

LIVING ROOFS™

FEATURING **GreenGrid®** MODULAR
VEGETATIVE TECHNOLOGY

THE ZERO EDGE GREENGRID® MODULAR VEGETATIVE ROOF SYSTEM

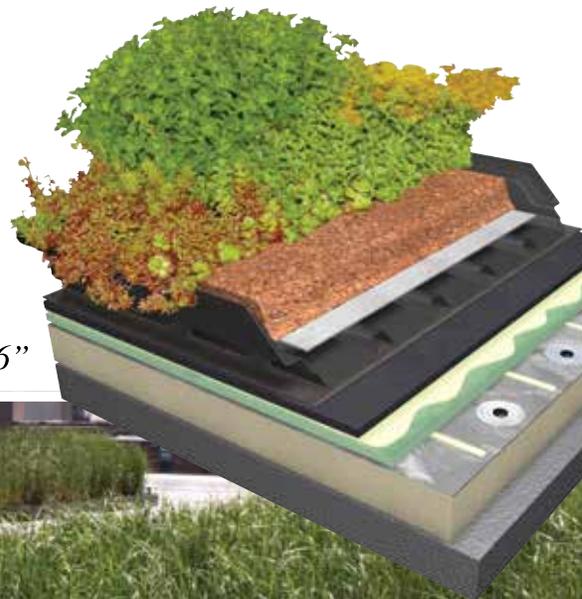
These new thin-edged modules are the 4th generation of GreenGrid®, keeping the functionality of the original modular vegetative roof system, but adding a more aesthetic seamless look, enhanced design versatility, and maximized stormwater retention.

Unlike hybrid/subterranean modular systems and traditional layered systems, G4 modules can be easily accessed and removed to perform maintenance or repairs to the underlying roof without damaging the vegetation. Additionally, G4 modules are specifically designed to maximize stormwater control, featuring deeper built-in reservoirs for additional stormwater retention.

GreenGrid offers versatility and design flexibility, with modules available in three different depths for a variety of planting options. Modules can be pre-grown at our nurseries to meet plant coverage specifications up to 95% and delivered to the job site to create an instant mature vegetative roof. This translates to a successful vegetative roof with less up-front maintenance, plus a beautiful look from day one. In addition, GreenGrid modules can be custom cut to fit any roof layout.



“The name trusted in roofing since 1906”



MULE-HIDE LIVING ROOFS™

VEGETATIVE ROOFS HELP REDUCE AIR POLLUTION, ENERGY PROBLEMS, AND PROVIDE STORMWATER MANAGEMENT

GreenGrid offers these benefits with many additional advantages for a “better way” versus the “old way”, the European built-in-place method.

GREENGRID VEGETATIVE MODULES ARRIVE AT THE WORKSITE PRE-VEGETATED (PRE-GROWN OPTION) IN PROPRIETARY GROWING MEDIUM THAT MEETS ALL SPECS, READY FOR INSTALLATION

These interlocking modules are composed of 100% pre-consumer recycled plastics that contribute towards LEED recycled content points. Additional LEED points are achievable (depending on design) for stormwater design-quantity control, heat island effect-roof, water efficient landscaping, optimize energy performance, regional materials, and innovation and design process.

COMPLETE LINE OF ACCESSORIES

Irrigation systems, edge treatments, pavers made from 100% post-industrial recycled rubber. Walkways, water ponds, outdoor furniture, and planter beds can be incorporated into the GreenGrid design extensive, semi-intensive and intensive design options.



CAN REDUCE AVG. DAILY ENERGY DEMAND FOR COOLING BY 50%+

Source 1

CAN DOUBLE THE LIFE OF THE ROOFING SYSTEM

Source 3

CAN RETAIN 40% TO 60% OF ANNUAL RAINFALL

Source 1 & 2

AFTER A 1" RAINFALL EVENT, CAN RETAIN UP TO 95%

Source 1

Source 1:

American Society of Agricultural Engineers

Source 2:

Denardo, J.e., AR. Jarrett H.B. Manbeck, D.. Beattie, and R.D. Berghage. 2005. Stormwater Mitigation and Surface Temperature Reduction by Green Roofs. Transactions of the ASAE. 48(4) 1491-1496.

