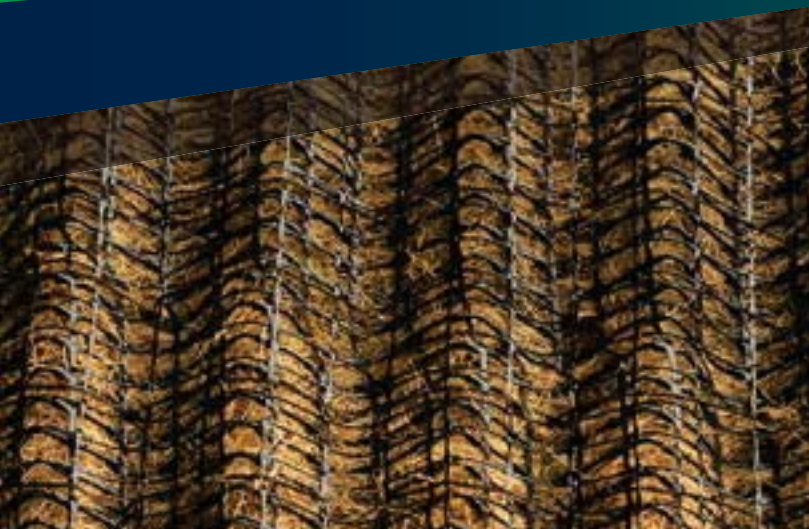


NORTH AMERICAN GREEN

EROSION AND SEDIMENT CONTROL SYSTEMS OVERVIEW





We've Got You Covered

Erosion control, sediment control and vegetation establishment are essential to almost every construction project. A well planned solution tailored to your site can eliminate costly reconstruction of degraded slopes and shorelines; prevent damage to landscapes, water sources and wildlife; and keep you in compliance with local and federal regulations. The North American Green full line of erosion and sediment control solutions can help cover your bases.

Construction often means removing vegetation, altering the landscape and/or covering previously vegetated areas with roads, driveways or buildings. These changes often cause soil erosion and sediment deposits, which can lead to a multitude of problems.

THE ENVIRONMENTAL TOLL

- ▶ Disrupting the ecosystem can hinder the natural resources on which wildlife depend for survival.
- ▶ Storm water runoff can increase stream bank erosion and disturb aquatic habitats and lifecycles.
- ▶ Construction site soils and chemicals can wash into water supplies and compromise water quality for humans and animals.

THE ECONOMIC TOLL

- ▶ The costs to rebuild degraded slopes and shorelines and dredge sediment-filled waterways reach billions of dollars annually.
- ▶ The EPA's NPDES Phase II rule requires an NPDES permit for the prevention of storm water inducing pollution on any construction site disturbing 1 acre or more.
- ▶ EPA effluent (runoff) guidelines are based on the technology that reduces pollutants the most and is economically achievable for an industry.

UNMATCHED SERVICE AND SUPPORT

With so much at stake, erosion control is a high priority. North American Green® Erosion and Sediment Control Systems are recognized as EPA Best Management Practices (BMPs) to help you comply with regulations and protect our (and your) most valuable resources.

Using North American Green Rolled Erosion Control Products can help you reach your Leadership in Energy and Environmental Design (LEED®) Green Building Rating System™ project certification goals. For more information, visit nagreen.com or call **800-772-2040**.

Yes, Erosion Control Matters

"Cutting edge" isn't the first thing that comes to mind when you think of erosion control – but maybe it should be. North American Green has continually advanced erosion control science and developed a full line of high-tech products backed by an industry-leading guarantee.

ALWAYS LOOKING AHEAD

The definition of proactive – *acting in advance to deal with an expected difficulty* – sums up our research and development philosophy. We conduct ongoing research at major universities and independent labs. We watch and listen to find out what customers need now and what you'll need next. We invest in innovation and product development to keep you ahead of erosion control issues with the most progressive solutions in the industry.

TESTING 1, 2, 3

To guarantee North American Green Erosion Control Systems perform under actual field conditions, we subject them to rigorous, large-scale, performance tests. We're so confident in our products, we proudly subject them to independent testing by the National Transportation Product Evaluation Program (NTPEP) of the American Association of State Highway and Transportation Officials (AASHTO). In a recent test, our

ShoreMax® Transition Mat combined with a VMax® Turf Reinforcement Mat underlayment pushed channel lining performance to an all-time high.

