LiveRoof® Texas LLC BRAND

Hybrid Green Roof System

Natural Function
Natural Beauty

USA MADE

Fully-Grown Invisible Modular Green Roof System

LiveRoof in Texas

GETTING TO KNOW THE GROWER

David Scott, owner of Joss Growers, Inc. in Georgetown, Texas, is highly regarded for his knowledge of drought-tolerant species native to Texas as well as new plant materials adapted to flourish in the wide range of Texas environments.

Scott started his nursery business in 1993 from his backyard where he quickly found success in his ability to focus on successful plant selections for the ever-changing Texas environment. It was this ability to stay ahead of the growing trends that has led to the current 65,000 square foot under cover nursery along with eight acres of open space that makes up the Joss Growers nursery today.

Scott's expertise in drought-tolerant plants has made him a valuable commodity when it comes to green roof design and plant selection in Texas. He's been involved with supplying plants to multiple green roof projects around Austin, since 2003 including the Lady Bird Johnson Wildflower Center and Austin City Hall to name a few.

After a West Austin green roof project, Scott traveled to a trade show in Vancouver where he first saw the LiveRoof Hybrid Green Roof System. "I knew this was a product I wanted to sell my customers," he said. "LiveRoof establishes a green roof as a naturally functioning ecosystem with the soil unified between modules across the rooftop. I could see it would install easily and seamlessly and, most importantly, that it would work."

The **Hybrid** Solution

LiveRoof was developed by horticulturists, green roof experts, roofers, landscapers, engineers, architects, and physical therapists to combine (hybridize) the best features of all green roof systems. Designed around the concepts of modularity and the natural function of plants, LiveRoof delivers the most aesthetically beautiful, sustainable, and energy-saving green alternative.

NATURAL MEADOW VIEW

Once placed on the roof, the soil elevators are removed and you are left with a monolithic green space.

FULLY VEGETATED

Our modules have no visible seams, which results in increased durability and a better looking roof.

LOW MAINTENANCE

LiveRoof is the most self-supporting product on the market, with small and predictable yearly maintenance costs.

INSTANTLY MATURE

Our plants are grown to maturity in a nursery prior to installation, giving you an instantly mature greenspace.

DESIGNED TO OUTPERFORM ALL OTHER ROOF SYSTEMS

- **Maximum Energy-Savings Benefits**
  Full coverage for optimal results
- **Eligible for LEEDS Credits**
  Ability to receive up to 20 possible points for a vegetated roof
- **Sustainable Materials**
  Modules contain 100% recycled plastic
- **Fast and Simple Installation**
  All materials and instructions provided, no special skills required. Modular and ergonomic design makes modules easy to handle
- **Extremely Durable**
  Internal system protected by vegetation
- **Little Maintenance**
  Most self-supporting product on market, with small and predictable maintenance cost
- **Easily Remove for Roof Access**
  Simply lift modules to conduct service or modifications
- **Convenient Delivery**
  Our logistically simple modules are easy to transport from production to installation
- **Instantly Mature Green Roof**
  Plants grown to maturity in nursery before installation

Designed for Texas

LOCAL RECOMMENDATIONS

Not all green roofs are created equal, or are equally green. The rooftop is an unforgiving environment for plants. Our knowledge of your local conditions is essential for determining what plants are best for your project. That's why we customize our plant and grass selections for your specific area, unlike other vendors who recommend a Sedum roof consisting of exotic species that may have performed well in other states but are **known to do poorly in Texas**.

SUSTAINABLE MIXES

LiveRoof Texas approaches each green roof project from a horticultural point of view. We see the rooftop environment as a biological system, and understand what it takes to produce a horticulturally sound, sustainable system designed so plants will flourish. We provide regional palette plant mixes with plenty of native xeric groundcovers, several ice plants, succulent perennials with good colors, and short-stature grasses. Please see pages 11-13 for more details on which plants mix(es) will work best for you.

"Most green roof systems have been designed by people in the roofing business, not people rooted in horticulture. Growers ought to look for green roof manufacturers who can see the rooftop environment as a biological system, who understand that a green roof has to be green — a horticulturally sound, sustainable system designed so plants will flourish."

— David Scott

SOIL ENGINEERED FOR TEXAS CLIMATE

Our soil is engineered using local components to be sustainable and horticulturally sound. LiveRoof Texas Engineered Green Roof Soil is designed to be long-lasting, used in conjunction with the LIveRoof module and to be the best green roof soil on the market. LiveRoof Texas Engineered Green Roof Soil ™, a proprietary blend of the finest inorganic and organic materials, is formulated under strictly controlled standards.