Source 3:

U.S. Department of Energy: Energy Efficiency and Renewable Energy. Federal Technology Alert. August 2004.

GreenGrid[®]
Engineered to Perform
Designed to Inspire
ROOFS

OVER 4 MILLION SQUARE FEET OF GREENGRID HAS BEEN INSTALLED SINCE 2001

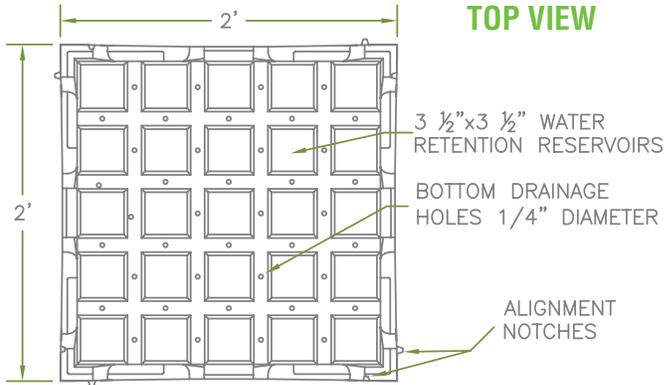
SYSTEM FEATURE/BENEFITS

GREENGRID G4 SEAMLESS MODULAR SYSTEMS	HYBRID / SUBTERRANEAN MODULAR SYSTEMS	TRADITIONAL LAYERED, BUILD-IN-PLACE SYSTEMS
Easy Roof Maintenance & Repair - Removal and replacement for access to the underlying waterproofing.	Varies - Systems become layered systems once installed and require excavation and location of buried modules.	No - Requires excavation and reconstruction which may be significant in extensive systems.
Quick & Easy Installation - Minimal effort using GreenGrid "universal module orientation and alignment". Saves on labor and equipment costs at the jobsite.	No - Requires extra time to fiddle with one-way orientation, removable sleeves, spill over, and cumbersome mandatory edge systems. Adds significantly to installation cost.	Varies - Can be time consuming and higher cost since construction takes place on the roof rather than off-site.
Nursery Pre-Vegetated - Variable vegetation coverage options up to 95%. GreenGrid works with you to balance economics and aesthetics to meet your goals.	Varies - Usually only one coverage option available. Take it or leave it.	No - Variable plant coverage options available but all planted on the roof, increasing labor costs and the need for more post installation maintenance for establishment.
Designed by Team of Professionals - Scientists, engineers, building performance specialists, horticulturists, roofing professionals, and sustainable design experts.	Varies - Often these systems are designed from a narrow point of view and do not always account for the broader concerns of vegetative roof installation and long term roof maintenance.	Varies - System designs vary and are often a collection of unrelated components that were not necessarily designed to work together.
Seamless Modular Aesthetics - Zero-edge module design for perfect aesthetics and truly modular system remains easy to remove/replace if needed.	No - Lacks the benefits of a truly modular system. Hybrid systems contain plastic modules imbedded in growth media eliminating benefits of a truly modular system.	No - Not modular.
Durable Material Construction - Comprised of 100% pre-consumer recycled HMWPE plastics with UV inhibitors and stabilizers warranted for 20 years but designed to last much longer without degradation.	Varies - Materials vary from system to system.	Varies - Materials vary from system to system.
Roof System Compatibility - Module edges are compatible with roof system waterproofing underlayments, excellent airflow and water drainage underneath. Optional full Wrap-Around Warranty available.	Varies - Sharp corners in metal modules and limited underflow drainage in some systems may limit installations to certain roof types.	Varies - Many Build-In-Place systems are proprietary.
Customizable Modules - modules are easily customized on the rooftop using hand tools to create curves or dimensions needed by the design.	Varies - Customization possible but will often require the use of cumbersome power cutting tools, increasing the chance of damage to the waterproofing system.	N/A
LEED Credits - Installed on 50% or more of your roof virtually guarantees 2 LEED points and can contribute towards an additional 7+ points towards certification.	Yes - Depends on system. Talk to the experts as many sellers claim misleadingly high numbers of points for their vegetative roof systems.	Yes - Depends on system.
Integrated & Controlled Water Retention - Built into module design. G4 realizes a 23% increase in available capacity to maximize storm water retention. Ecoballast® modules augment stormwater retention without plants and growing media.	Varies - Many systems contain low or no storage capacity other than what's available in growth media.	Varies - Water retention layers are typically a separate additional layer for storm water retention.
Integrated Irrigation Capability - Designed specifically to be compatible with low-flow drip and sprinkler head irrigation systems as an integral component of the module design.	Varies - May be complicated to install subsurface systems which require post-installation excavation to run lines. Not designed as part of the system, merely an afterthought.	Varies - May be complicated to install subsurface systems which require post-installation excavation to run lines. Not always designed as part of the system, merely an afterthought.