THE WHOLE NINE YARDS, GUARANTEED

Our Ultimate Assurance Guarantee is the most comprehensive in the industry. If any properly specified and installed North American Green® Rolled Erosion Control Product designed by a qualified engineer or by one of our technical representatives in accordance with our Erosion Control Materials Design Software (ECMDS®) fails to perform under the conditions in the Guarantee, then we will replace the failed product with our next higher-performance RECP product, along with the cost of seed, fertilizer, topsoil and other amendments lost due to such product failure. Our Guarantee warrants in accordance with its terms and conditions all registered projects designed with the latest version of our ECMDS and properly installed.

North American Green Turf Reinforcement Mats are also guaranteed to reinforce vegetation for five years after installation, and the functional longevity of these products' permanent structures is warranted for a minimum of 10 years after installation, subject to the terms and conditions set forth in the Guarantee.



From project start to finish, North American Green erosion and sediment control products will keep you protected until vegetation is established.



A well planned erosion control solution tailored to your site can eliminate costly reconstruction of degraded slopes.



Our full line of products offers a solution for nearly every erosion problem caused by wind and water.



North American Green Erosion Control Systems are recognized as EPA Best Management Practices (BMPs) that help you comply with regulations and protect valuable resources.

Erosion Control Systems



Every site has unique challenges created by soil characteristics, topography, climate and other environmental conditions. The RollMax™ System Rolled Erosion Control Products (RECPs) conquer all your site challenges. Whether you need temporary or permanent protection, short-term or long-term durability, biodegradable or photodegradable solutions, our RollMax RECPs deliver a wide variety of advantages, features and benefits.

- High-performance protection of topsoil from wind and water erosion
- Support quick, healthy vegetation growth
- Protect dormant seeds during winter months
- Stabilize slope erosion to keep roads safe and clean
- Reinforce vegetation roots and stems
- Protect water quality in lakes, rivers and streams
- Conform to landscape features
- Provide easy handling and transport



GO Transit, Greater Toronto, Ontario, Canada

During construction on a Toronto commuter rail system, a steep railway embankment required stabilization to protect a nearby pond from sediment runoff. North American Green® VMax® Permanent Composite SC250® TRMs were installed to prevent surface erosion and promote vegetation re-establishment.

PERMANENT TURF REINFORCEMENT MATS

The RollMax System of permanent Turf Reinforcement Mats (TRMs) are ideal for high-flow channels, stream banks, shorelines and other areas needing permanent vegetation reinforcement and protection from water and wind. More economical and aesthetically pleasing than rock riprap, articulated concrete blocks or poured concrete, our TRMs protect vulnerable areas with minimum maintenance and maximum durability.

VMAX® TURF REINFORCEMENT MATS

- VMax® Permanent Composite TRMs combine three-dimensional matting and fiber matrix material for all-out erosion protection, vegetation establishment and reinforcement. These products increase the permissible shear stress of many types of vegetation up to 14 pounds per square foot (0.67kN/m²) – erosion protection equal to 36 in. (900 mm) rock riprap and concrete. VMax TRMs are available with various performance capabilities and support reinforced vegetative lining development from germination to maturity.



VMAX® UNIQUE THREE-DIMENSIONAL DESIGN

North American Green VMax® Permanent Composite TRMs are each designed to maximize performance through all developmental phases of a reinforced vegetative lining.

- Corrugated matting structure that lends structure and a true reinforcement to vegetation over flat net mats
- Helps create a shear plane that deflects flowing water away from the soil surface
- Incorporates fiber matrix to supplement the TRM structure's ground cover and moisture retention properties

- VMax® High-Performance TRMs (HPTRMs) utilize woven 3-D structures that are soil-filled for use in areas experiencing high stress and strain. The VMax HPTRMs are designed to provide appropriate thickness and open area for effective erosion and vegetation reinforcement against high flow induced shear forces up to 16psf (0.77 kN/m²), and with one of the highest tensile strengths on the market up to 4,400 lbs/ft (64 kN/m) our HPTRMs are excellent for increased bearing capacity of vegetated soils subjected to heavy loads from maintenance equipment and other vehicular traffic.

EROSION CONTROL BLANKETS

North American Green Erosion Control Blankets (ECBs) immediately prevent erosion and help establish vegetation. As vegetation takes root and stem systems stabilize the underlying soil, most ECBs gradually degrade. These products come in a range of weights and materials to accommodate low- to high-flow channels and moderate to severe slopes.

