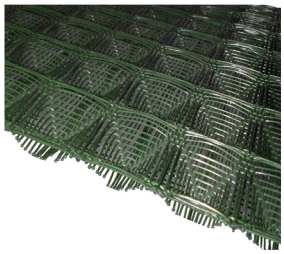
MATERIAL PROPERTY DATA SHEET

WESTERN GREEN

EXCEL PP5-Xtreme™

Permanent • 3-D Woven • UV Stable •
High Performance Turf Reinforcement Mat

DESCRIPTION



PP5-Xtreme is a High-Performance Turf Reinforcement Mat (HP-TRM) produced by weaving 100% UV-stabilized, high denier synthetic mono-filament yarns woven into permanent, high-strength, three-dimensional structure. The optimized properties of the material provide immediate erosion control with excellent vegetation establishment and class-leading long-term turf reinforcement. Additionally, the high strength at low elongation is ideal for slope stability applications (when paired with deep-seated, high strength anchors) and is unique compared to other HPTRMs. The design life of PP5-Xtreme is rated at fifty years in typical installations, however, can vary based on conditions. PP5-Xtreme is made in the USA and monitored by quality assurance testing at a GAI-LAP accredited laboratory.

Material Content	
Woven , Single Layer	Green or Tan

Standard Roll Sizes				
Width	8 ft	(2.4 m)	15 ft	(4.5 m)
Length	135 ft	(40.5 m)	150 ft	(45 m)
Weight ± 10%	90 lb	(42.0 kg)	113 lb	(51.0 kg)
Area	120 sy	(100 m^2)	250 SY	(209 m^2)

Material available in custom roll sizes

Approvals & Classification	
Classification	FHWA: Type 5.C / ECTC: 5.F
TTI Approvals	N/A
NTPEP Number	ECP-2022-01-014

Index Property	Test Method	MARV	
Thickness	ASTM D6525	0.3 in.	(7 mm)
Mass/Unit Area	ASTM D6566	9.0 oz/sy	(300 g/sm)
Tensile Strength – MD	ASTM D6818	4,000 lbs/ft	(58.4 kN/m)
Tensile Strength – TD	ASTM D6818	3,000 lbs/ft	(43.8 kN/m)
Elongation - MD	ASTM D6818	25%	
Elongation – TD	ASTM D6818	20%	
UV Stability	ASTM D4355	90% @6000 hr	
UV Stability	ASTM D7238	90% @6000 hr	
Resiliency	ASTM D6524	75%	
Light Penetration	ASTM D6567	30%	
Biomass Improvement	ASTM D7322	325%	
Specific Gravity	ASTM D792	57.4 lb/ft^3	(0.92 g/cm^3)
Porosity	ECTC	95%	
Carbon Footprint	GHG*	1.6 kg CO_2 e/m^2	

Design Parameters		
Property	**Unvegetated**	**Vegetated[3]**
RUSLE C Factor[2]	N/A	N/A
Slope Maximum Gradient[1]	0.5H:1V	0.5H:1V
Permissible Shear Stress[2]	2.3 psf	17.0 psf (815 Pa)
Permissible Velocity[2]	8.0 fps	25.0 fps (7.6 m/s)
τ_{veg} / τ_{TRM} (HEC-15)	N/A	0.26

Manning's n Roughness (HEC-15)		
τ_{lower}	τ_{mid}	τ_{upper}
0.027	0.027	0.025

1 Maximum Gradient a recomendation for typical installations.
2 Hydraulic thresholds compliant with ASTM D6459/D6460 but generalized for typical applications.
3 Vegetated values dependent on established stand of vegetation
*WRI/WBCSD Greenhouse Gas Protocol: Product Life Cycle Accounting and Reporting Standard, 2013.

Rev. 4.2023
Scan for additional and updated product information, or click here.

WESTERN EXCELSIOR CORPORATION

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01/01/2023

RE: Certification of Conformance and Delivery for PP5-Xtreme

To Whom it May Concern:

This document has been drafted to provide certification as to the origin, properties and delivery of PP5-Xtreme, an Erosion Control Blanket (ECB). PP5-Xtreme is produced by Western Excelsior Corporation (WEC). The material is produced in the United States. Each roll is subjected to regular inspection and testing in accordance with the WEC Quality Assurance Program. Properties and specifications of the material are provided on document number WG_MPDS_PP5-XTREME, attached as reference. Installation documentation may be found at www.westernexcelsior.com.

Since most WEC products are sold to distributors and stocked, WEC is typically unable to certify material type or quantity delivered to the project/project site. However, space is provided below for distributor/contractor certification of materials delivered to the project/project site.

To the best of our knowledge, the information included is accurate.