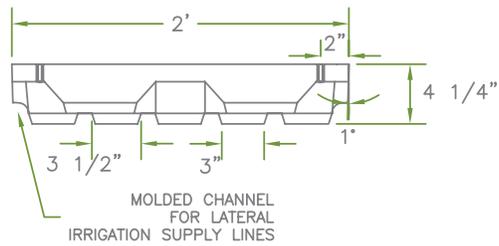
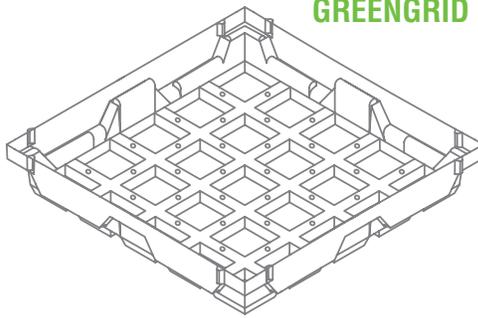
MULE-HIDE LIVING ROOFS™ FEATURING MODULAR GREENGRID® TECHNOLOGY

- Modular Design Maximizes Stormwater Management
 - Collects water to establish & maintain healthy plants
 - Retains runoff & peak flow of rain events, relieving overburdened sewers
 - Reduces the need for retention ponds
- Saves Energy Costs
- Can Double the Life of the Waterproofing Roof System
- EPDM or TPO Waterproofing System options
- Lightweight, Movable Modular Design
 - Installs quickly
 - Easy leak detection and repair
 - Partial vegetative roof design options
- Plant Module Options - Pre-vegetated to 50, 80 up to 95% coverage
- Contributes Towards LEED Certifications
- Sustainable Solution for New or Retrofit Roofing

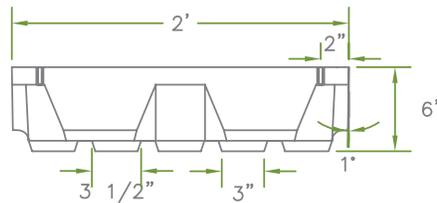
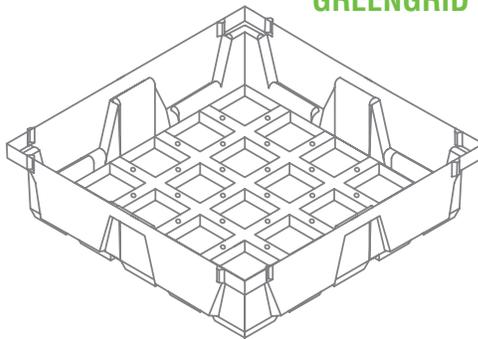
COMPONENTS & SPECIFICATIONS



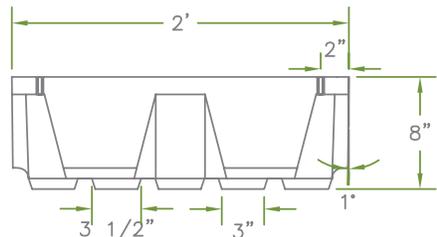
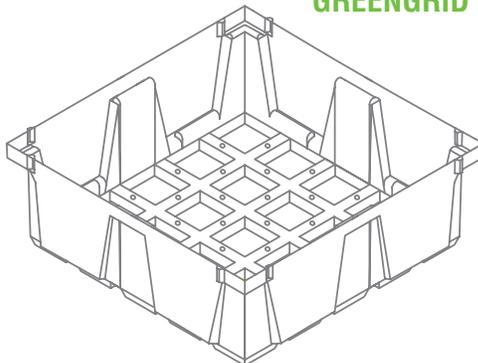
GREENGRID EXTENSIVE (4-INCH)



