

Millennium Park, Chicago , IL



# Greenroof• Roofscares®

The roof is a forgotten element on most buildings. Designed and built as a multi-functional element, roof space can be made cost effective, make significant environmental contributions and provide aesthetically pleasing usable outdoor spaces.

The Barrett Company has over 80 years of successful, proven experience in the roofing and waterproofing industry. Combining a family tradition of proven waterproofing expertise with that of qualified landscape professionals, Barrett is able to offer building owners a complete single-source system, *Greenroof•Roofscares®*.

Among the many *Greenroof•Roofscares®* installations, four projects have won the prestigious Green Roofs for Healthy Cities "North American Awards of Excellence".

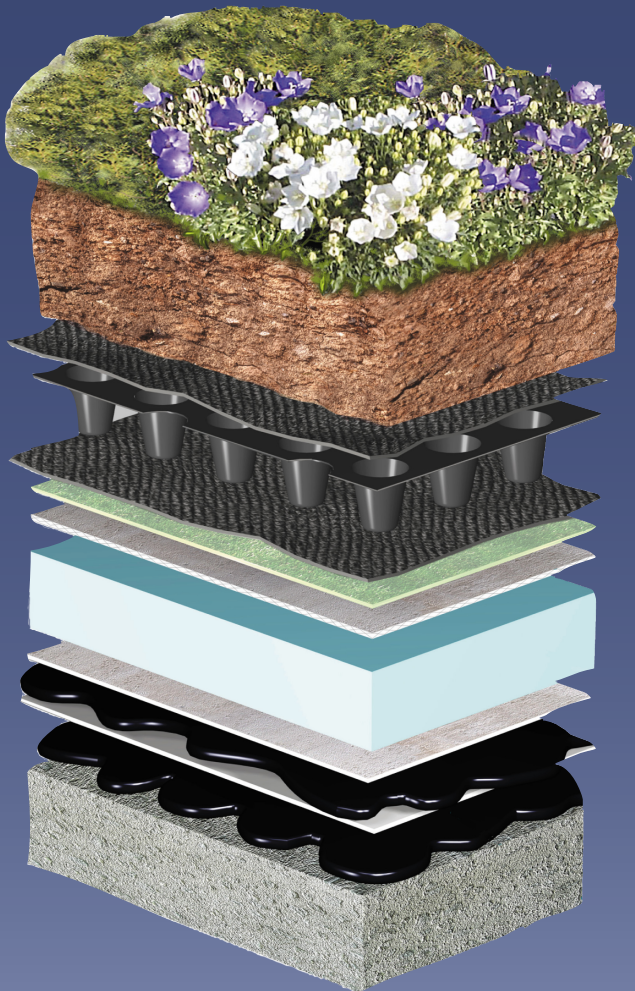
This state-of-the-art roofing-landscape assembly provides many new benefits:

#### Owner Benefits Include:

- Create amenity space
- Tax benefits increasingly available in urban areas
- Reduces energy expenses
- Increased property values
- Create aesthetic appeal of the roof space
- Reduced interior noise pollution
- Low life cycle cost
- Single source warranty

#### Ecological Benefits Include:

- Reduce or eliminate stormwater runoff
- Reduction of urban heat island effect
- Reduces energy creation demands
- Conversion of carbon dioxide to oxygen, improving urban air quality
- Processes airborne toxins through photosynthesis
- Reduced greenhouse gas emissions
- Prolongs roof life resulting in reduction of landfill debris
- Recycled and recyclable materials in most components



Conceptually, the *Greenroof•Roofscares®* can turn unused roof space into a park-like garden setting with a keen sensitivity to environmental enhancement.

*Greenroof•Roofscares®* systems are designed around inter-dependent components which function as a natural vegetation habitat, encouraging biodiversity. The otherwise "lost" roof space restores nature's footprint over the building, creating a public or private open space, offering the potential of serenity, balance, harmony and true sustainability.



Soldier Field Parking Deck Greenroof, Chicago, IL





Between the World and the Weather Since 1928

## Greenroof•Roofscapes® Components

### Membrane

The waterproofing membrane is the most critical element of any greenroof. Without a tough, long-life, watertight membrane the entire concept is undermined. The time-proven Barrett RAM Tough 250 membrane offers:

- *A fluid-applied SBS Modified bitumen, reinforced with spunbond polyester fabric for extra toughness and redundancy.*
- *Aggressive full adhesion to the structural substrate preventing water migration between the membrane and the deck in the event the membrane is damaged.*
- *A monolithic waterproofing membrane, without seams or joints, which can withstand constant water immersion and hydrostatic pressure.*
- *Long-term physical stability in an environment of water, fertilizers, chlorides and mild acids.*
- *Reliable and redundant detailing at all penetrations and perimeters.*
- *High abuse resistance of the membrane as measured by the membrane's toughness and tenacity.*
- *Exceptional self-healing properties in warm temperatures.*
- *Quality control program from design through project completion.*
- *More than three decades of proven performance.*

### Protection

**Greenroof•Roofscapes®** designs incorporate long-term protection from root growth penetrating the membrane with "RB" FLL approved root barriers. Composed of polyethylene sheets and compatible tape, roots slide along the surface of the permanent root barrier.