Jill Pack, CPESC
Product Manager

Standard Material Delivery Certification

Material Provided by (Distributor/Contractor): _____

Material Provided to (Contractor/Project): _____

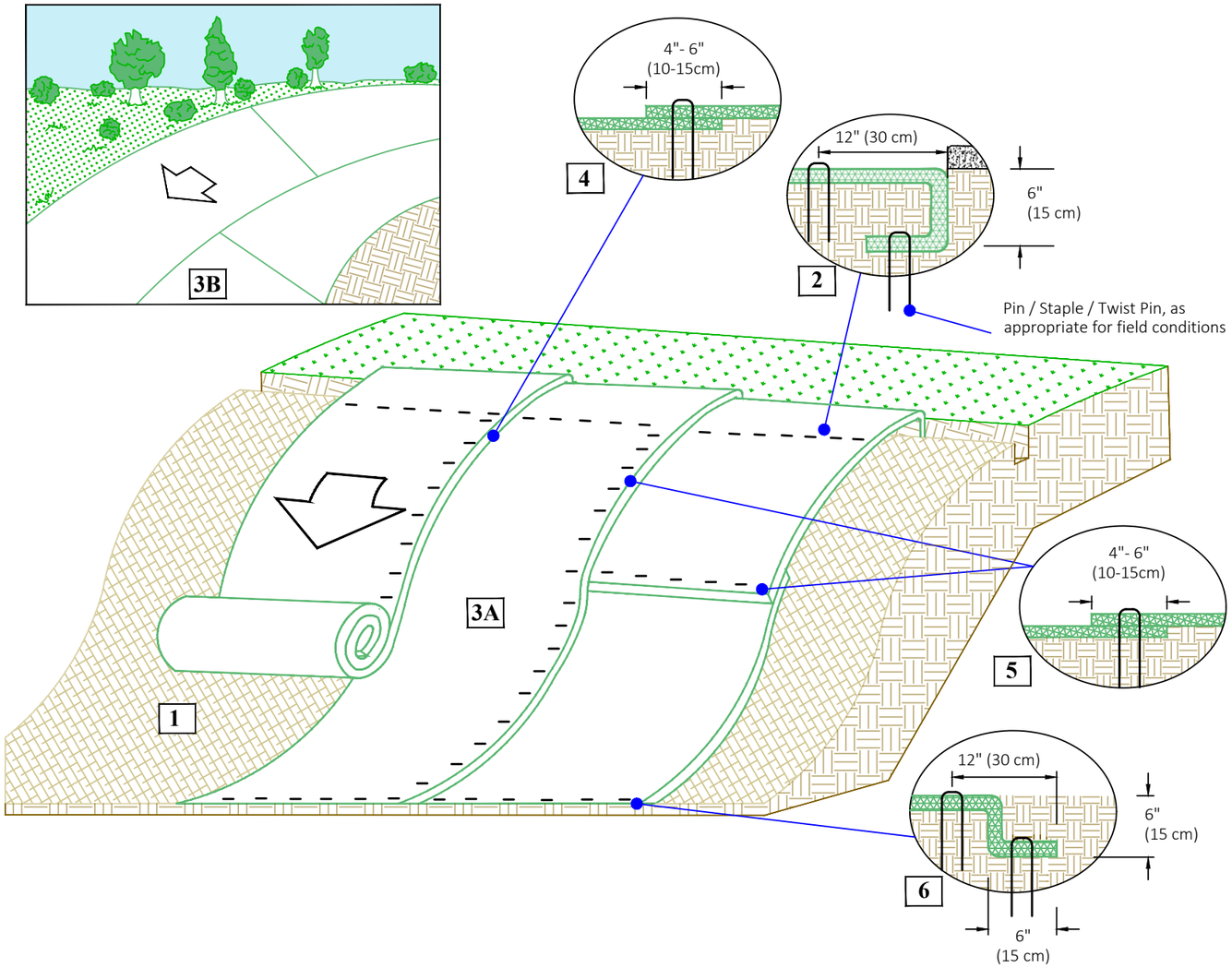
Project Name / Project Number: _____

Rolls / Square Yards Provided: _____

Specification #: _____

Signature: _____ Date: _____

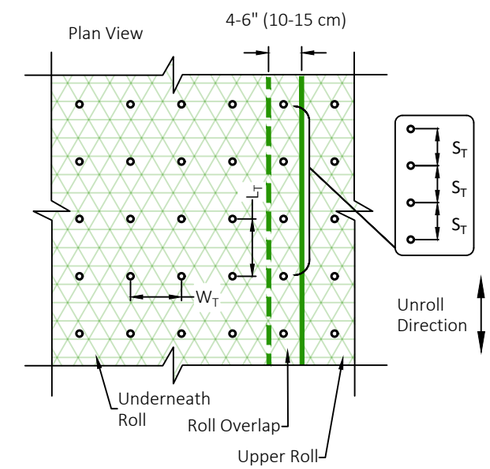
Title: _____



Instructions

1. Prepare soil before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed. Ground surface must be free of debris, rocks, clay clods and raked smooth sufficient to allow intimate contact of the RECP with the soil over the entirety of the installation.
2. Begin at the top of the slope by anchoring the RECPs in a 6" (15 cm) deep X 6" (15 cm) wide trench. Anchor the RECPs with a row of staples/stakes/pins spaced at S_T apart in the bottom of the trench. Backfill and compact the trench after stapling and fold the roll over downslope. Secure RECPs over compacted soil with a row of staples/stakes/pins spaced at S_T apart across the width of the RECPs.
3. Roll the RECPs (A) down or (B) horizontally across the slope. When laying RECPs horizontal, a maximum of two roll widths or 16 feet, whichever is less, may be applied up the slope. If two roll widths or 16 ft is insufficient to cover the slope, material shall be placed vertically. RECPs will unroll with appropriate side against the soil surface. All RECPs must be securely fastened to soil surface by placing staples/stakes/pins in appropriate locations as shown in the staple pattern guide. RollMax RECPs and ECBs should utilize Staple Pattern C, TRMs and VMax materials should utilize Staple Pattern D.
4. The edges of parallel RECPs must be stapled with approximately 4" - 6" (10 - 15 cm) overlap.
5. Consecutive RECPs spliced down the slope must overlapped with the upstream mat atop the downstream mat (shingle style). The overlap should be 4" - 6" (10 - 15 cm).
6. At the terminal end, secure each mat across the width with a row of staples/stakes/pins spaced at S_T. If exposed to flow, foot traffic, wind uplift or other disruption, trench the terminal end in as shown in detail.
7. Fasteners should provide a minimum of twenty pounds of pullout resistance. Six-inch (10 cm) X one-inch (2.5 cm) eleven gauge staples are typically adequate. In loose soils, longer staples may be necessary, twist pins can provide the greatest pullout resistance. In hard or rocky soils, straight pins, such as HP-8 or HP-12, may by used where staples or twist pins are refused, provided the minimum pullout requirements are met. Bio-degradable fasteners shall not be used with TRM or HPTRM materials.

Staple Pattern Guide



- Pin / Staple / Twist Pin, as appropriate for field conditions

	Staple Pattern	
Dimension	C	D
W_T	30" (75 cm)	22" (55 cm)
L_T	30" (75 cm)	22" (55 cm)
S_T	18" (45 cm)	18" (45 cm)
Nominal Frequency	1.7 / SY	3.0 / SY
Application	ECB (Degradable)	TRM (Permanent)
Required Fastener	Min. 20# pullout	Min. 20# pullout

*Note: Staple Pattern A and B used prior to 8/2019 have been discontinued.

Project: Standard Slope/Rainfall Layout - RECP

Shown: Isometric View of Slope, Fastener Placement, Trenching and Overlap, Some Fasteners and Vegetation Omitted for Clarity, NTS

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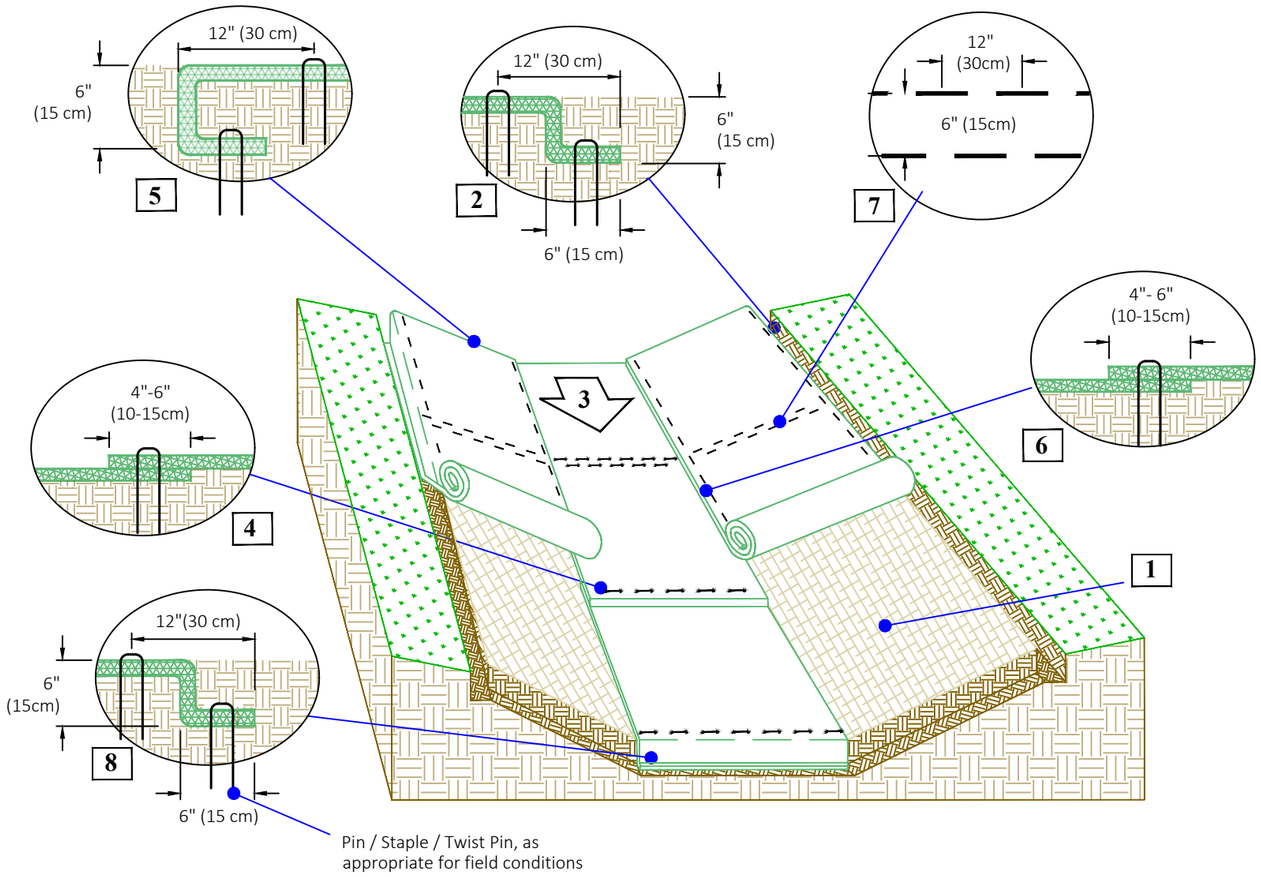


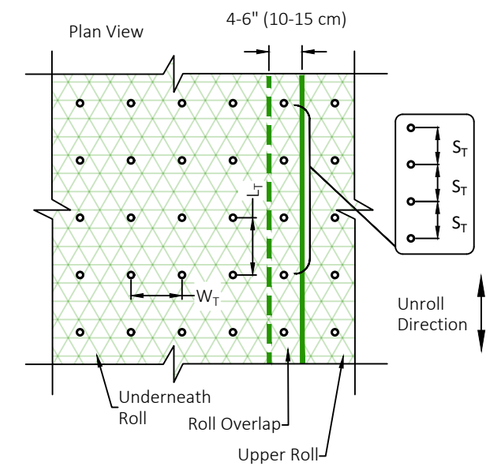
CRITICAL POINTS
A. Overlaps and Seams
B. Projected Water Line
C. Channel Bottom/Side Slope Vertices

NOTES:
*Horizontal staple spacing should be altered if necessary to allow staples to secure the critical points along the channel surface.