TEXAS PROJECTS

1. **TERRELL HILLS HOUSE**
San Antonio, Texas

2. **GREENSTREET**
Houston, Texas

3. **GABLES PARK PLAZA**
Austin, Texas

4. **MANDELL PARK**
Houston, Texas

Visit www.LiveRoofTexas.com/Projects for more information on our projects

CASE STUDY:

HIPOLITO F. GARCIA FEDERAL BUILDING, *San Antonio*

The Hipolito F. Garcia Federal Courthouse earned the top rating under the LEED green building program. The centerpiece of the project is the green roof system, grown by LiveRoof Texas.

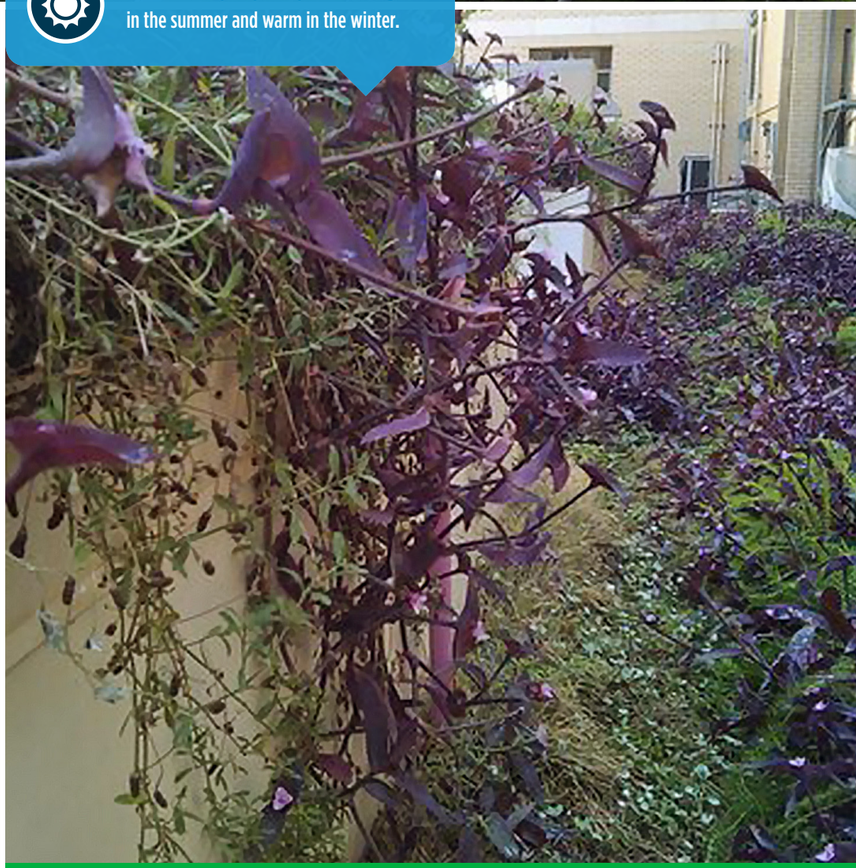
The green roof is irrigated from air conditioning condensate, which prevents this water from entering the wastewater system and provides an additional cooling benefit to the building.

At 13,000 square feet, it is the largest green roof in the city. Installation took 9 days to complete.

Water collected from the air conditioning's condensation tank and ground-water is to irrigate the building's roof.

Plant diversity helps keep the building cool in the summer and warm in the winter.

6" Plants are rooted in 6 inches of engineered soil, the standard depth for all LiveRoof projects.



Photos by Brian Scantlin, ValleyCrest Landscape Companies

System Features

LiveRoof Deep

Soil Depth: Appx. 6"

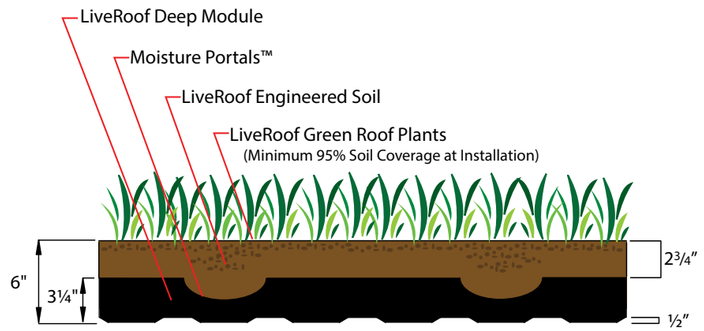
Module Size: 1' x 2' x 3 ¼"

Weight: Appx. 40 - 50 lbs/sf saturated and vegetated.