ERONET™ PHOTODEGRADABLE ECBs

- Eronet™ Short-Term Photodegradable ECBs are designed for moderate slopes and low-flow channels. Made of 100% agricultural straw stitched to or between lightweight polypropylene netting with degradable thread, Eronet

ECBs come in short-term varieties to protect and mulch soil surfaces from 45 days to 12 months.

- Eronet™ Extended-Term, Long-Term and Permanent ECBs use heavy-duty double-netting and long-lasting coconut or permanent polypropylene fiber for protection and vegetation support for up to 36 months or longer. These products are available for extended- and long-term stabilization of steep slopes, medium- to high-flow channels and shorelines.

BIONET® BIODEGRADABLE ECBs

- BioNet® Short-Term Biodegradable ECBs are appropriate for bioengineering projects, environmentally sensitive sites, shaded areas, stream banks and shorelines. They're made of 100% agricultural straw stitched with biodegradable thread to 100% biodegradable jute fiber netting. Available in single- or double-net varieties, they protect for up to 12 months and leave no synthetic residues.
- BioNet® Extended-Term and Long-Term Biodegradable ECBs incorporate coconut fiber stitched with biodegradable thread between biodegradable jute fiber top and bottom nets. Great for steep slopes, medium- to high-flow channels and shorelines, a choice of two products provides erosion protection and vegetation establishment for 18 to 24 months.



Yellowstone National Park, near Cody, Wyoming

Reconstruction of Highway 14 near Yellowstone created bare, dry rocky exposed slopes requiring erosion protection. North American Green® BioNet® SC150BN® biodegradable erosion control blanket was selected for its extended longevity and ecological friendliness. Native vegetation was established within one growing season, preserving the natural aesthetics and preventing pollution of the nearby river.




















Green Hills Tributary Improvement, Eugene, Oregon

Improvements along the streambanks were needed to improve drainage and flood control for the City of Eugene, Oregon. North American Green® BioNet® C125BN® provided ample protection of the soil so the groundcover could be established on the slopes and the native grasses and vegetation could take root.

RollMax Product Selection Chart



TEMPORARY			
Product Description	Longevity	Typical Slope Applications (H:V)	Channel Application Thresholds
ERONET			
 Accelerated photodegradable, polypropylene top net, 100% straw fiber matrix	45 days	4:1 - 3:1	1.55 psf / 5.0 fps
 Accelerated photodegradable, polypropylene top & bottom net, 100% straw fiber matrix	60 days	3:1 - 2:1	1.75 psf / 6.0 fps
 Photodegradable, polypropylene top net, 100% straw fiber matrix	12 months	4:1 - 3:1	1.55 psf / 5.0 fps
 Photodegradable, polypropylene top & bottom net, 100% straw fiber matrix	12 months	3:1 - 2:1	1.75 psf / 6.0 fps
 UV-stable polypropylene top net, 70% straw/30% coconut fiber matrix, photodegradable polypropylene bottom net	24 months	2:1 - 1:1	2.0 psf / 8.0 fps
 UV-stable polypropylene top & bottom nets, 100% coconut fiber matrix	36 months	1:1 and Greater	2.25 psf / 10.0 fps
BIONET			
 Lemo woven biodegradable jute top net, 100% straw fiber matrix	12 months	4:1 - 3:1	1.6 psf / 5.0 fps
 Woven biodegradable jute top and bottom net, 100% straw fiber matrix	12 months	3:1 - 2:1	1.85 psf / 6.0 fps
 Woven biodegradable jute top and bottom net, 70% straw/30% coconut fiber matrix	18 months	2:1 - 1:1	2.10 psf / 8.0 fps

TEMPORARY			
Product Description	Longevity	Typical Slope Applications (H:V)	Channel Application Thresholds
BIONET CONT'D			
 Woven biodegradable jute top and bottom net, 100% coconut fiber matrix	24 mo.	1:1 and Greater	2.35 psf / 10.0 fps
 700 g woven biodegradable coir top net, 100% coconut fiber matrix, woven biodegradable jute bottom net	36 mo.	1:1 and Greater	2.35 psf / 10.0 fps
PERMANENT			
ERONET			
 UV-stable polypropylene (PP) top and bottom net, 100% PP fiber matrix	Permanent	1:1	Unvegetated: 3.0 psf/10.0 fps Vegetated: 10 psf / 16.0 fps
VMAX			
 UV-stable PP top & bottom nets, UV-stable PP crimped center net, 70% straw/30% coconut fiber matrix	Permanent	1:1 and Greater	Unvegetated: 3.0 psf/10.5 fps Vegetated: 10 psf / 16.0 fps
 UV-stable PP top & bottom nets, UV-stable PP crimped center net, 100% coconut fiber matrix	Permanent	1:1 and Greater	Unvegetated: 3.2 psf/10.5 fps Vegetated: 12 psf / 20.0 fps
 UV-stable PP top & bottom nets, UV-stable PP crimped center net, 100% PP fiber matrix	Permanent	1:1 and Greater	Unvegetated: 4.0 psf/12.5 fps Vegetated: 14 psf / 25.0 fps
 100% UV-stable PP monofilament yarns, woven into a 3-D structure	Permanent	1:1 and Greater	Vegetated: 15 psf / 25 fps
 100% UV-stable PP monofilament yarns, woven into a 3-D structure	Permanent	Extreme High Flow Channels, 1:1 and Greater Slopes	Vegetated: 16 psf / 25 fps

