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Living Roofs

BUT WILL I HAVE TO MOW IT?

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"Sunlight, water, rapid temperature changes, and ice are tough on building materials. Underground structures are by their very nature pretty much immune to such threats. Many ancient structures that have been protected by the earth are found to be unchanged after two, three even four thousand years." Infra Structures, by Malcom Wells.


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Using an earth covered, vegetated roof (or "green roof") has become a popular way to approach sustainability in building construction. Use in commercial-size building types is now well documented and increasingly evident around the world. In Tokyo, Japan, all new buildings over 10,000 square feet are required to have a portion of the roof vegetated. In Germany, where much of the green roof technology began, approximately 15% of all flat roofs are green. And in our own country, Chicago has set the standard, instituting a green roof grant program encouraging the installation of green roofs on existing buildings.

Large-scale flat-roofed buildings benefit from vegetative planting in a number of ways. As a planted and porous surface, a green roof mitigates storm water run off and can help fulfill storm water retention requirements for a site, thereby increasing the buildable envelope. Compared with a traditional asphalt or gravel surface, a green roof reduces the "heat island" effect, where substantial amounts of paving act as a heat sink. In addition, a planted roof does not experience the same temperature fluctuations found in traditional materials, contributing to cooler building temperatures. This facilitates in the down sizing of mechanical equipment used for air conditioning. The soil and vegetation of a green roof offer better protection to the roofing membrane from UV radiation, thereby increasing its lifespan over traditional roofs. Finally, sound attenuation is better under a green roof, and air quality is improved.

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A residential-scale green roof can take advantage of nearly all the benefits found in commercial use (although at a smaller order of magnitude). In addition, it offers important design and aesthetic considerations often lost on larger buildings. The most profound advantages provided by a green roof in residential construction are life expectancy, thermal moderation and sound attenuation. Studies in Europe have found roof membrane life to double as a result of better protection from solar radiation provided by the soil and plantings that cover it (Peck & Kuhn, 2001). As in larger scale buildings, minimized fluctuations in roof surface temperature ensure a more stable building temperature, while exterior noise is reduced by the density of soil and vegetation that make up a green roof.

Green roofs in residential construction also provide aesthetic benefits. For large homes, making a portion of the roof green is a subtle but sophisticated design aesthetic that minimizes the extent of the roof line while better relating the structure to its surrounding landscape. Additionally, combining more than one roofing material is often a better design solution. When designing multi-unit residences, such as a duplex with a single story connection, a green roof can be used to obscure the connection between the two units. This solution allows for the design of two complementary yet independent units that can stand on their own.

The layers of material that make up a modern green roof contribute to greater feasibility of use in a variety of climates and conditions, including pitched roof applications. A manufactured drainage-aeration-water storage layer can store small amounts of water to compensate for dry spells, while a special growth medium designed to be lighter-weight is conducive to plant growth. The total build-up system is designed for little if any additional structural support compared to one which employs a sand or gravel base layer.

The advantages of using a green roof in residential construction should not be overlooked. In addition to providing longevity to a roof, thermal benefits and sound attenuation, aesthetic and design considerations prove green roofs can add exciting possibilities for architectural design.