Dry Weight: Appx. 30 lbs/sf (confirm with local grower)

Merits: When irrigated, expands plant biodiversity to array of drought resistant conventional and native perennials, grasses, and vegetables.

Plants: Succulent ground covers, and highly drought tolerant native and adapted non-native perennials, grasses, and vegetables.



LiveRoof Standard*

Soil Depth: Appx. 4 ¼"

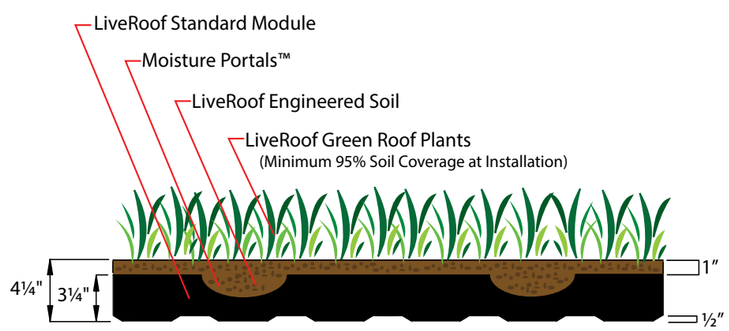
Module Size: 1' x 2' x 3 ¼"

Weight: Appx. 27 - 29 lbs/sf saturated and vegetated.

Dry Weight: Appx. 20 lbs/sf (confirm with local grower)

Merits: Maximizes storm water management, integrates perfectly with new construction and often times existing buildings.

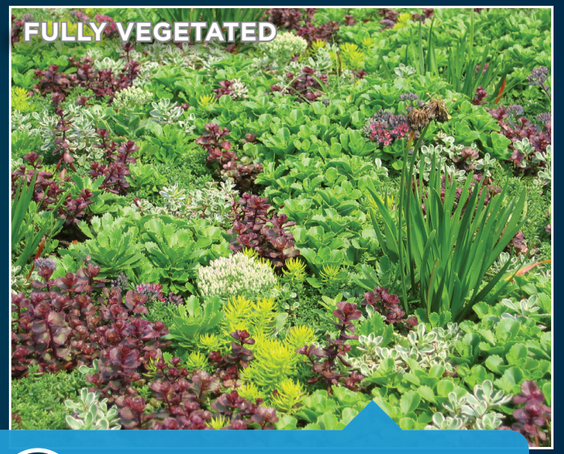
Plants: Succulent ground covers, water conserving accent plants, and hard spring blooming bulbs.



* ONLY SUITABLE FOR HOUSTON

LOW MAINTENANCE

Because Liveroof is mature and fully vegetated "like a carpet"* there is no costly Establishment period (which with many systems can drag on into perpetuity). And, when the LiveRoof maintenance protocol is followed, maintenance is inexpensive and easy. We even send two-monthly email maintenance newsletter. This useful resource guides the maintenance provider through seasonal maintenance events.



When maintained according to our protocol, an acre sized LiveRoof can be maintained in as little as 15 hours a year.

WHAT'S IT LIKE TO CARE FOR A 45,000 SQFT LIVEROOF?

Chuck Tubergen, of Haworth Inc., had this to say:

"It's easy, and quite honestly, I really enjoy it. It takes me about 30 minutes and I usually find only enough weeds to fill my hand. Up on the roof it is beautiful, peaceful, and my maintenance events are like a pleasant walk surrounded by a colorful meadow that changes (the flowers and foliage) each time you see it."
Note: this equates about 12 hour total per year.

Chuck has been caring for this roof since 2006, and it is perfect – thick like carpeting, and gorgeous year round.