Turf and Earth Reinforcement Mat Systems (TERMS)

When your site requires the highest strength and the best available performance, protect your ground with a system that combines high-performance turf reinforcement mats (HPTRMs) with percussion driven anchors (PDAs). The earth anchors penetrate the soil strata to offer the best anchoring in the worst conditions, while our TRMs provide permanent protection of the soil and vegetation. Our variety of earth anchors are designed to offer durability and strength under extreme hydraulic stress and adverse soil conditions. And, when our PDAs are utilized in conjunction with one of our HPTRMs, they offer unparalleled performance.

ADVANCED ANCHORING TECHNOLOGY

North American Green is the exclusive provider of Gripple® Anchor solutions for the erosion control market. The Gripple Terra-lock anchoring system is a time and labor saving method of geotechnical engineering for erosion control, soil retention and slope reinforcement. In addition, we have a complete line of Gripple anchors and accessories. For more information, visit our website www.nagreen.com

DESIGN SPECIFIC SYSTEMS

Our wide range of HPTRM and anchoring solutions can be combined in various ways to create reinforced anchored systems to meet the specific needs of your project. Consult a North American Green technical assistance representative for more information on the system's performance options.

SELECT HIGH-PERFORMANCE TRM

Product	Mass/Area (oz/yy)	Product Description	Channel Application Thresholds	Tensile Strength
TMAX 3K	7.5	Basic HPTRM with UV-stable woven construction	Vegetated 16.0 psf / 25 fps	3,200 x 3,000 lbs/ft
TMAX	10	Optimized HPTRM for channels and slopes, UV-stable, woven synthetic construction	Vegetated 16.0 psf / 25 fps	4,400 x 3,300 lbs/ft
W3000	14.7	Specialized HPTRM, UV-stable for soil infilling and vegetation establishment	Vegetated 16.0 psf / 25 fps	3,600 x 3,800 lbs/ft

SELECT ANCHOR

Product	Anchor Description	Anchor Size	Typical Working Load	Typical Application
Twist Pins	Stainless steel twist-end anchor. Available in TL-TA1 for compacted soils and TL-TA2 for soft soils.	8"	50-180 lbs	Anchoring for moderate loading/survivability.
		12"	10-230 lbs	
Gripple TLA2	Gravity Die Cast Percussion Driven Earth Anchor (PDEA). Available in Zinc Aluminum Alloy or Stainless Steel	3 in" anchor area, 3 mm, 3 ft tendon (typ.)	500 lbs	Surficial Slope and High Loading capabilities under hydraulic stress
Gripple TLA3	Gravity Die Cast Percussion Driven Earth Anchor (PDEA). Available in Zinc Aluminum Alloy or Stainless Steel	6 in" anchor area, 3-4 mm, 3-6 ft tendon (typ.)	1000 lbs	Handles high to extreme loading to greater subsurface depths.
Gripple TLA4	Gravity Die Cast Percussion Driven Earth Anchor (PDEA). Available in Zinc Aluminum Alloy or Stainless Steel	13 in" anchor area, 4-6 mm, 6-9 ft tendon (typ.)	2000 lbs	Ultimate loading and strength for structural support.



North American Green Turf and Earth Reinforcement Mat Systems offer elevated anchoring in a wide range of soil and site parameters.