Instructions

1. Prepare soil before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed. Ground surface must be free of debris, rocks, clay clods and raked smooth sufficient to allow intimate contact of the RECP with the soil over the entirety of the installation.
2. Begin at the top of the channel by anchoring the RECPs in a 6" (15 cm) deep X 6" (15 cm) wide trench with approximately 12" (30 cm) of RECPs extended beyond the up-slope portion of the trench. Use ShoreMax mat at the channel/culvert outlet as supplemental scour protection as needed. Anchor the RECPs with a row of staples/stakes/pins approximately 12" (30 cm) apart in the bottom of the trench. Backfill and compact the trench after stapling. Apply seed to the compacted soil and fold the remaining 12" (30 cm) portion of RECPs back over the seed and compacted soil. Secure RECPs over compacted soil with a row of staples/stakes/pins spaced approximately 12" (30 cm) apart across the width of the RECPs.
3. Roll center RECPs in direction of water flow in bottom of channel. RECPs will unroll with appropriate side against the soil surface. All RECPs must be securely fastened to soil surface by placing staples/stakes/pins in appropriate locations as shown in the staple pattern guide.
4. Place consecutive RECPs end-over-end (Shingle style) with a 4"- 6" (10 - 15 cm) overlap. Use a double row of staples staggered 4" apart and 4" on center to secure RECPs.
5. Full length edge of RECPs at top of side slopes must be anchored with a row of staples/stakes/pins spaced at S_T apart in a 6" (15 cm) deep X 6"(15 cm) wide trench. Backfill and compact the trench after stapling.
6. Adjacent RECPs must be overlapped approximately 4"- 6" (10 - 15 cm) and secured with staples/stakes/pins at S_T.
7. In high flow channel applications a staple check slot is recommended at 30 to 40 foot (9 -12m) intervals. Use a double row of staples staggered 6" (15 cm) apart and 12" (30 cm) on center over entire width of the channel.
8. The terminal end of the RECPs must be anchored with a row of staples/stakes/pins spaced at S_T apart in a 6" (15 cm) deep X 6" (15 cm) wide trench. Backfill and compact the trench after stapling.
9. Fasteners should provide a minimum of twenty pounds of pullout resistance. Six-inch (10 cm) X one-inch (2.5 cm) eleven gauge staples are typically adequate. In loose soils, longer staples may be necessary, twist pins can provide the greatest pullout resistance. In hard or rocky soils, straight pins, such as HP-8 or HP-12, may by used where staples or twist pins are refused, provided the minimum pullout requirements are met. Bio-degradable fasteners shall not be used with VMax (TRM) or TMax (HPTRM) materials.

Staple Pattern Guide



- Pin / Staple / Twist Pin, as appropriate for field conditions

	Staple Pattern
Dimension	E
W_T	20" (50 cm)
L_T	20" (50 cm)
S_T	18" (45 cm)
Nominal Frequency	3.8 / SY
Required Fastener	Min. 20# Pullout

WESTERN GREEN
WESTERN EXCELSIOR CORPORATION
NORTH AMERICAN GREEN
EAST COAST erosion control

Project: Standard Channel Layout, Unroll w/Flow - RECP

Shown: Isometric View of Channel, Fastener Placement, Trenching and Overlap, Some Fasteners and Vegetation Omitted for Clarity, NTS

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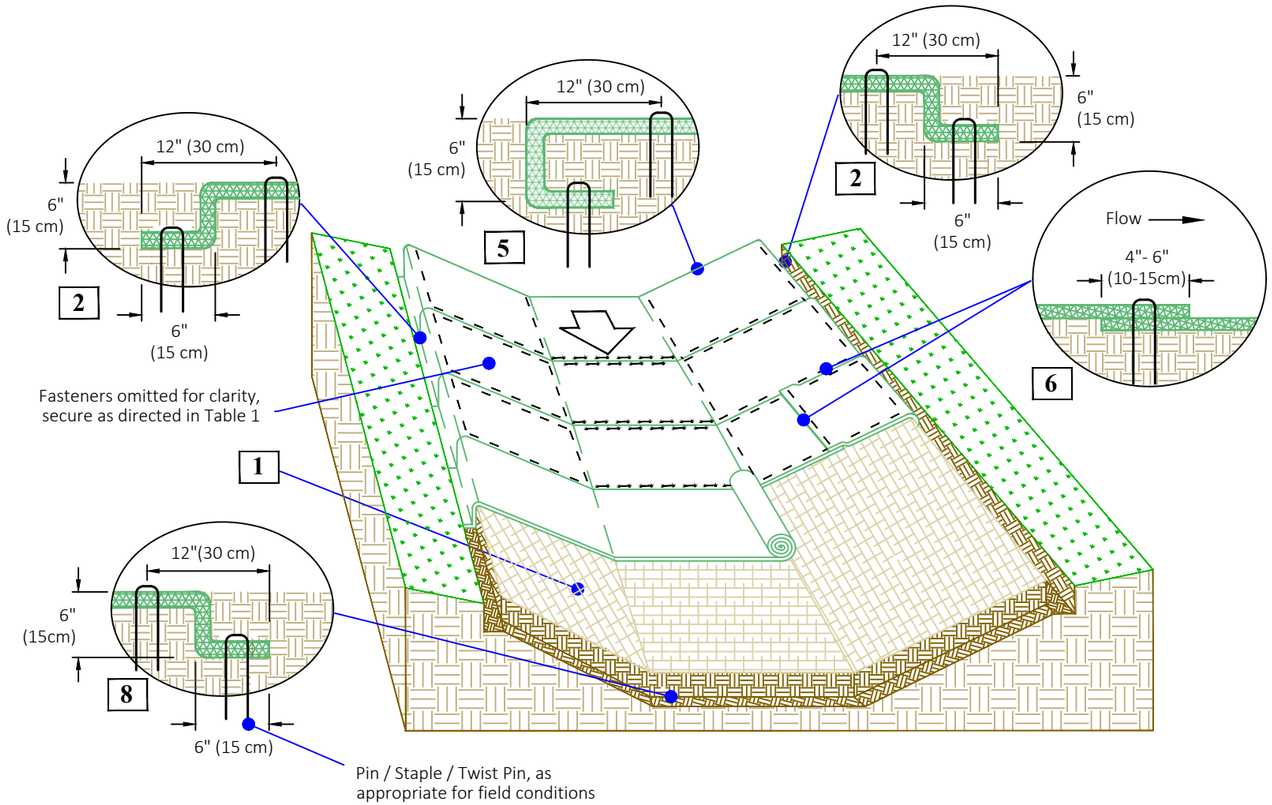


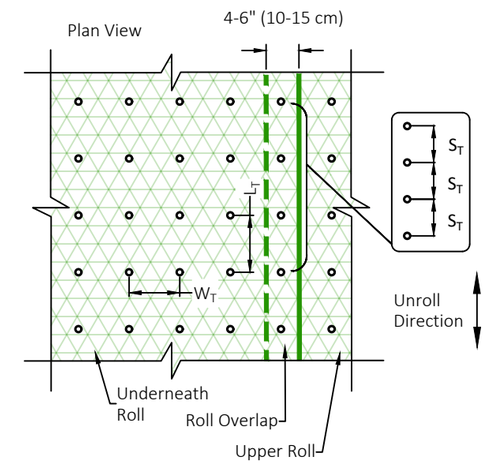
CRITICAL POINTS
- A. Overlaps and Seams
- B. Projected Water Line
- C. Channel Bottom/Side Slope Vertices

NOTES:
*Horizontal staple spacing should be altered if necessary to allow staples to secure the critical points along the channel surface.