MAINTENANCE PATHS

To avoid trampling over plants during maintenance, LiveRoof has developed the RoofStone® paver system. The artisan quality green RoofStone pavers are designed to integrate seamless with the LiveRoof Standard and Deep system options.
To learn more, visit www.liveroof.com/roofstone-integrated-paver

*In hot climates, less dense planting is sometimes desirable

Irrigation Systems

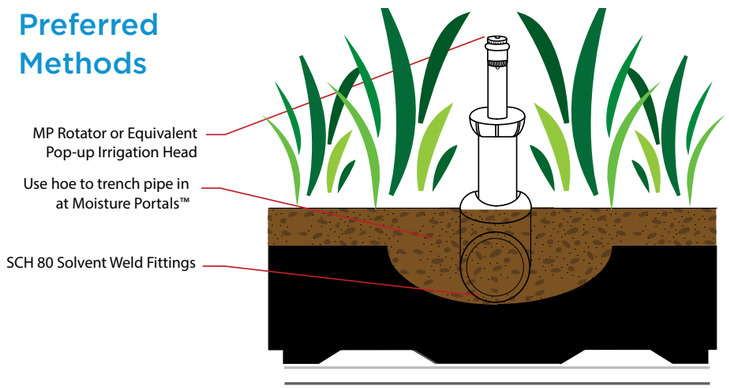
BENEFITS OF IRRIGATION VS. NO IRRIGATION

- Net energy savings
- Net water savings
- Reduced temperature fluctuation (less wear on membrane)
- Less maintenance cost
- Plants will be optimally beautiful
- Avoid plant loss due to drought
- Greater owner satisfaction

WHICH TYPE IS BEST?

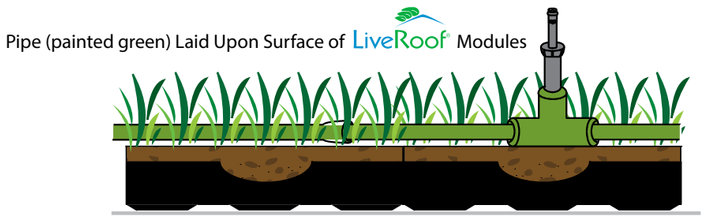
Overhead matched precipitation rotor systems are the best – and do a better job with less water than drip or sub-irrigation methods. During 2011, an irrigation study was conducted in the MSU Plant Science Greenhouse by Bradley Rowe, PhD, in LIveRoof green roof modules. Substrates that were watered with overhead spray irrigation retained more water with less waste than sub-irrigation and drip. This is because green roof substrates are coarse textured and do not wick water or move it horizontally very well.

Preferred Methods



Note: Our system requires only 6" of soil to grow a sustainable roof, compared with 18"+ for other systems.

Surface Application of Irrigation



SAVE WATER, IRRIGATE

In his paper "How Green Roofs Partition Water, Energy, and Costs in Urban Energy-Air Conditioning Budgets," Paul S. Mankewicz Ph.D., of the Gaia Institute, illustrated the hidden relationship of water and energy when he asked the question "is it more cost effective to utilize potable water for cooling than electricity?" Central to his comparison is that the cost of electricity for a ton of air conditioning in New York costs $13 .50, while the evaporation of 33 gallons of water produces and equivalent ton of air conditioning for only 26 cents. Every ton of air conditioning requires 84 kilowatt-hours to produce. In four major cities, this quantity of electricity takes between 24 and 89 gallons of water to generate. On the average each gallon of water used to cool a structure will save 1.7 gallons of water used to produce energy.

Cost of producing 1 Ton of A/C

{ the amount of energy required to melt 1 ton of ice }

Plant Mixes Designed with Texas in Mind

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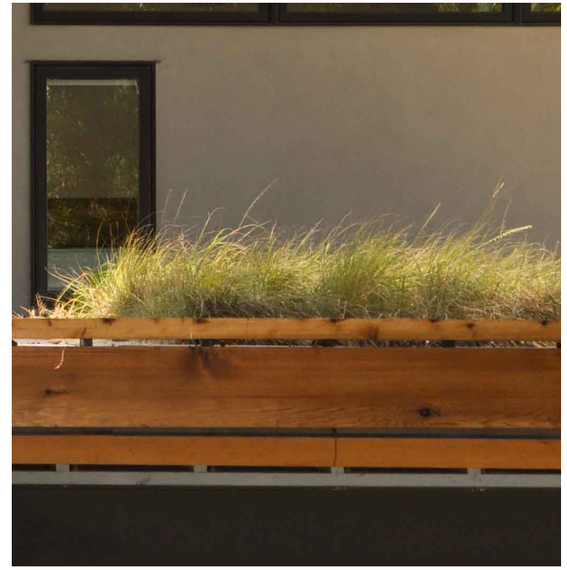
FLOWER MIX (SUN)

The blending of purple heart with the rocky point and or alpine ice plant allows for vibrant colors throughout the year. The addition of frog fruit to this mix adds another unique color aspect.