Flexible revetment mats provide cost-effective erosion protection from turbulent water flow and moderate wave attack. North American Green® RevetMax™ System is ideal for applications where riprap, articulated concrete blocks or other rigid materials are normally used. When combined with a Turf Reinforcement Mat (TRM) or other underlayment, this unique armoring solution dramatically elevates permissible shear stress and velocity protection. The RevetMax System products:

- Install easily over difficult topography and are highly flexible
- Prevent floating or uplifting in submerged conditions due to their non-buoyancy
- Facilitate vegetation growth through voids in the mat
- Require no heavy equipment for installation
- Safer for pedestrian and vehicle traffic than hard armor materials

SHOREMAX® TRANSITION MATS

Flexible, UV-stabilized ShoreMax® Transition Mats protect highly erosive areas such as shoreline transition zones, channel bottoms and pipe outlets and outfalls. Our ShoreMax Mat can be used for slope drains in parking lots, roadways,



The RevetMax System ShoreMax Transition Mat is a smart option to replace rock in high scour areas such as pipe outlets.

mines and landfills. The RevetMax System ShoreMax Mat can provide soft armoring on shorelines and spillway applications where wave attack can reach critical stages.

In large-scale channel testing, results showed an unvegetated ShoreMax Mat combined with a VMax® P550® TRM underlayment can withstand flow-induced shear stresses of 8.6 psf (0.40kN/m²) and velocities up to 19.5 fps (5.9m/s). This level of performance exceeds that of a full mature stand of vegetation.

SIMPLE TO INSTALL

Installation of the ShoreMax mat can be done simply and without the need for expensive equipment. The ShoreMax mat and TRM underlayment are simply installed over a prepared seeded soil and fastened into place with fasteners.

The flexibility of the ShoreMax mats allows them to be easily installed with a variety of fasteners such as the ShoreMax stake, wire staples, rebar staples, and percussion driven anchors. Since the ShoreMax mat easily self-conforms to the underlying terrain, fasteners are not required to force conformance with the underlayment materials - they only serve to hold the panels in place. The type and size of the fastener used is dependent upon the underlying soil and degree of compaction.



Recreational Lake, Tampa, Florida

The wind and waves from boats and other marine vehicles took a toll on the shorelines of a recreational lake. To combat further erosion, the ShoreMax Transition Mat was installed over high-tensile strength TRMs. Together, they protected the shore and offered low maintenance, easy entry for pedestrians and safe small boat launches.



Unprotected topsoil, particularly on slopes and construction sites, is vulnerable to erosion and runoff problems. Significant damage can occur until these areas are ready for permanent erosion control. The SediMax™ System can help prevent such damage and save millions spent on restoring slopes, rebuilding drainage channels and dredging ponds and streams.

SEDIMAX-FR® FILTRATION ROLLS

North American Green® SediMax-FR™ (Filtration Rolls) create a temporary, three-dimensional sediment filtration structure perfect for forest fire rehabilitation, bioengineering projects, construction sites, ski slopes, wetland mitigation and other applications where storm water runoff is a concern. The 100% biodegradable product is made with a 70% straw and 30% coconut-fiber matrix reinforced with biodegradable netting rolled edge to edge. Other important benefits include:

- Up to 98% effective at reducing sediment migration
- 100% biodegradable
- Assists with environmental regulation compliance
- Helps earn points toward Leadership in Energy and Environmental Design® (LEED) Green Building Rating System™ project certification goals



Roanoke, Virginia

Along the roadside of a construction site, North American Green® VMax® C350® composite Turf Reinforcement Mat (TRM) and North American Green® BioNet® S150™ Erosion Control Blanket (ECB) protected the nearby channels from erosion, filtered sediment and aided vegetation establishment.

- Can be incorporated with live planting, live staking and seeding
- Encasement net flexibility minimizes accidental wildlife entrapment

SEDIMAX-SW™ STRAW WATTLES

North American Green® SediMax-SW™ (Straw Wattles) are economical alternatives to silt fence and straw bales for sediment control and storm water runoff. They can be staked along the contour of newly constructed or disturbed slopes, wrapped around storm drain inlets and used as check dams on slopes and in swales and grass waterways. Straw wattles are recycled, compressed, agricultural straw cylinders wrapped in photodegradable synthetic netting.

INSTALLATION: ON A ROLL

Our SediMax System products are a snap to install. SediMax-FR are positioned, rolled out, re-rolled from edge to edge, and secured with wooden stakes; SediMax-SW are laid out, staked and can be used individually or tied together to achieve any length.



Wenatchee National Forest, Chelan, Washington

After a forest fire in Wenatchee National Forest, the SediMax System SediMax-FR was used to trap silty, ashy soil while allowing water to pass through, greatly reducing soil migration into waterways.