Instructions

1. Prepare soil (fig. 1) before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed. Ground surface must be free of debris, rocks, clay clods and raked smooth sufficient to allow intimate contact of the RECP with the soil over the entirety of the installation. Apply seed and amendments to the compacted soil.
2. Dig anchor trench, 6" (15 cm) deep X 6" (15 cm) wide, at the upstream most edge of installation across the channel. Begin at the top of the channel by unrolling the RECP across the channel, perpendicular to the direction of flow, cut to fit. Carefully flip the RECP panel upstream, leaving it upside down. Place the upside down leading edge in the trench. Anchor the RECP panel with a row of fasteners spaced at S_T apart in the bottom of the trench. Backfill and compact the trench after fastening. With the RECP secured in the backfilled trench, flip the RECP panel over, right side up, over the backfill. The end result should mimic fig. 2. Secure RECP just downstream of trench with a row of fasteners located approximately 12" (30 cm) downstream from the trench, spaced at S_T.
3. Roll subsequent RECP panels across the channel, fitting the downstream panel under the upstream panel. RECPs shall be unrolled with appropriate side against the soil surface. All RECPs must be securely fastened to soil surface by placing twist pins in appropriate locations as shown in the pin pattern guide.
4. Place consecutive RECPs end-over-end (Shingle style) with a 4"- 6" (10 - 15 cm) overlap, see fig.6. Secure overlaps as shown.
5. Adjacent RECPs must be overlapped approximately 4"- 6" (10 - 15 cm) and secured with fasteners at S_T.
6. The terminal end of the RECPs must be anchored with a row of fasteners spaced at S_T apart in a 6" (15 cm) deep X 6" (15 cm) wide trench (minimum). Backfill and compact the trench after stapling.
7. Fasteners should provide a minimum of twenty pounds of pullout resistance. Six-inch (10 cm) X one-inch (2.5 cm) eleven gauge staples are typically adequate. In loose soils, longer staples may be necessary, twist pins can provide the greatest pullout resistance. In hard or rocky soils, straight pins, such as HP-8 or HP-12, may by used where staples or twist pins are refused, provided the minimum pullout requirements are met. Bio-degradable fasteners shall not be used with VMax (TRM) or TMax (HPTRM) materials.

Staple Pattern Guide



- Pin / Staple / Twist Pin, as appropriate for field conditions

	Staple Pattern
Dimension	E
W_T	20" (50 cm)
L_T	20" (50 cm)
S_T	18" (45 cm)
Nominal Frequency	3.8 / SY
Required Fastener	Min. 20# Pullout

WESTERN GREEN

Project: Standard Channel Layout, Unroll Cross Flow - RECP

Shown: Isometric View of Channel, Fastener Placement, Trenching and Overlap, Some Fasteners and Vegetation Omitted for Clarity, NTS

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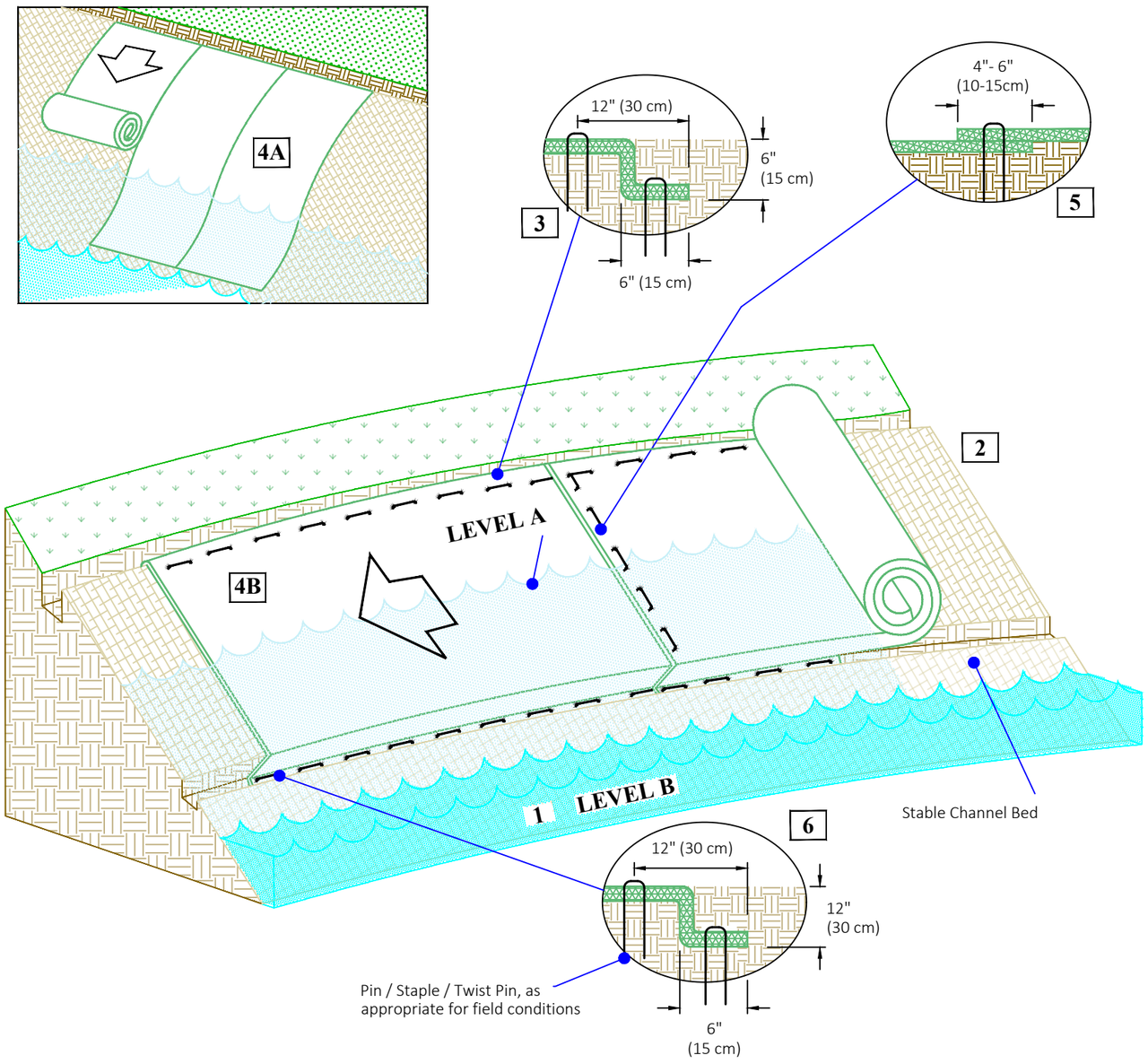
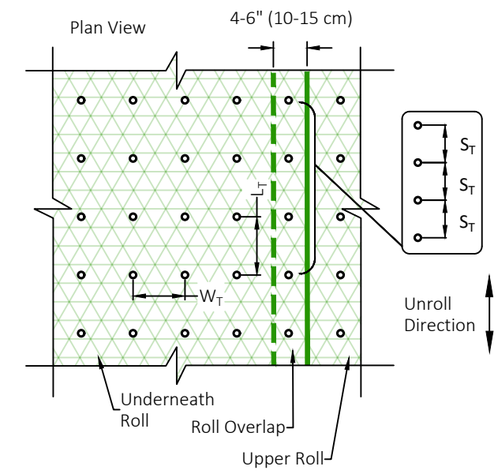


