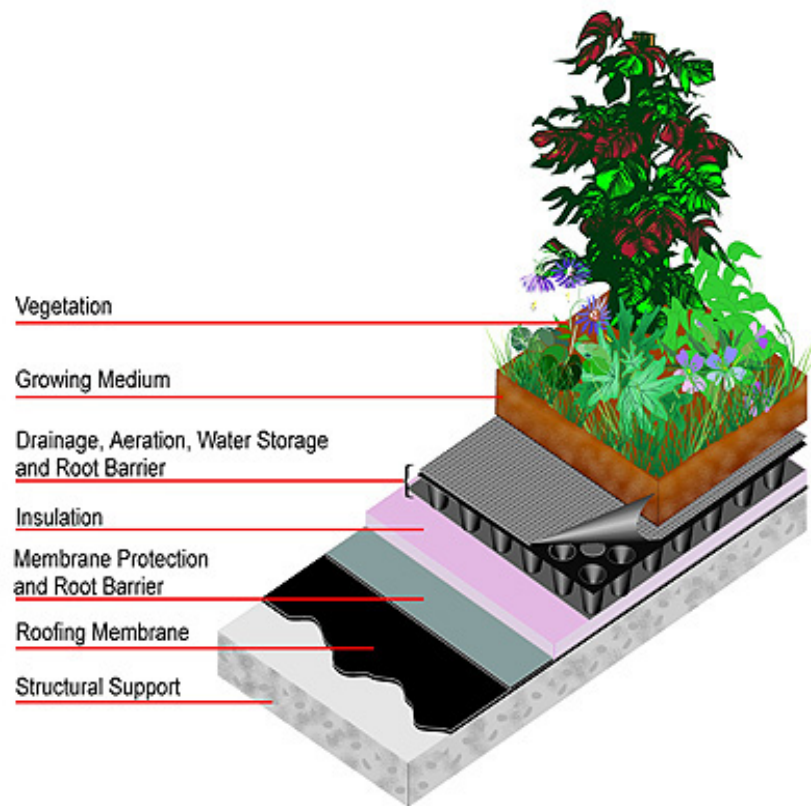




Low Impact
Development Center, Inc.

Green Roofs

Green roofs, also known as vegetated roof covers, eco-roofs or nature roofs, are multi-beneficial structural components that help to mitigate the effects of urbanization on water quality by filtering, absorbing or detaining rainfall. They are constructed of a lightweight soil media, underlain by a drainage layer, and a high quality impermeable membrane that protects the building structure. The soil is planted with a specialized mix of plants that can thrive in the harsh, dry, high temperature conditions of the roof and tolerate short periods of inundation from storm events.



Green roof cross-section
(Source: [American Wick Drain Corp.](#))

Historically, engineered green roofs originated in northern Europe, where sod roofs and walls have been utilized as construction materials for hundreds of years. The development of contemporary approaches to green roof technology began in the urban areas of Germany over 30 years ago. Because of ongoing water quality degradation and a limited existing infrastructure for the control of stormwater in these areas, few alternatives were available for improved stormwater management designs. Environmental and economic considerations helped spur the

development of green roof systems that could provide the necessary stormwater treatment on-site. Roofscapes, Inc. have developed a numerical saturate-unsaturated flow simulation model that investigates the variables influencing the effectiveness of green roofs.



Chicago City Hall Urban Heat Island Initiative project
(Source: [Roofscapes, Inc.](#))

Green roofs provide stormwater management benefits by:

- Utilizing the biological, physical, and chemical processes found in the plant and soil complex to prevent airborne pollutants from entering the storm drain system.
- Reducing the runoff volume and peak discharge rate by holding back and slowing down the water that would otherwise flow quickly into the storm drain system.

Green roofs are not only aesthetically pleasing, but they also:

- Reduce city “heat island” effect
- Reduce CO₂ impact
- Reduce summer air conditioning cost
- Reduce winter heat demand
- Potentially lengthen roof life 2 to 3 times
- Treat nitrogen pollution in rain
- Negate acid rain effect
- Help reduce volume and peak rates of stormwater

The hydrologic processes that can be influenced by design choices and aid in the management of stormwater include:³

- Interception of rainfall by foliage, and subsequent evaporation.
- Reduction in the velocity of runoff.
- Infiltration.
- Percolation.
- Shallow subterranean flow, through the soil.
- Root zone moisture uptake and evapotranspiration.