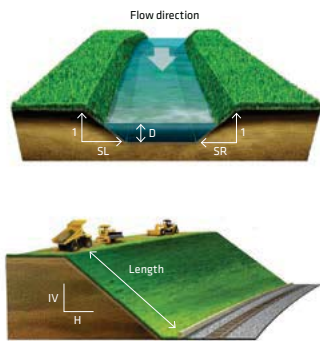


Sometimes, the Best Advice Is Free

For more than three decades, engineers, designers and contractors looking for reliable erosion control solutions have turned to North American Green first. Not only do we deliver unmatched quality and a rock-solid guarantee, our powerful Erosion Control Materials Design Software® (ECMDS) ensures proper evaluation, design, product selection and project planning.

TOOLS OF THE TRADE

ECMDS provides comprehensive site-specific erosion control analyses. Our sophisticated calculations help you develop sustainable soil protection and vegetation establishment plans. All recommendations are based on data from controlled laboratory and field research involving erosion control blankets, turf reinforcement mats, hydraulic erosion control products, and transition mats.



The channel and slope design modules are only two of the design options available in ECMDS Software.

DESIGN AND COMPLY

ECMDS is a must-have, especially if you face tough erosion and sediment control regulations. Product design recommendations are based on test data from one or more of these facilities: TR/Environmental Inc, Texas Transportation Institute, San Diego State University, Utah State University and/or Colorado State University. ECMDS product recommendations are based on time-tested design protocol developed by the USDA and FHWA.

READY WHEN YOU ARE

ECMDS is web-based for easy access from your desktop, laptop, smart phone or notebook. And, best of all, it's completely free of charge. To learn more and access the software directly, go to www.ECMDS.com

HOLD YOUR GROUND

We have top-quality solutions for every erosion control need. Our products are rigorously tested and proven effective for a wide range of real-world applications including:

- ▶ Slopes and embankments
- ▶ Landfills
- ▶ Shorelines
- ▶ Ditches and culvert outfalls
- ▶ Levees and earthen dams
- ▶ Channels and spillways
- ▶ Wetlands
- ▶ Bioengineering
- ▶ Golf courses
- ▶ Residential developments
- ▶ Military bases

Installation Made Easy

Choosing the right solution is half the battle against costly erosion. The other half is proper installation. We provide all the tools and instructions you need for quick, effective RECP installation tailored to your site.

- ▶ North American Green® is a proud partner with Gripple® Anchor Solutions. Percussion Driven Anchors increase the veneer's mechanical strength by reaching deep into the soil strata for enhanced anchoring in the worst conditions. Gripple Anchors can be used to permanently secure VMax® Turf Reinforcement Mats or RevetMax™ Flexible Revetment System products.
- ▶ Our fastener options include Gripple twist pins, wire staples, the PinPounder installation tool, rebar stakes, ShoreMax® high-impact plastic stakes, environmentally friendly North American Green® BioSTAKES® and our wooden EcoSTAKES®

Proper staple patterns must be used to achieve optimal results in RECP installation. Fastener rates range from 0.7 to 3.8/sy depending on the material and site conditions. Site

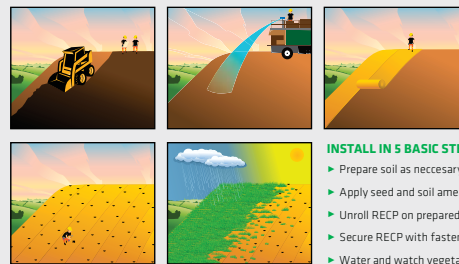
specific staple pattern recommendations based on soil type and severity of application may be acquired through North American Green® Erosion Control Materials Design Software (ECMDS®). Consult the full system of Installation Guides for complete installation instructions.

EXPERIENCE YOU CAN RELY ON

North American Green is the industry leader in providing comprehensive erosion and sediment control and turf reinforcement solutions. Our integrated systems and products were developed to ensure absolute customer satisfaction. Our products are backed by the most thorough quality assurance practices in the industry. And, we provide comprehensive design assistance for all of our systems.

For more information about North American Green Erosion Control Systems, visit nagreen.com, e-mail customerservice-nag@nagreen.com or call 800-772-2040. We are happy to assist you in developing solutions for all of your erosion and sediment control projects.

BASICS OF INSTALLATION



INSTALL IN 5 BASIC STEPS

- ▶ Prepare soil as necessary
- ▶ Apply seed and soil amendments
- ▶ Unroll RECP on prepared site
- ▶ Secure RECP with fasteners
- ▶ Water and watch vegetate



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