Instructions

1. For easier installation, lower water level from Level A to Level B before installation.
2. Prepare soil before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed. Ground surface must be free of debris, rocks, clay clods and raked smooth sufficient to allow intimate contact of the RECP with the soil over the entirety of the installation.
3. Begin at the top of the shoreline by anchoring the RECPs in a 6" (15 cm) deep X 6" (15 cm) wide trench. Anchor the RECPs with a row of staples/stakes/pins spaced at S_T apart in the bottom of the trench. Backfill and compact the trench after stapling.
4. Roll RECPs either (A) down the shoreline for long banks (top to bottom) or (B) horizontally across the shoreline slope. RECPs will unroll with appropriate side against the soil surface. VMax TRMs should always be installed parallel to flow. All RECPs must be securely fastened to soil surface by placing staples/stakes/pins in appropriate locations as shown in the staple pattern guide.
5. The edges of all horizontal and vertical seams must be stapled with approximately 4" - 6" (10 - 15 cm) overlap. Note: *In streambank applications, seam overlaps should be shingled in the predominant flow direction.
6. The edges of the RECPs at or below normal water level must be anchored by placing the RECP's in a 12" (30 cm) deep X 6" (15 cm) wide anchor trench. Anchor the RECPs with a row of staples/stakes/pins spaced approximately 12"(30cm) apart in the trench. Backfill and compact the trench after stapling (stone or soil may be used as backfill). For installation at or below normal water level, use of ShoreMax mat on top of the RECP or geotextile underneath is likely required for sections below the normal water line.
7. Fasteners should provide a minimum of twenty pounds of pullout resistance. Six-inch (10 cm) X one-inch (2.5 cm) eleven gauge staples are typically adequate. In loose soils, longer staples may be necessary, twist pins can provide the greatest pullout resistance. In hard or rocky soils, straight pins, such as HP-8 or HP-12, may by used where staples or twist pins are refused, provided the minimum pullout requirements are met. Bio-degradable fasteners shall not be used with VMax (TRM) or TMax (HPTRM) materials.

Staple Pattern Guide



○ Pin / Staple / Twist Pin, as appropriate for field conditions

	Staple Pattern
Dimension	E
W_T	20" (50 cm)
L_T	20" (50 cm)
S_T	18" (45 cm)
Nominal Frequency	3.8 / SY
Required Fastener	Min. 20# Pullout

WESTERN GREEN

Project: Standard Channel Bank Layout - RECP

Shown: Isometric View of Channel, Fastener Placement, Trenching and Overlap, Some Fasteners and Vegetation Omitted for Clarity, NTS

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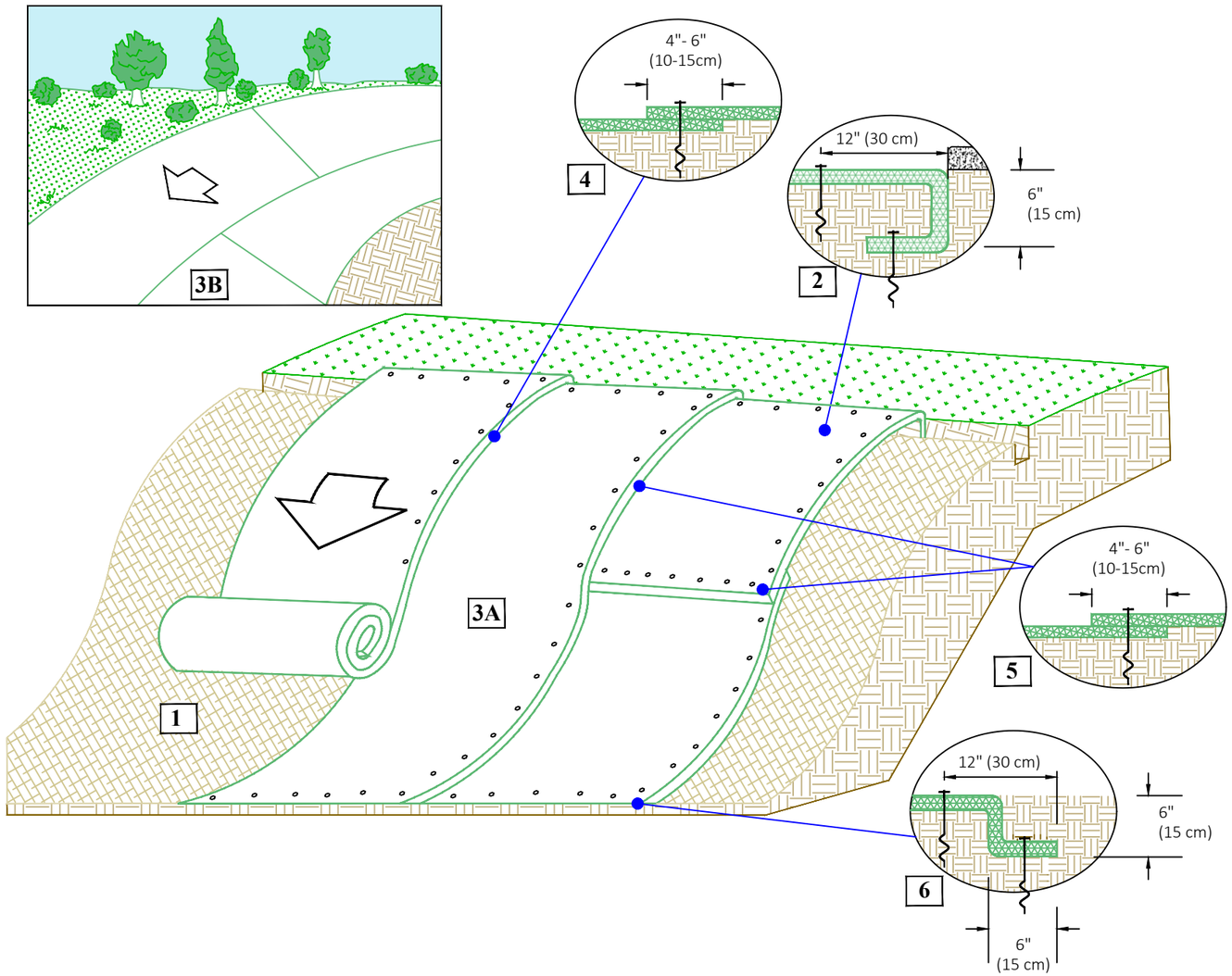
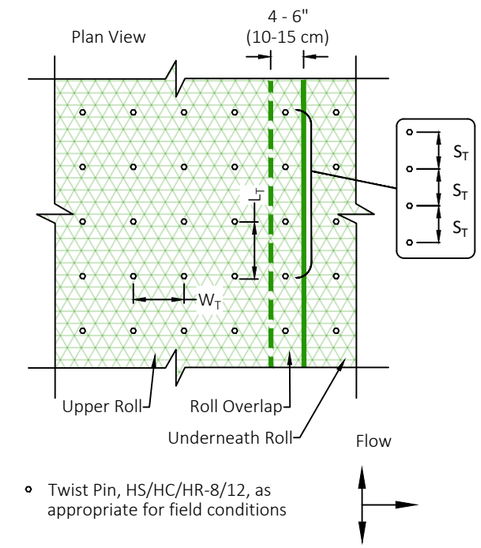


Instructions

1. Prepare soil before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed. Ground surface must be free of debris, rocks, clay clods and raked smooth sufficient to allow intimate contact of the RECP with the soil over the entirety of the installation.
2. Begin at the top of the slope by anchoring the RECPs in a 6" (15 cm) deep X 6" (15 cm) wide trench. Anchor the RECPs with a row of staples/stakes/pins spaced at S_T apart in the bottom of the trench. Backfill and compact the trench after stapling and fold the roll over downslope. Secure RECPs over compacted soil with a row of staples/stakes/pins spaced at S_T apart across the width of the RECPs.
3. Roll the RECPs (A) down or (B) horizontally across the slope. When laying RECPs horizontal, a maximum of two roll widths or 16 feet, whichever is less, may be applied up the slope. If two roll widths or 16 ft is insufficient to cover the slope, material shall be placed vertically. RECPs will unroll with appropriate side against the soil surface. All RECPs must be securely fastened to soil surface by placing staples/stakes/pins in appropriate locations as shown in the staple pattern guide. RollMax RECPs and ECBs should utilize Staple Pattern C, TRMs and VMax materials should utilize Staple Pattern D.
4. The edges of parallel RECPs must be stapled with approximately 4" - 6" (10 - 15 cm) overlap.
5. Consecutive RECPs spliced down the slope must overlapped with the upstream mat atop the downstream mat (shingle style). The overlap should be 4" - 6" (10 - 15 cm).
6. At the terminal end, secure each mat across the width with a row of staples/stakes/pins spaced at S_T. If exposed to flow, foot traffic, wind uplift or other disruption, trench the terminal end in as shown in detail.
7. Fasteners should provide a minimum of sixty pounds of pullout resistance. Falcon HC-8 or HS-8 are typically adequate. In loose soils, longer twist pins may be necessary, HC-12 or HS-12. In hard or rocky soils, hardened spikes (12" Ardox) or Falcon HR-8 / HR- 12 pins may be used, assuming minimum pullout resistance is provided. Bio-degradable fasteners shall not be used with TRM or HPTRM materials.