The key component to any green roof being successful lies in the amount of vegetation that covers the substrate. The use of both purple heart and ice plants allows for full-coverage year round. Frog fruit (white blooms) make the color contrasts something to be desired. We use cold-hardy ice plants that don't typically freeze when temperatures drop below 32 degrees. Ice plants also bloom for most of Summer and into Fall. The combination of these plants allows for color changes and texture that is unmatched.

Water needs: Low



GRASS MIX (SUN)

The combination of Blue grama, Blonde Ambition, Texas Bluegrass, Side oats grama, and one flowering plant (i.e. Trailing germander, bluebonnets, black foot daisy etc.) mimics a typical Texas prairie.

For optimal performance, we have seen that the most effective way of portraying a Texas plain is to use native grass species. These grasses provide dramatic height and texture variations in different parts of the year, especially when the seed heads tower above the module. Texas bluegrass, a winter grass, has the ability to stay green during times of colder temperatures and portrays a vibrant green color. Sideoats grama is the official grass of the State of Texas, which is why it performs flawlessly in the LiveRoof engineered soil. We typically add at least one flowering plant to these mixes to give some added color during Spring/blooming time.

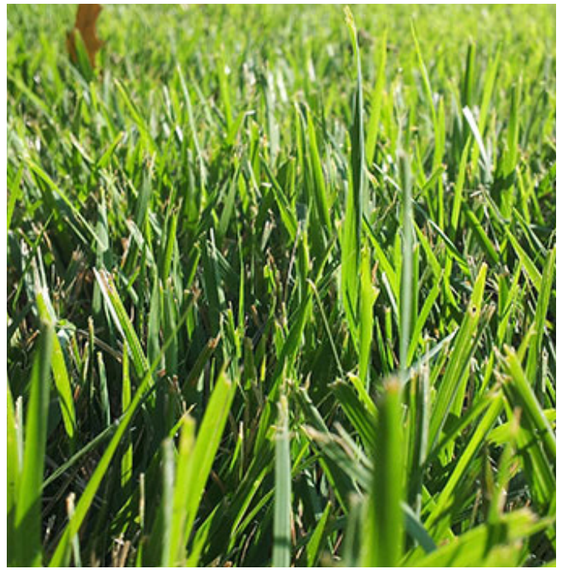
Water needs: Medium to Low

HYBRID MIX (SHADE)

Texas Sedge, Berkley Sedge, Horse herb, and occasionally frog fruit can be used when shade is a factor.

Not all buildings have the ability to attract full sun to the roof. This mix allows for plants to sustain in an environment that doesn't have a lot of direct sunlight throughout the day. The low-lying horse herb and frog fruit allow for ground cover, while the Berkley and Texas sedge can provide variety of height distinction which adds to the likeability of this mix. Both the horse herb (yellow) and frog fruit (white) produce blooms to add an assortment of color.

Water needs: Average to Low



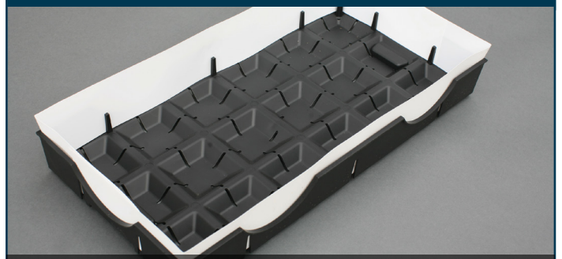
TURF GRASS MIX

Recommended Turf Grass Mix: Palisades Zoysia may be mono-planted in our modules and doesn't need to be mowed.

The palisades zoysia variety has shown to sustain remarkably well in the Southwest environment of the United States. It allows us to create a view that can mimic a lawn while not causing you to mow on a regular basis if at all. The height of the zoysia does not typically grow higher than 3". The aggressive nature of this species also stalls the ability for weed seed to infiltrate the module.

