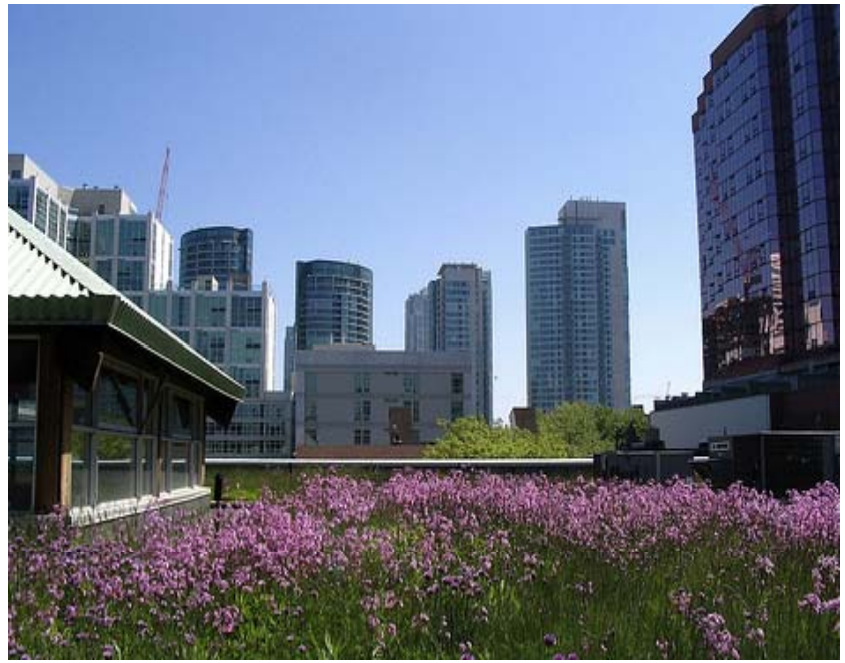
Green Roofs



Environment friendly e-library

Green Roofs

Green roofs, provide many benefits to the public and building owners. Green roof design and installation is still in it's infancy in North America, although well established in some European countries like Germany.

- The cost of a green roof is typically two to three times the cost of a conventional roof. However, studies show that the roof membrane will last well past it's conventional design life; in many cases up to 30 or even 40 years.

Green Roofs

Building owners considering a green roof need to be aware of some concerns:

•Fire ratings have not been determined due to the variety of plants available. A proposed rule requires that there be a 6' border around any green roof section greater than a 152 squares *(10'x10' area = 1 square)*. And that the longest side of any green roof be only 125'. Also- beware of grease and exhaust vents.

•Plant and soil should not be used as ballast to hold the roof membrane in place as wind uplift has not been specified.

•Metal flashings and copings should not be aluminum due to interaction with fertilizers. Stainless steel and copper are better choices. Flashings must be high enough to accommodate the depth of the green roof.

•The cost of maintenance should be included in the design and future annual budgets.

•Live and dead loads need to be determined by a structural engineer.

•Understand drainage issues and maintenance.

Green Roofs

Plants can help us eliminate our use of fossil fuels in ways beyond providing us with local food. By incorporating vegetation into our landscape through the use of green roofs, we can greatly diminish the supplemental energy our buildings require by reducing the amount of excess heat and cold that enters in the first place.

Green Roofs

Environmental Benefits

•Indoor and outdoor plants cleanse the air of pollutants created by furnaces and passing cars and trucks and take carbon dioxide out of the air.

•Storm water that can overflow sewage systems is instead retained and released back into the environment, reducing flood potential.

•If done on a large enough scale, green roofs can reduce the ambient temperature by several degrees in the summertime.

•Additional green space provides forage and housing to a wide variety of insects, birds, and smaller animals.

Green Roofs

Major Economic Benefits

•Green roofs can reduce roof temperatures by up to 70 to 80 degrees F. Substantial reductions in interior temperatures result, often by as much as 6 to 8 degrees F. Considering that a 1- degree F decrease in interior temperatures can reduce air conditioning use by 8 percent, this can lead to huge energy savings.

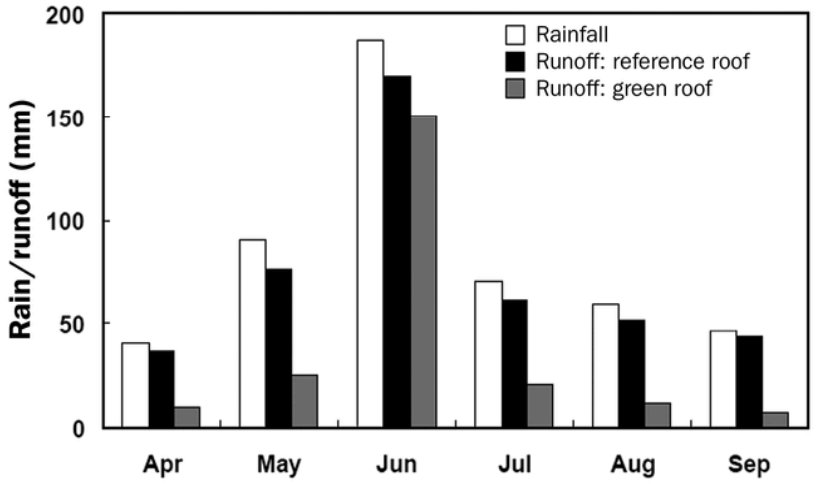
•Roofs can become usable space.