Staple Pattern Guide



- Twist Pin, HS/HC/HR-8/12, as appropriate for field conditions

	Staple Pattern	
Dimension	C	D
W_T	30" (75 cm)	22" (55 cm)
L_T	30" (75 cm)	22" (55 cm)
S_T	18" (45 cm)	18" (45 cm)
Nominal Frequency	1.7/SY (2.0/Sm)	3.0/SY (3.6/Sm)
Application	ECB (Degradable)	TRM (Permanent)
Required Fastener	Min. 60# pullout	Min. 60# pullout
*Note: Staple Pattern A and B used prior to 8/2019 have been discontinued.		

Project: Standard Slope/Rainfall Layout - RECP

Shown: Isometric View of Slope, Fastener Placement, Trenching and Overlap, Some Fasteners and Vegetation Omitted for Clarity, NTS

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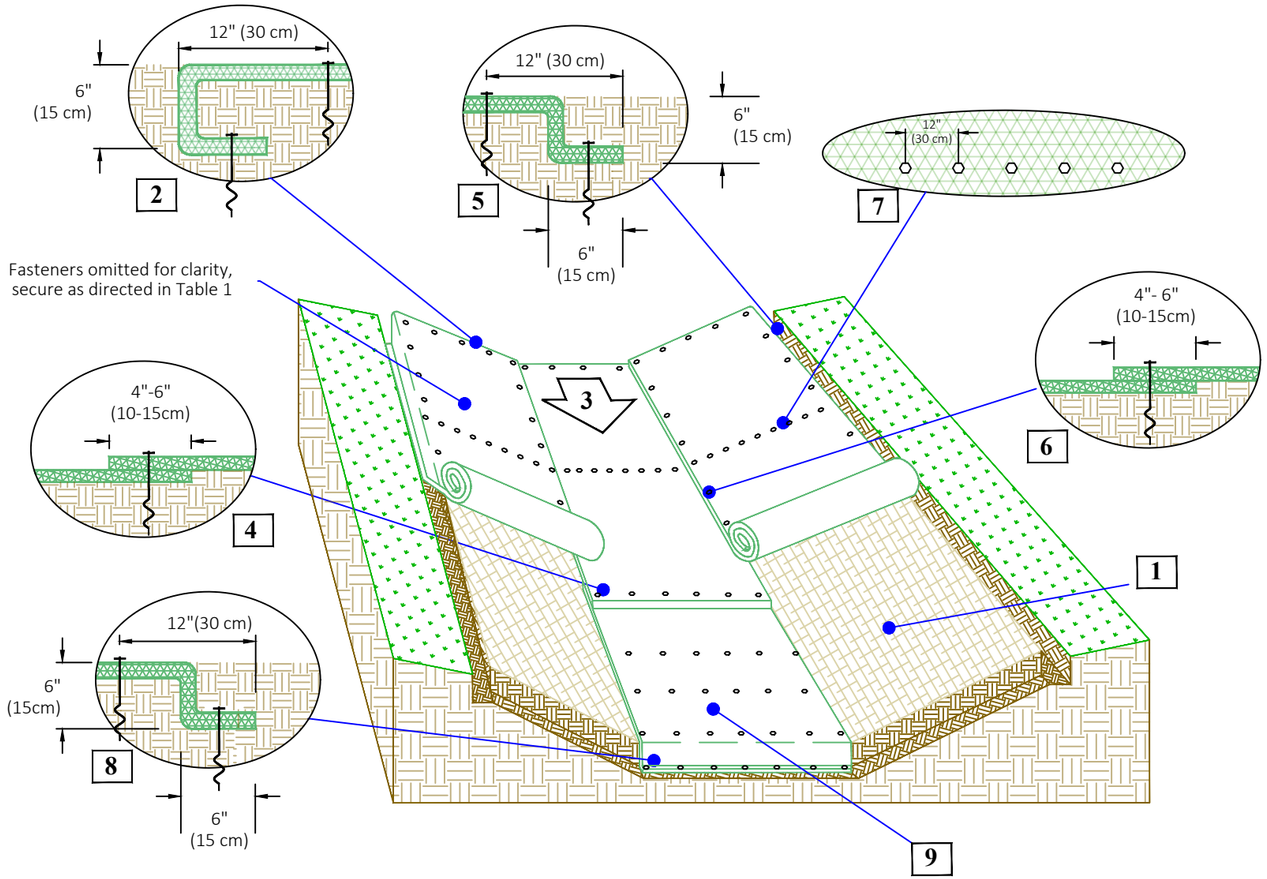


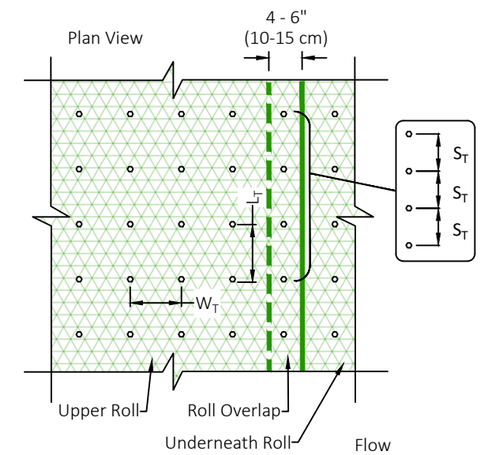
CRITICAL POINTS
- A. Overlaps and Seams
- B. Projected Water Line
- C. Channel Bottom/Side Slope Vertices

NOTES:
*Horizontal staple spacing should be altered if necessary to allow staples to secure the critical points along the channel surface.

Instructions

1. Prepare soil before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed. Ground surface must be free of debris, rocks, clay clods and raked smooth sufficient to allow intimate contact of the RECP with the soil over the entirety of the installation.
2. Begin at the top of the channel by anchoring the RECPs in a 6" (15 cm) deep X 6" (15 cm) wide trench with the RECPs staged upstream of the trench. Anchor the RECPs with a row of twist pins spaced at S_T apart in the bottom of the trench. Backfill and compact the trench after fastening. Apply seed to the compacted soil and unroll the RECPs back over the seed and compacted soil, proceeding downstream. Secure RECPs over compacted soil with a row of twist pins located approximately 12" (30 cm) from the upstream edge of the installation, spaced at S_T.
3. Roll center RECPs in direction of water flow in bottom of channel. RECPs shall be unrolled with appropriate side against the soil surface. All RECPs must be securely fastened to soil surface by placing twist pins in appropriate locations as shown in the pin pattern guide.
4. Place consecutive RECPs end-over-end (Shingle style) with a 4"- 6" (10 - 15 cm) overlap. Secure overlaps as shown.
5. Full length edge of RECPs at top of side slopes must be anchored with a row of twist pins spaced at S_T apart in a 6" (15 cm) deep X 6"(15 cm) wide trench. Backfill and compact the trench after stapling.
6. Adjacent RECPs must be overlapped approximately 4"- 6" (10 - 15 cm) and secured with twist pins at S_T.
7. In high flow channel applications a pin check slot is recommended at 30 to 40 foot (9 -12m) intervals. Use a row of twist pins spaced at 12" (30 cm) on center over entire width of the channel.
8. The terminal end of the RECPs must be anchored with a row of twist pins spaced at S_T apart in a 6" (15 cm) deep X 6" (15 cm) wide trench (minimum). Backfill and compact the trench after stapling.
9. Secure fasteners throughout the body of the mats. Fasteners should provide a minimum of sixty pounds of pullout resistance. Falcon HC-8 or HS-8 are typically adequate. In loose soils, longer twist pins may be necessary, HC-12 or HS-12. In hard or rocky soils, hardened spikes (12" Ardox) or Falcon HR-8 / HR- 12 pins may be used, assuming minimum pullout resistance is provided. Bio-degradable fasteners shall not be used with TRM or HPTRM materials.