Water needs: Low

SYSTEM PROCESS



Step 1. Soil Elevator inserted into LiveRoof module

Step 2. Module filled with LiveRoof engineered soil

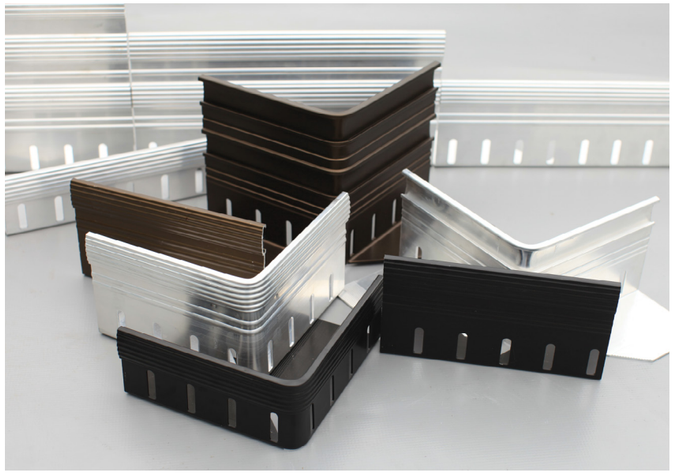
Step 3. Plants are grown to maturity at nursery

Step 4. Modules are installed tightly

Step 5. Elevators are removed for a seamless roof

System Accessories

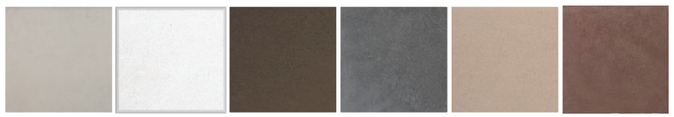
The all new LiveRoof RoofEdge® and RoofStone® products represent second generation green roofing. Each product is the result of lessons learned during hundreds of installations, and collectively represent a new standard for function, aesthetics, and integration.



RoofEdge

Designed to be architecturally "pleasing to the eye," but also with the contractor in mind. Economical and easy to install, the quality of the materials and finishes—whether natural aluminum or bronze or black anodized—are better than ever.

RoofEdge corners save time and money. Our pre-formed corners are far more precise than field-bent corners.



RoofStone

RoofStone is an accessory for walkways and patios integrated into LiveRoof installations.

RoofStone pavers fit right up against LiveRoof modules, so no special edging is required. The bases also include convenient handgrips. LiveRoof manufactures the RoofStone base with 100% recycled, post-industrial polypropylene.

Available in six versatile colors *(left)*: Natural, Light Reflective, Mocha, Charcoal, Beach Sand, and Red Brick.

Potential LEED Contributions

Our advanced green roof system can help you earn LEED points in several credit categories – above and beyond that of just any green roof system. LiveRoof green roofs have been used on dozens of LEED certified projects. Our products contribute to stormwater control, provide habitat for wildlife, mitigate heat island effect, reduce cooling loads, and provide many other benefits.

v2009

- Sustainable Sites Credit 5.1: Site Development, Protect and Restore Habitat
- Sustainable Sites Credit 5.2: Site Development, Maximize Open Space
- Sustainable Sites Credit 6.1: Quantity Control
- Sustainable Sites Credit 7.1: Heat Island Effect – Non-Roof
- Sustainable Sites Credit 7.2: Heat Island Effect – Roof
- Water Efficiency Credit 1.1: Water Efficient Landscaping, Reduce by 50%
- Water Efficiency Credit 1.2: Water Efficient Landscaping, No Potable Use or Irrigation
- Energy & Atmosphere Credits 1.1-1.19: Optimize Energy Performance
- Material & Resource Credit 2: Construction Waste Management
- Material & Resource Credit 4: Recycled Content
- Material & Resource Credit 5: Regional Materials
- Material & Resource Credit 6: Rapidly Renewable Materials

v4

- Sustainable Sites: Site Development – Protect or Restore Habitat
- Sustainable Sites: Open Space
- Sustainable Sites: Rainwater Management
- Water Efficiency: Outdoor Water Use Reduction
- Energy & Atmosphere: Optimize Energy Performance
- Material & Resources: Construction and Demolition Waste Management
- Material & Resources: Building Product Disclosure and Optimization – Environmental Product Declarations
- Energy & Atmosphere Credits 1.1-1.19: Optimize Energy Performance
- Material & Resource Credit 2: Construction Waste Management
- Material & Resources: Building Product Disclosure and Optimization – Sourcing of Raw Materials
- Material & Resources: Building Product Disclosure and Optimization – Material Ingredients

Your city may offer green roof incentives, such as a Density Bonus, where additional space is earned for each square foot of planted bed provided on a vegetated roof.

View our Fact Sheet online for more information.

