to establish the minimum requirements for roof greening specification in the UK. All Wallbarn materials discussed are FLL compliant where they are specifically referred to in the FLL guide.

Although some products are used on a frequent basis and constitute a ‘system’ it must be noted that every project has its own requirements which can include geographic location, desired use/roof objectives, microclimate etc and this should be taken into account when specifying a green roof.

Materials must be fit for purpose. All materials will have different USP’s and some benefits may seem more attractive than others but consideration must be given to the short, mid and long term viability of the roof. Of particular note are drainage layers which can be prone to compression due to static imposed loads (its own weight) or superimposed loads

such as follow on trades and maintenance traffic etc. Cheap drainage layers are often only suitable for short term viability and so FLL guides should be considered as a minimum.

4.0 Benefits

- 4.1 **Sustainable drainage.** Water retention and attenuation is the **PRIMARY** influence for the increase in roof greening. Specific design can affect the level of attenuation as well as providing a filtering and cleansing benefit. Reducing the impact on urban drainage at peak times, allowing water to permeate into subsoils etc has major benefit in reducing the risk of flooding.
- 4.2 **Biodiversity.** Green roofs can replace habitat that has been lost as a result of urban development and can create habitats for a wide range of flora and fauna.
- 4.3 **Carbon sequestration.** Plants absorb carbon and release oxygen during photosynthesis which helps remove emissions.
- 4.4 **Urban Heat Island Effect.** The evaporative cooling of green roof vegetation also reverses the heat reflecting effect from hard impermeable surfaces that artificially increases ambient air temperature.
- 4.5 **Reduction in solar gain.** By returning moisture to the atmosphere through evapotranspiration, solar gain can be reduced. Moist air helps trap dust and some gasses which reduces pollution
- 4.6 **Building performance.** The evaporative cooling effect combined with increased insulation or thermal mass can reduce the need for summer cooling (air conditioning etc) which results in reduced carbon emissions.
- 4.7 **Acoustic performance.** Green roof build ups can help reduce transfer of noise and can provide sound attenuation.
- 4.8 **Amenity and well being.** Green roofs have a positive visual impact and can provide valuable outdoor recreational areas.
- 4.9 **Membrane protection.** Green roofs prevent UV light degradation of the waterproof covering, reduce the diurnal temperature differences maintaining a more even environment and reducing extremes of hot and cold as well as excessive drying

Glossary of terms

- **BIODIVERSE:** A roof designed to create a desired habitat
- **ACID:** With a pH value less than 7
- **ALKALI:** With a pH value over 7
- **BROWN:** Using locally won soils and substrates and specifically used to encourage local wildlife
- **BIODIVERSITY:** Variation of life forms that are able to co-habit sustainably
- **BIODIVERSITY ACTION PLAN:** A plan formulated to protect and encourage a range of species at a local/regional/national/global level.
- **BREEAM:** Building Research Establishment Environmental Assessment Method
- **CAM:** (Crassulacean Acidic Metabolism) plants that deal with drought conditions by closing their stomata during the day
- **CLIMAX VEGETATION:** The total mature development of a plant or community of plants

- **DIURNAL:** Happening during the day or daily
- **ECO HOMES:** As for BREEAM but specifically aimed at domestic property
- **EXTENSIVE:** Lightweight thin substrates with low growing hardy plants
- **GREY WATER:** Water collected [from a roof] and used for non potable applications such as toilet flushing, irrigation
- **GRO:** Green Roof Organisation
- **HYDRO or HYDRA SEEDING:** Method of applying seed by mixing with water and gel and mechanically spraying onto the substrate
- **HYMENOPTERA:** Bees, hoverflies, wasps etc
- **FLL:** Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau
- **INTENSIVE:** Thicker substrates generally using a range of plant types
- **NEUTRAL:** With a pH value around 7
- **RHIZOMES:** Underground stems that bud to produce new shoots and plants
- **SEDUM:** A fleshy leaved plant
- **SEQUESTRATION:** To remove or separate
- **SUB-SOIL:** Any soil from below the top soil horizon, generally with no or low organic content
- **SUBSTRATE:** An engineered soil designed to provide a balance of nutrient and water retention
- **SUCCULENT:** Plant that can exist in dry arid conditions by using water stored in its leaves
- **SUDS:** Sustainable Urban Drainage Systems
- **SUSTAINABILITY:** Capacity to maintain an ecological state indefinitely
- **TOPSOIL:** Soil containing a high content of organic matter able to sustain vegetation



FAQ's

What are sedums?

Sedums are a species of low growing drought tolerant plants that adapt readily for life at roof level and can thrive in a shallow free draining growing medium. Different sub-species are chosen to give a good aesthetic mix, flowering predominately between May and July.

Are wildflowers weeds?

Any plant that is in the wrong place can be called a weed. Wildflowers are used because they offer a greater diversity than just sedums. The species used on roofs are chosen for their hardiness and suitability.

Can green roofs be installed on a completely flat roof surface?

This isn't ideal, we recommend a minimum fall of 1:60 with no areas of permanent standing water as this will lead to problems of permanent grass and moss contamination and may lead to the roots rotting. It should be noted that some grass and moss may be sporadically present during the wetter months, simply because the growing conditions exist, but these will die off in the summer months as insufficient moisture is retained within the shallow substrate growing medium for these plants to survive. Our **M-Trays** have a 45mm drain capacity that means that they are able to be laid onto flat roofs and can even be placed where there is standing water.

Is irrigation necessary for an extensive green roof?

Do I need to fertilise the sedums?

Fertiliser is essential to maintain the condition of the plants, as little nutrient exists in the shallow growing medium. Nutrients in the form of fertiliser help the plants to become conditioned and resistant to temperature extremes. It also helps some plants to flower and seed. Without fertiliser, the strongest and most resistant species will become predominant and you will end up with a monoculture, losing the variety and aesthetic balance.

Fertiliser is best applied each year during springtime (end of March to mid May).

What are the advantages of M-Tray modular green roofs over other systems?

As explained in some of the questions above M-Trays have significant advantages than loose lay systems

1 They are lightweight meaning they are easier to install

- 2 The speed of installation is more than twice as quick as loose lay systems**
- 3 They can be installed by non-skilled labour because of their simplicity**
- 4 They require less if no irrigation because of the unique special substrate blend**
- 5 The M-Trays do not suffer from being disturbed in transit so the vegetation stays in primary condition**
- 6 M-Trays are grown on for over 12 months before they are delivered to site to ensure healthy vibrant vegetation**
- 7 M-trays come with Sedum vegetation and sedum and Wildflowers for bio-diverse roofs**