### Drainage, Water Retention & Aeration

The alternating balance between drainage, retention of a supplementary water supply and sufficient aeration for plants is provided with RAM drain options and aeration mat.

RAM drain mats are manufactured with integral reservoirs providing for improved plant hydration while simultaneously allowing excess water drainage and air flow. Ram Drainage mediums have a heavy fabric mat on the bottom for additional protection of the membrane. The top geo-textile fabric acts as a filter to prevent soil migration into the drainage channels.

"Rooflite"™ drainage aggregate is another design option.

Soil depth and vegetation design influence the appropriate control materials.

#### **Ram-Drain Roofscape 1241**

For systems less than 6 inches deep.  
Water flow - 12 gallons/min./12 in.  
Water Retention - 10 cu. in./SF

#### **Ram Drain Roofscape 2451**

For High Profile Systems.  
Water Flow - 100 gal/min./12 in.  
Water Retention - 14 cu. in./SF

"Rooflite"™ drainage aggregate offers flexible design options.

#### **Ram-Aeration 600**

Provides aeration for insulation and vegetation.

### Insulation

Insulation is a high density extruded polystyrene with a 'R' value of 5.0 per inch. Ballast weight and compressive strength is determined by the insulation manufacturer.

### Soil Overburden

"Rooflite"™ soil specifications are usually determined by the landscape architect. Many variables affect the choice of the proper soil mix. The variables should be evaluated for the specifics of each project. Soil considerations include:

- **FLL Compliance**
- **Quality Control**
- **Vegetation Requirements**
- **Moisture and Nutrient Retention**
- **Drainage Design**
- **PH Level**
- **Porosity and Compaction**
- **Weight Restrictions on Structure**
- **Structure for Plant Anchorage**



The Baltimore Convention Center, Baltimore, MD

# General Design Considerations

## Plant Specifications

Plant specifications are generally determined by the landscape architect or Barrett basic **Greenroof-Roofscapes®** offerings. Designs are classified as **High Profile** and **Low Profile**.

**Low Profile** planting systems have a depth of 6 inches or less. Low profile designs typically include sedums, herbs and wild flowers. Low profile systems are considered low maintenance. They are also known as "**Extensive**" systems.

**High Profile** planting systems are those of more than 6 inches of soil depth. High profile systems may include shrubbery, decorative trees, and sod. High profile systems are generally considered as high maintenance designs and require irrigation. They are also known as "**Intensive**" systems.

## Maintenance

It is a standard roofing industry recommendation that all roofs have an ongoing maintenance program.

**Greenroof-Roofscapes®** also require a programmed cycle of care and maintenance appropriate for the planting design.

## Wind Resistance

All Barrett membranes are UL Class A and many are FM Class I-90 approved, however, UL and FM do not fully address **Greenroof-Roofscapes®** designs. Ballast weights are easily adjusted to comply with industry standards. Wind erosion of the soil can be addressed with a number of design features including Barrett's erosion control mats.

## Fire Resistance

**Greenroof-Roofscapes®** that are properly maintained are generally considered to be acceptably fire resistant. Consult local code officials.

**Greenroof-Roofscapes®** are usually installed over concrete decks which produces a high degree of interior fire protection.

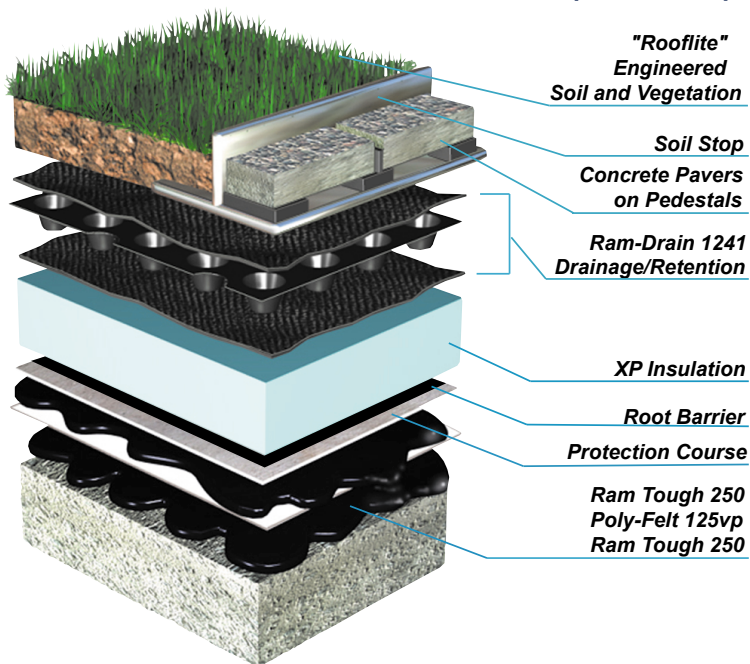
Some **Greenroof-Roofscapes®** systems are irrigated with sprinklers, providing additional fire protection. Vegetation-free zones are required at all roof top openings and perimeters for additional fire safety.