LiveRoof.com/green-roofs-and-leed/

LIVEROOF DESIGN & SUPPORT RESOURCES

Design Software

LiveRoof is pleased to offer a Building Information Model for use with Autodesk® Revit ® Architecture building design software. This allows architects to model not only the geometry of the LiveRoof system, but also its properties. The LiveRoof BIM allows architects, engineers, construction managers, contractors and building owners to easily access information about the LiveRoof system during design, construction, and after installation. BIM provides a visual rendering of the LiveRoof system, includes technical information, and facilitates specification.
The LiveRoof BIM can be accessed in the A&E section of LiveRoof.com

Design Checklist

We provide a checklist to help designers optimize each LiveRoof green roof design.

Spec Writer

LiveRoof also offers an amazingly effective Spec Writer tool for use by architects. This web-based tool allows for time savings and consistency in writing specifications. See **www.liveroof.com/spec-writer/**

Ongoing Support

LiveRoof provides ongoing “best practice” sharing and maintenance event reminders to LiveRoof owners and caretakers via our bi-weekly email newsletter. This helps to protect ones investment in the LiveRoof System.

System Specifications

Module Size
LiveRoof Standard: 1' x 2' x 3 ¼" (soil height appx. 4 ¼")
LiveRoof Deep: 1' x 2' x 3 ¼" (soil height appx. +/- 6")
LiveRoof MAXX: 1' x 1' x 3 ¼" (soil height appx. +/- 8")

Module Weight
Standard, Deep, and MAXX: 14oz./sqft

Material
100% recycled polypropylene (avg. 10% post-consumer, 90% post-industrial)

Water Dispersal
Appx.. 10 gal per min. per lineal foot.
Hi-Flow option available with standard and deep module.

Module Color
Black or gray

Weight Vegetated (Fully Saturated)
LiveRoof Standard: appx. 27-29 lbs./sqft
LiveRoof Deep: appx. 40-50 lbs./sqft
LiveRoof MAXX: appx. 60-65 lbs./sqft

Drainage
Positive drain holes, at lowest point in module

Soil Media
Proprietary LiveRoof specified engineered soil, based upon German FLL granulometric specifications, 94+% by dry weight inorganic content for minimal shrinkage/decomposition. (92% in British Columbia). Dry weight appx. 60-65 lbs/cu.ft No V.O.C.; Compliant with TACO standards specifications.
May vary somewhat with local grower.

Acceptable Protective Underlying Materials
Modules to be placed directly upon heavy duty (HDPE, Polypropylene, TPO, EPDM or recyclable PVC) slip sheet/root barrier of 40-60 mil. thickness with effectively bonded seams. This is placed as an additional protective barrier above roof waterproofing membrane and extended 3 inches vertically along parapet to ward against edge abrasion. This may also be glued to parapet if manufacturer approves. Confirm suitability of waterproofing membrane with manufacturer. Alternatively low profile drain boards work well and manufacturers of cold fluid applied reinforced urethane membranes typically warrant their systems for use in conjunction with the LiveRoof system.

Irrigation System
Recommended for backup during prolonged hot dry windy weather patterns. Considered mandatory in warm/hot climates. Simple overhead system is inexpensive and effective insurance. Irrigation requirements are dependent on plant selection, climate and roof design.

GUARANTEED

In addition to LiveRoof LLC's industry leading 50 year module warranty, Liveroof can provide an overburden warranty at an additional cost and most Liveroof Growers offer an extendable plant warranty. The LiveRoof system is also compatible with the waterproofing system warranties of major waterproofing manufactures and in some cases, full system single source warranties are offered by certain waterproofing system manufactures.

Most importantly, LiveRoof, LLC will always try to convey to you what it is that you should know, rather than what you want to hear. Liveroof green roofs are extremely low maintenance, but no green roof requires "no maintenance". Therefore, all warranties are subject to proper care through the consistent execution of the Liveroof Standard Maintenance Protocol. This is easy, and we are pleased to instruct you at your location.

For full warranty and disclaimers, see LiveRoof.com

CONTACT US
FOR DEMONSTRATIONS, PRICING, AND PLANT RECOMMENDATIONS

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Texas Nursery & Landscape Association
Green Roof Professional Accredited GRP
U.S. Green Building Council Member

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See Inside back cover for Texas Contact information and to arrange for a personal consultation.

Please Visit LiveRoofTexas.com for More Information