Pin Pattern Guide



- Twist Pin, HS/HC/HR-8/12, as appropriate for field conditions

Table 1

	Pin Pattern
Dimension	E
W_T	20" (50 cm)
L_T	20" (50 cm)
S_T	18" (45 cm)
Nominal Frequency	3.8/SY (4.6/Sm)
Required Fastener	Min. 60# Pullout

WESTERN GREEN
WESTERN EXCELSIOR CORPORATION
NORTH AMERICAN GREEN
EAST COAST erosion control

Project: Standard Channel Layout, Unroll w/Flow - RECP w/Falcon Twist Pins

Shown: Isometric View of Channel, Fastener Placement, Trenching and Overlap, Some Fasteners and Vegetation Omitted for Clarity, NTS

Date: 4/4/2023
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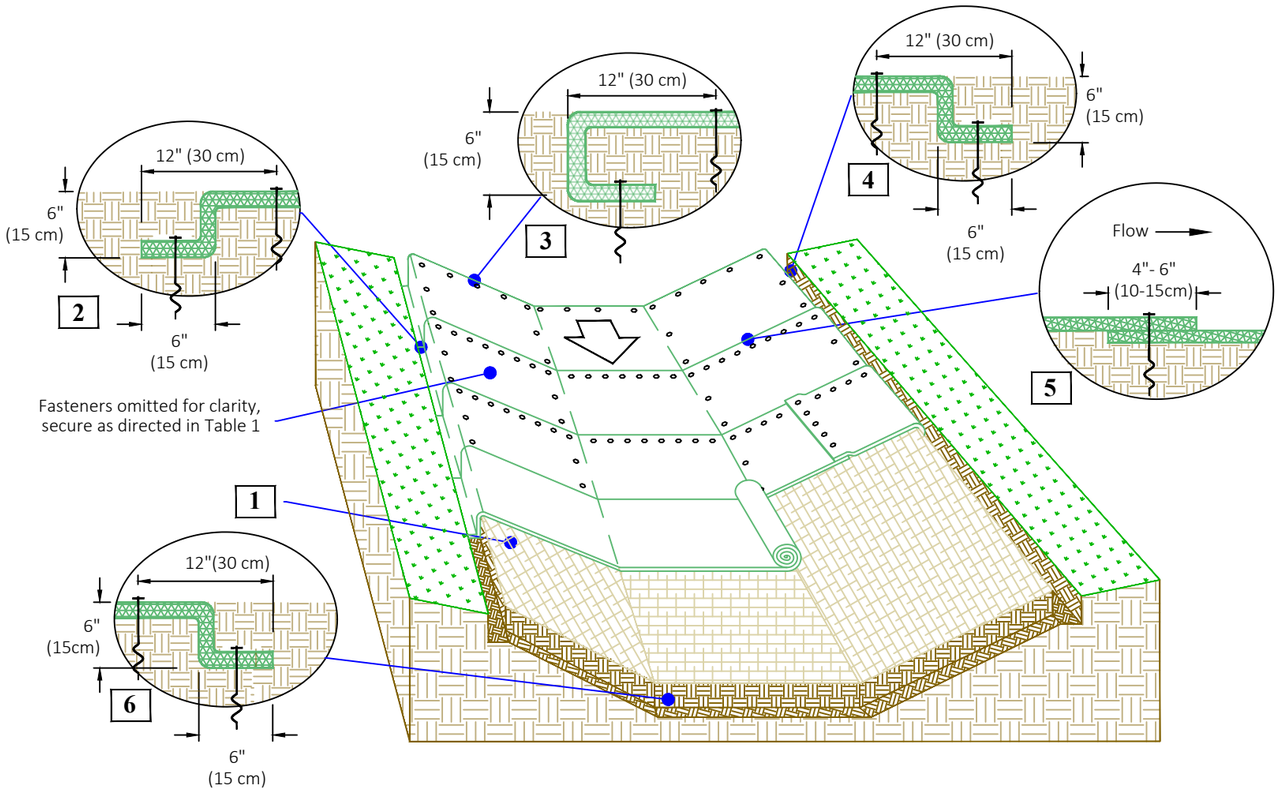
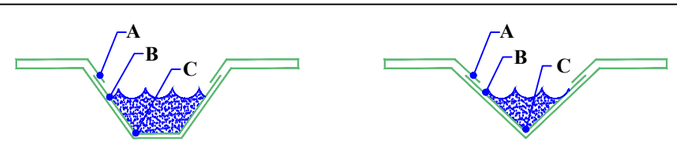


CRITICAL POINTS
A. Overlaps and Seams
B. Projected Water Line
C. Channel Bottom/Side Slope Vertices

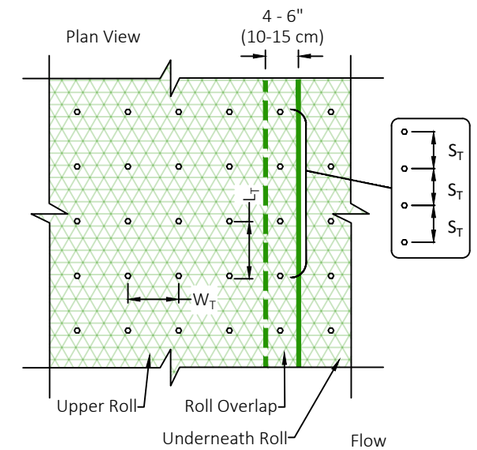


NOTES:
*Horizontal staple spacing should be altered if necessary to allow staples to secure the critical points along the channel surface.

Instructions

1. Prepare soil (fig. 1) before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed. Ground surface must be free of debris, rocks, clay clods and raked smooth sufficient to allow intimate contact of the RECP with the soil over the entirety of the installation. Apply seed and amendments to the compacted soil.
2. Dig anchor trench, 6" (15 cm) deep X 6" (15 cm) wide, at the upstream most edge of installation across the channel. Begin at the top of the channel by unrolling the RECP across the channel, perpendicular to the direction of flow, cut to fit. Carefully flip the RECP panel upstream, leaving it upside down. Place the upside down leading edge in the trench. Anchor the RECP panel with a row of twist pins spaced at S_T apart in the bottom of the trench. Backfill and compact the trench after fastening. With the RECP secured in the backfilled trench, flip the RECP panel over, right side up, over the backfill. The end result should mimic fig. 2. Secure RECP just downstream of trench with a row of twist pins located approximately 12" (30 cm) downstream from the trench, spaced at S_T.
3. Roll subsequent RECP panels across the channel, fitting the downstream panel under the upstream panel. RECPs shall be unrolled with appropriate side against the soil surface. All RECPs must be securely fastened to soil surface by placing twist pins in appropriate locations as shown in the pin pattern guide.
4. Place consecutive RECPs end-over-end (Shingle style) with a 4"- 6" (10 - 15 cm) overlap, see fig.6. Secure overlaps as shown.
5. Adjacent RECPs must be overlapped approximately 4"- 6" (10 - 15 cm) and secured with twist pins at S_T.
6. The terminal end of the RECPs must be anchored with a row of twist pins spaced at S_T apart in a 6" (15 cm) deep X 6" (15 cm) wide trench (minimum). Backfill and compact the trench after stapling.
7. Secure fasteners throughout the body of the mats. Fasteners should provide a minimum of sixty pounds of pullout resistance. Falcon HC-8 or HS-8 are typically adequate. In loose soils, longer twist pins may be necessary, HC-12 or HS-12. In hard or rocky soils, hardened spikes (12" Ardox) or Falcon HR-8 / HR- 12 pins may be used, assuming minimum pullout resistance is achieved. Bio-degradable fasteners shall not be used with TRM or HPTRM materials.