GREENGRID SEMI-INTENSIVE (6-INCH)



GREENGRID INTENSIVE (8-INCH)





GREENGRID COMPONENT	SPECIFICATION DESCRIPTION AND NOTES			
G4 System Modules	Dimensions (W x L)		Depth (D)	
	Standard Units	SI Units	Standard Units	SI Units
Extensive	24 in. x 24 in. [OD ± 1/8 in.]	60.96 cm x 60.96 cm [OD ± 0.318 cm]	4.25 in.	10.80 cm
Semi-Intensive			6.0 in.	15.24 cm
Intensive			8.0 in.	29.32 cm
Weight Range	Approximate Minimum ^{Note 1}		Approximate Maximum ^{Note1}	
Extensive	26 lbs/sf	126.9 kg/m ²	30 lbs/sf	146.5 kg/m ²
Semi-Intensive	39 lbs/sf	190.4 kg/m ²	44 lbs/sf	214.8 kg/m ²
Intensive	52 lbs/sf	253.9 kg/m ²	58 lbs/sf	283.2 kg/m ²
Drainage Clearance	3/4 in.	1.91 cm	All size modules	
Module Material	Wall Thickness		100% pre-consumer high molecular weight polyethylene. Protected with UV inhibitors and stabilizers. (20 year warranty standard)	
Extensive	0.187 in. [187 mil]	4.75 mm		
Semi-Intensive	0.200 in. [200 mil]	5.08 mm		
Intensive	0.225 in. [225 mil]	5.72 mm		
Module Color	Black (custom colors available upon request)			
Filter Layer	3 ounce spunbonded polypropylene geotextile			
Growing Medium	Proprietary engineered blend of organic and inorganic components. Blended to satisfy FLL guidelines. Custom blends available to meet project-specific needs (e.g., weight, water holding capacity, etc.).			
Vegetation	Succulent groundcovers, conventional perennials and grasses, and/or native forb and grasses. Consult Weston GreenGrid horticulturists for specific recommendations.			
Typical Roofing Systems	New or existing single-ply EPDM, TPO, BUR, or hot/cold fluid applied membranes. Contact selected waterproofing system manufacturer for specific requirements and/or materials compatibility.			
Module Connectors	Nylon/Plastic panel fasteners or zip ties. 1/4 in. (0.64 cm) drill hole diameter required.			
Irrigation Systems	Proprietary system designed based on project-specific requirements			
<p>Note 1: All weights are presented with growing media at maximum water-holding capacity. Conservative estimates for vegetation and module weight per SF have been included in above weight ranges. Weights may vary based on requirements for project-specific vegetation selections and variations in regional materials incorporated into engineered growing media. Consult GreenGrid representative for further information.</p>				