Nonirrigated systems should be manually watered until fully established and in periods of drought to reduce risks. Drip lines are recommended during the establishment period.

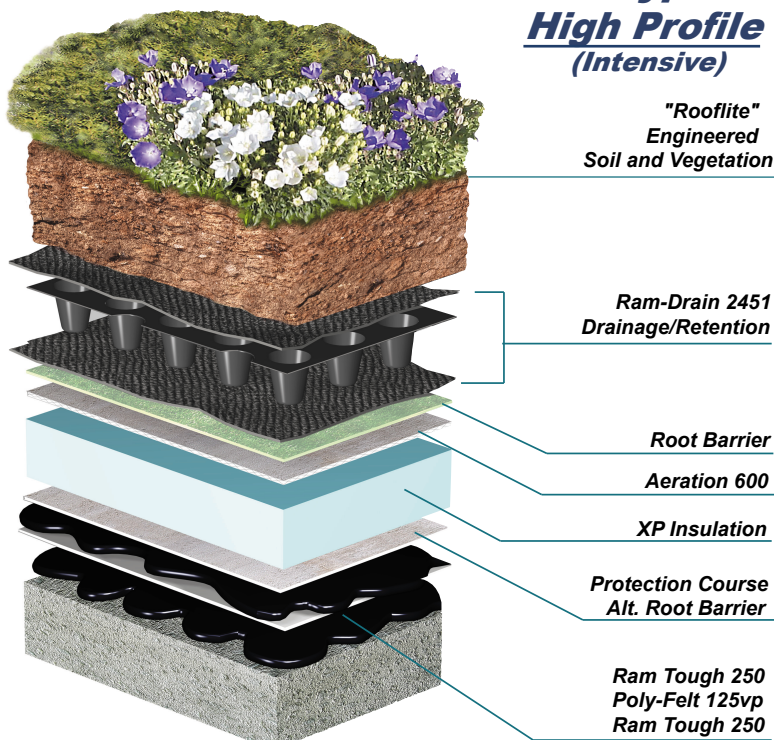
Vegetation considerations include:

- **Drought and Wind Resistance**
- **Local & Micro Climate Conditions**
- **Reactivity to Sunlight and Shade**
- **Maintenance Requirements**
- **Root System Aggressiveness**
- **Wildlife Habitat Potential**

## Typical Low Profile (Extensive)



## Typical High Profile (Intensive)





## Design Alerts

- Flashing conditions and perimeters are designed without soil cover or plantings in a 24 to 48 inch wide border path which is typically filled with gravel ballast or precast concrete pavers set on pedestals.
- Flashing heights must rise 8 inches above the highest expected waterline.
- Drains are kept free of plantings and designed with inspection and clean-out boxes.
- If irrigation systems are not installed as part of the system, suitable access to a water source must be provided.
- Roof loads, fully saturated, must be carefully evaluated by a structural Engineer early in the design phase. Deadloads can range from 21psf to over 100psf.
- For slopes in excess of 3:12 consult Barrett Tech Services.



*U.S. Tax Court, Washington, D.C.*

**Barrett Tech Services will assist you in making the right selections to meet your program.**

### OTHER QUALITY SYSTEMS AVAILABLE FROM THE BARRETT COMPANY

- RAMTOUGH Elastomeric BUR Systems
- RAM COLD®
- RAM COLDTAR®
- Barrett Specification Reroof Systems
- Highway Membrane For Bridge & Parking Decks



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### Minimum **Greenroof•Roofscapes®** Deadload Design Weights are:

Membrane, root barrier, protection and insulation	4.5 lbs.
Drainage - water retention	1.5 lbs.
Soil, 2.5 inches (saturated)	14 lbs.
Sedum plantings	1 lb.
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Roofscape total	21 lbs./ft <sup>2</sup>
Concrete pavers on pedestals	21 lbs./ft <sup>2</sup>
Gravel ballast	15-20 lbs./ft <sup>2</sup>

## Replacing Nature's Footprint One Roof at a Time



*The Aqua, Chicago, IL*