Green Roofs

Major Economic Benefits

•Typical estimates are that a green roof extends the lifetime of a roof between 100 and 200 percent, by protecting the rooftop from ultraviolet radiation, large temperature fluctuations, drying winds, and punctures.

•Some municipalities will allow larger foot print buildings based on decreased water run-off provided by a green roof.



Green Roofs

Types of Green Roofs

There are commonly two categories of green roofs.

1. Extensive
2. Intensive

A third less common green roof is referred to as Semi-Intensive.

Green Roofs

Characterisitic	Extensive	Semi Intensive	Intensive
Depth of soil	< 6"	25% +or- 6"	>6"
Accessibility	Inaccessible	Partly accessible	Accessable
Saturated weight	Low 10-35lbs p/sft	35-50lbs p/sft	High 35-300lbs p/s
Plant diversity	Low	Greater	Greatest
Cost	Low	Varies	High
Maintenance	Minimum	Varies	High
Irrigation system	Not required	Sometimes	Always

Green Roofs

Features and Benefits

Green Roofs

of Green Roof Types

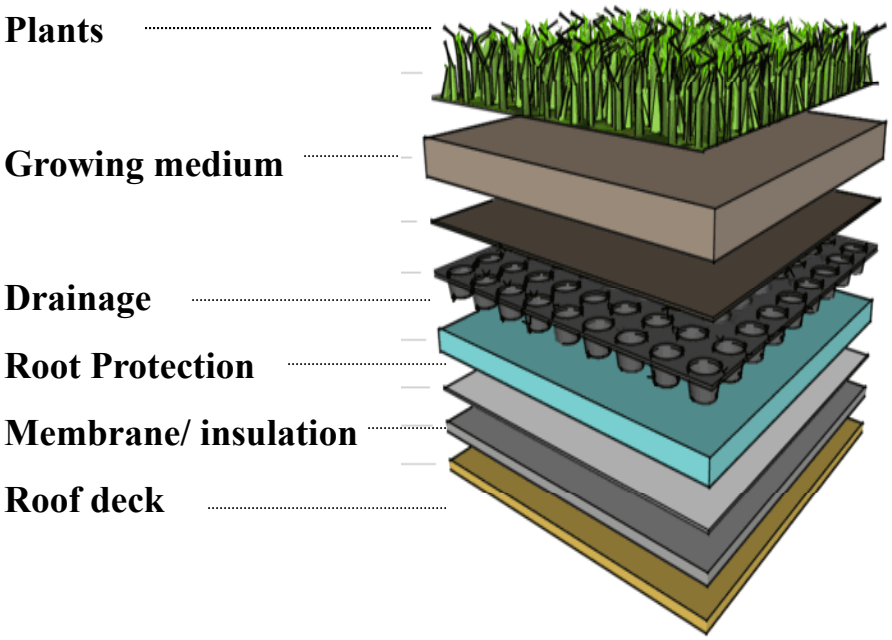
Extensive	Semi Intensive	Intensive
Lightweight	Combines features of intensive and extensive	Greater diversity of plants
Suitable for large areas	Utilizes areas with greater loading capacity	Best insulation and storm water properties
Low maintenance cost	Greater coverage than intensive	Greater range of design
More suitable for retrofit	Average maintenance	Usually accesible
Lower cost	Greater plant diversity than extensive	Best variety of human uses
Easier to replace	Greater opportunities for aesthetic design	Greatest opportunity for aesthetic design

Green Roofs

Composition

In general, all green roofs have five basic components, although sometimes one layer achieves two or more functions:

1. Weatherproof membrane
2. Root-protection barrier
3. Drainage layer
4. Growing medium
5. Plants



Green Roofs

As popularity of green roofs increase roof manufactures are starting to design and specify green roofs. Plant trays that include the root barrier or roof membrane protection, drainage and growing medium are becoming very popular as they are:

- Easy to handle.
- Provide consistent weight loads and standardization.
- Eliminate installation steps.

The biggest benefit of a tray system is that plants are delivered fully grown, eliminating the need for a growth period on the roof where the plants have to be closely cared for.

Green Roofs

Green Roof Associated Products

•When designing a green roof the following additional items need to be considered:

- •The roof should be flood tested after installation of the roof membrane.
- •Fall protection if the roof will have frequent visitors or require frequent maintenance.
- •Walkway
- •Safe access – a roof hatch is preferable to outside ladders

Green Roofs

To learn more and watch a video explaining green roofs click here:

http://www.greenroofs.com/Greenroofs101/