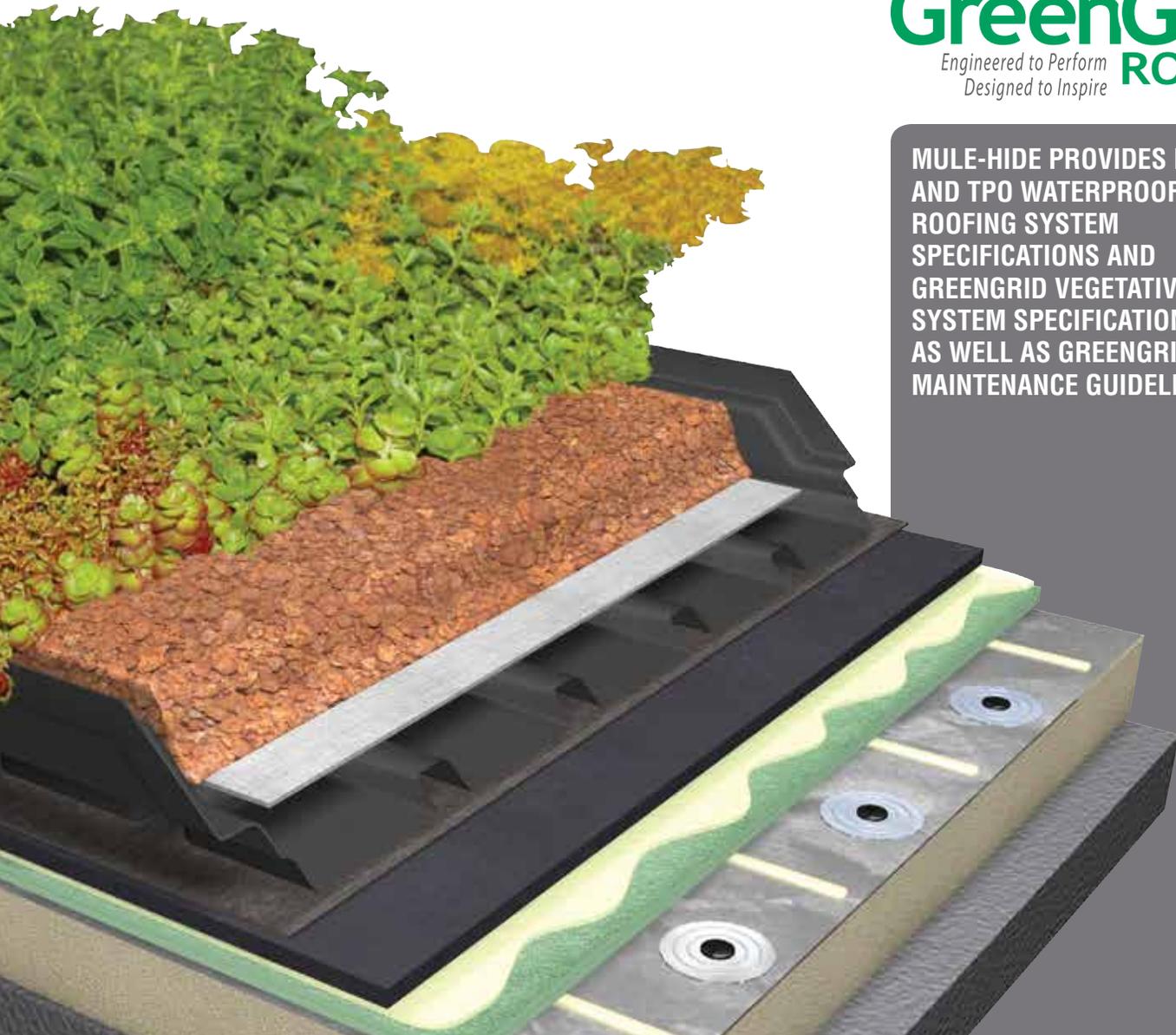
MULE-HIDE EPDM LIVING ROOFS™

EPDM has 40+ years of field performance with over 20 billion square feet of installations and boasts the roofing industry's longest average service life.

- Superior fatigue, heat and hail resistance
- High resistance to ozone, weathering, abrasion, and wind
- Flexibility in low temperatures
- Thermal shock durability
- Black EPDM - .045, .060, and .090 mil
- Seam Tapes for enhanced contractor productivity & system performance
- GreenGrid vegetative modules are pre-vegetated with project-specific recommended plants in proprietary growing medium - extensive, semi-intensive and intensive designs available
- Optional Ecoballast modules are filled with stone ballast and drilled with drainage holes at proper distance from top to pre-determine and control stormwater retention



MULE-HIDE PROVIDES EPDM AND TPO WATERPROOFING ROOFING SYSTEM SPECIFICATIONS AND GREENGRID VEGETATIVE SYSTEM SPECIFICATIONS AS WELL AS GREENGRID MAINTENANCE GUIDELINES





MULE-HIDE TPO LIVING ROOFS™

TPO is the affordable white roof and the fastest growing membrane in the industry due to its energy saving, cool roof properties. Ideal when a partial vegetative roof is desired, so the exposed roof areas offer a bright white, cool roofing surface.

- 8' & 10' wide sheets mean less labor and less waste
- One of the thickest top plies in the industry for watertight integrity, yet lightweight
- Resists impact wind uplift, and the harshest elements of weather
- Environmentally friendly with no plasticizer migration out of the sheet
- Mule-Hide TPO is CRRC® rated and Energy Star® listed
- Standard TPO - .045, .060, and .080 mil in white, gray, or tan
- GreenGrid vegetative modules are pre-vegetated with project-specific recommended plants in proprietary growing medium - extensive, semi-intensive and intensive designs available
- Optional Ecoballast modules are filled with stone ballast and drilled with drainage holes at proper distance from top to pre-determine and control stormwater retention

FOR MORE INFORMATION ABOUT THE GREENGRID SYSTEM

In the US and Canada visit www.mulehide.com and www.greengridroofs.com. Mule-Hide single-ply for MH Living Roofs are installed by approved contractors.