Pin Pattern Guide



- Twist Pin, HS/HC/HR-8/12, as appropriate for field conditions

Table 1

	Pin Pattern
Dimension	E
W_T	20" (50 cm)
L_T	20" (50 cm)
S_T	18" (45 cm)
Nominal Frequency	3.8/SY (4.6/Sm)
Required Fastener	Min. 60# Pullout

WESTERN GREEN

Project: Standard Channel Layout, Unroll Cross Flow - RECP w/ Falcon Twist Pins

Shown: Isometric View of Channel, Fastener Placement, Trenching and Overlap, Some Fasteners and Vegetation Omitted for Clarity, NTS

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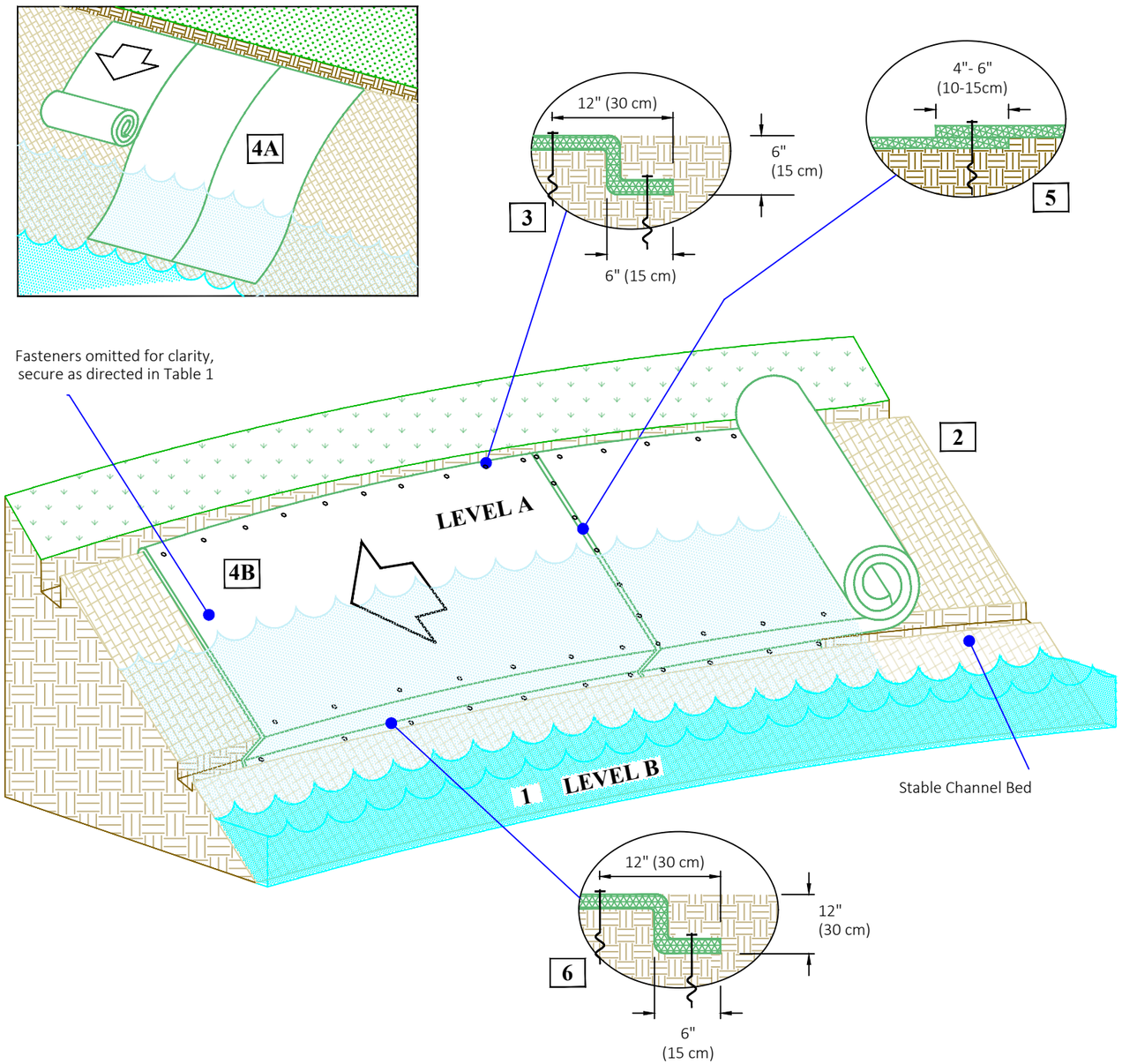
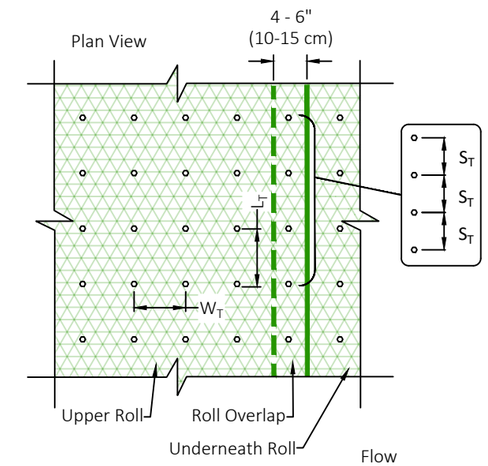


Instructions

1. For easier installation, lower water level from Level A to Level B before installation.
2. Prepare soil before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed. Ground surface must be free of debris, rocks, clay clods and raked smooth sufficient to allow intimate contact of the RECP with the soil over the entirety of the installation.
3. Begin at the top of the shoreline by anchoring the RECPs in a 6" (15 cm) deep X 6" (15 cm) wide trench. Anchor the RECPs with a row of staples/stakes/pins spaced at S_T apart in the bottom of the trench. Backfill and compact the trench after stapling.
4. Roll RECPs either (A) down the shoreline for long banks (top to bottom) or (B) horizontally across the shoreline slope. RECPs will unroll with appropriate side against the soil surface. VMax TRMs should always be installed parallel to flow. All RECPs must be securely fastened to soil surface by placing staples/stakes/pins in appropriate locations as shown in the staple pattern guide.
5. The edges of all horizontal and vertical seams must be stapled with approximately 4" - 6" (10 - 15 cm) overlap. Note: *In streambank applications, seam overlaps should be shingled in the predominant flow direction.
6. The edges of the RECPs at or below normal water level must be anchored by placing the RECP's in a 12" (30 cm) deep X 6" (15 cm) wide anchor trench. Anchor the RECPs with a row of staples/stakes/pins spaced approximately 12"(30cm) apart in the trench. Backfill and compact the trench after stapling (stone or soil may be used as backfill). For installation at or below normal water level, use of ShoreMax mat on top of the RECP or geotextile underneath is likely required for sections below the normal water line.
7. Fasteners should provide a minimum of sixty pounds of pullout resistance. Falcon HC-8 or HS-8 are typically adequate. In loose soils, longer twist pins may be necessary, HC-12 or HS-12. In hard or rocky soils, hardened spikes (12" Ardox) or Falcon HR-8 / HR- 12 pins may be used, assuming minimum pullout resistance is provided. Bio-degradable fasteners shall not be used with TRM or HPTRM materials.

Pin Pattern Guide



- Twist Pin, HS/HC/HR-8/12, as appropriate for field conditions

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Nominal Frequency	3.8/SY (4.6/Sm)
Required Fastener	Min. 60# Pullout

WESTERN GREEN

Project: Standard Channel Bank Layout - RECP w/Falcon Tist Pins

Shown: Isometric View of Channel, Fastener Placement, Trenching and Overlap, Some Fasteners and Vegetation Omitted for Clarity, NTS

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