



# Ask an Expert

By Tracy Nelson, Executive Director of the Lower Ninth Ward Center for Sustainable Engagement and Development

**Q** *What do I have to do to prepare my flat garage roof to be a green living roof and collect rainwater?*

**A** Introducing a living roof is a great way to extend the life of your garage surface, make a blah space beautiful, and create a cooler interior for your garage. And there is an easy strategy for collecting rainwater that you can put into motion yourself.

A flat surface is a good place for a living roof garden. The two most important design decisions are: finding the best method to waterproof the surface of your garage, and determining the type of foliage you want growing up there.

In the living roof world, there are three types of green roofs that vary in weight, depth of soil and the type of foliage that can be grown. These systems are extensive (least expensive and lowest maintenance), semi-extensive (heavier and requiring some maintenance) or intensive (living roofs which are more like walkable gardens.)



A Norwegian green roof cottage photographed by its creator William Veikho Viitanen.

If your garage has asphalt decking, the extensive system is best, as it is the most lightweight. This will grow a variety of sedums and other plants with shallow roots. If your garage has a concrete deck, you can go the semi-extensive route which has a deeper layer of soil and can grow a wider variety of plants, such as wildflowers. Beware, though, that this garden will

be quite heavy once installed. If you find that you really want the option of taller, more diverse plantings but have a wood frame garage, you may have to reinforce your structure to handle the extra load of the wildflower option.

Now, how do you actually create this garden? Here are the top three systems, starting with the traditional style. This method is for those roofs that have a parapet, or a low wall that acts as a perimeter at the edge of a flat roof, bordering the edge. First, waterproof your surface with asphalt or bitumen and make sure there are no leaks. You want to get this part right as it is a big headache if it needs to be redone. The second applied layer is the root membrane that stops plant roots from penetrating the asphalt, thus causing leaks. Use a pond liner, butyl lining or damp-proof polythene. Whenever possible, you want this layer to be one continuous sheet or the seams should overlap by at least eight to 12 inches. Next, install the filter sheet or drainage layer. This will allow the water to drain away but keep the soil where you want it. Make sure that water can drain to your gutter system, as standing water is tremendously heavy. Next, add the soil. Use engineered soil and not typical potting soil. This is important as engineered soil is lighter in weight, will retain moisture needed for the plants during those dry months and can drain off excess water when necessary. It also comes without weed spores and, in my weed-pulling-weary opinion, this bit of information sold me! Lastly, add the plants. The soil structure for the extensive system will support a great variety of sedums, moss and lichens while the semi-extensive soil will support a more highly diverse, grassland type plant species (think of that wildflower field).

There are two newer living roof systems that are both fun and easy to install. They do cost a little bit more, but they are great for flat roofs without a parapet. The middle of the road option is called a Green Pak roof system, and the high-end system is the Green Roof



Hundertwasser Village, Vienna, Austria. Instead of demolishing the existing parking garage, the creator chose to maintain its facades and rebuild the interior. The structure is able to support the weight of the intensive living roof. Photo courtesy of Klaus Kalke.

Blocks. Both of these are great as they can easily be removed in the future. The water proofing steps for these are the same as for the traditional method.

The Green Pak system is basically a burlap type sack that contains engineered soil and can be carried up to the roof by two handles sewn onto the sack. Just line these up to the density that you want, cut small holes in the top and plant your seedlings. You will need to water the plants to get them established.

The Green Roof Blocks are even easier but are slightly higher in price. These consist of two-by-two square aluminum boxes with carrying handles that come from the company already filled with soil and established plants. This gives you the immediate pleasure of an instant garden.

So what are the costs? I've seen the extensive system listed as low as about \$9 per square foot for three inches of growing media and sedums. More commonly the range is between \$14 and \$25 per square foot, including roofing membranes. Semi-intensive costs around \$25 to \$40 per square foot and can go up from there.

To complete this project, the installation of a water cistern to collect overflow will make your garage pretty self-contained. Here is the skinny on a simple water catchment system: Get a cistern or rain barrel that is made out of a non-reactive material such as redwood, galvanized steel or plastic. It

should be watertight, have a smooth interior surface (so that you can scrub it down periodically), a tight fitting lid and should be able to handle the volume of your roof runoff and meet your watering needs. You can connect the cistern to one of your downspouts but make sure that you have screens and leaf guards on your gutters. There should also be an overflow pipe for those heavy days of rain. If you want to use this to water your garden or flower beds, a cistern that is on a raised platform can create a gravity feed that can be used without electricity.

I must admit that your question has inspired me to turn my own backyard shed into a green living roof. And since I have been meaning to create a rain catchment system on my house to offset my water bill, this will give me an excuse to experiment in a small way first! I hope you enjoy transforming your garage.

[www.greenroofblocks.com/index.php/page/product/green-paks](http://www.greenroofblocks.com/index.php/page/product/green-paks)

[www.greenroofs.org/](http://www.greenroofs.org/) and <http://www.greenroofs.com/>

[www.greenroofs.com/projects/plist.php](http://www.greenroofs.com/projects/plist.php)

[www.kidsfromkanata.ca/files/rainbarrels.html](http://www.kidsfromkanata.ca/files/rainbarrels.html)

[www.dnr.state.md.us/ed/rainbarrel.html](http://www.dnr.state.md.us/ed/rainbarrel.html)

<http://raingardens.org/> (This website has good information on rain barrels but also helps you plan a rain garden for the overflow from your cistern.)

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