**MULE-HIDE ALSO OFFERS
GREENGRID TO GO OVER
EXISTING ROOFS OR
NON-MULE-HIDE NEW
WATERPROOFING SYSTEMS**

AVAILABLE WARRANTIES

MULE-HIDE LIVING ROOF™ 10, 15 OR 20-YEAR MEMBRANE MATERIAL WARRANTIES*

Available covering the Mule-Hide Membrane (EPDM or TPO).

MULE-HIDE LIVING ROOF™ 10, 15 OR 20-YEAR STANDARD & PREMIUM SYSTEM WARRANTIES*

Available covering the Mule-Hide Membrane and Mule-Hide labeled accessories.

20-YEAR GREENGRID® MATERIAL WARRANTY*

Available that covers the GreenGrid module.

MULE-HIDE WRAP-AROUND WARRANTY*

Available that covers the lifting and repositioning of the modules, walkway pads, pavers, and ballast before and after warranted roof repairs are completed.

*Refer to the Mule-Hide Warranty for type, specific terms and conditions of each warranty. Sample warranties may be obtained through Mule-Hide Technical Department. System warranties are only available through Mule-Hide warranty eligible contractors.

GreenGrid is a proprietary technology of ABC Supply Co., Inc. U.S. and International patents pending. GREENGRID and ABC Supply Co., Inc. are registered trademarks of American Builders & Contractors Supply Co., Inc. GREENGRID System is a proprietary technology. U.S. and International patents pending. WESTON is the sole licensee of the GREENGRID System in the U.S.

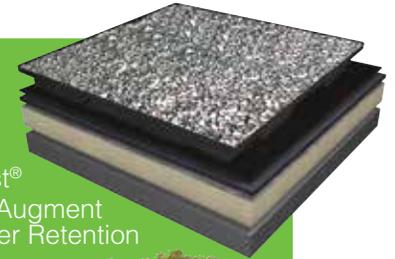
U.S. Patents: 6,711,851 | 6,862,842 | 7,900,397 | 7,997,02 | 8,555,545
Canadian Patents: 2,416,457 | 2,418,262 | 2,416,463
Additional U.S. and international patents pending



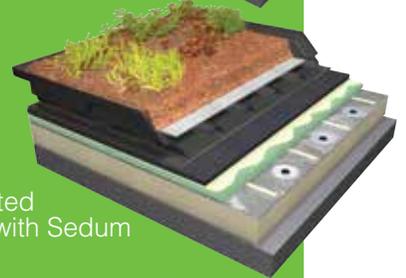
Contact Mule-Hide Products for specific product approvals and ratings. Featured industry association/organization logos are U.S. registered trademarks. Mule-Hide is an AIA registered CES provider. Energy Star is only valid in the United States for Roofing Products.

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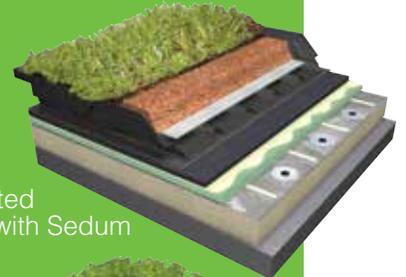
Ecoballast®
Modules Augment
Stormwater Retention



Pre-Planted
Module with Sedum
Plugs



Pre-Planted
Module with Sedum
Mat



Pre-Grown
Option with up to
95% Coverage



“The name trusted in roofing since 1906”

Customer Line: 800-786-1492 • www.mulehide.com

Check our website monthly for the latest updates & technical bulletins.

National Support Center • 1195 Prince Hall Drive • Beloit, WI 53511 • tel. 608.365.3111 • fax. 608.365.7852

The information herein should not be considered all-inclusive and should always be accompanied by a review of the Mule-Hide specifications and guidelines and good application practices.

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