



# PYRAWALL™

Engineered Vegetated Wall System

## PYRAWALL™ INSTALLATION AND MAINTENANCE GUIDELINES

Thank you for purchasing PYRAWALL™ by Propex Operating Company, LLC (Propex). This document provides installation and maintenance guidelines for PYRAWALL used as a reinforced-soil wall and/or steepened slope system. PYRAWALL provides a durable, geotechnically stable structure that provides immediate erosion protection and long-term vegetative cover, consisting of two components:

- PYRAMAT® - High Performance Turf Reinforcement Mat (HPTRM)
- Fiber-composite Internal Bracing

PYRAWALL is an Engineered Wrap-Face Vegetated Solution with a unique design for each specific project. While Propex has made every effort to ensure general validity, this information should not be used for a specific application without independent professional examination and verification of its suitability, applicability, and accuracy. The information provided herein is for general information only, and is intended to present installation guidance. Project specific contract documents take precedence when details are different than what is represented in this document. Depending upon the critical nature of the structure to be armored, work restrictions may be in place such as limiting work based on growing seasons, weather patterns, etc. Work should be performed under the provisions set forth for the specific project. Propex Engineering Services is available for support during installation to consult for solving constructability issues encountered in specific applications. Please feel free to call our technical support hotline at (800) 621-1273.

### BEFORE INSTALLATION BEGINS

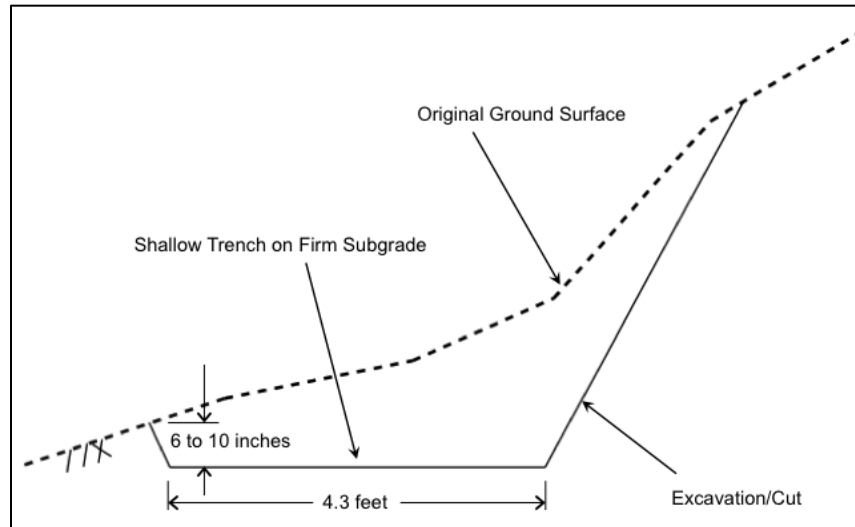
- *Coordinate with a Propex Representative:* A pre-construction meeting is suggested with the construction team and a representative from Propex. This meeting should be scheduled by the contractor with at least a two week notice.
- *Gather the Tools Needed:* Tools that you will need to install PYRAWALL include a pair of industrial shears to cut PYRAMAT 75, tape measure, equipment for soil compaction, and equipment for vegetation establishment.
- *Determine how to Establish Vegetation:* The method of vegetation establishment should be determined prior to the start of installation. Different vegetation establishment methods may require different installation timing and schedules.

## INSTALLATION OF PYRAWALL

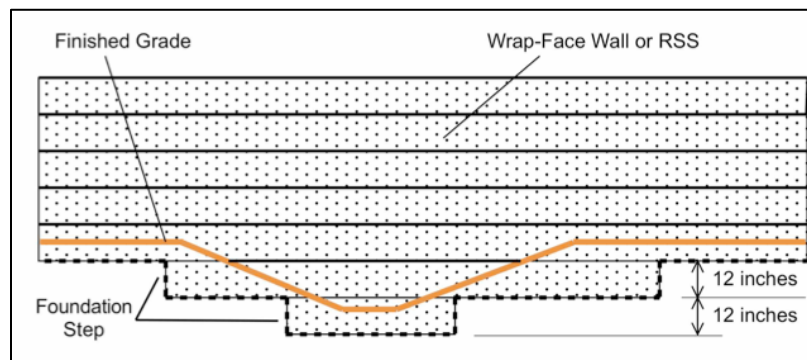
### PREPARE THE SITE

It is recommended during all stages of site preparation that disturbed soils remain unprotected for not more than a single day. Depending on project size this may require progressive site preparation during installation.

1. Excavate a shallow, level trench at least 4.3 ft. (1.3 m) wide and 6 to 9 in (15 to 23 cm) deep below finished grade using an excavator with smooth bucket to reduce disturbance at the defined subgrade elevation.
2. The cut-slope excavation width shall not exceed the lines and grades shown on the Plans, and care shall be taken to avoid encroachment near bordering properties. As necessary, to account for grade variations along the wall base line, the trench shall have level sections separated by 12 in (30 cm) steps to allow for grade alignment with the 12 in (30 cm) wrapped lifts.



**Figure 1 - Excavation of Shallow Trench or Leveling Pad in Approved Native Soil**



**Figure 2 - Elevation View Showing Stepped Foundation for Grade Changes**

3. Deleterious material (overly wet soil, uncontrolled loose fill, construction debris, organics, etc.) encountered during this excavation shall be over-excavated, removed, and replaced with compacted granular fill or approved backfill soil. Compact the subgrade as specified by the Engineer.
4. If specified by the engineer, a perforated drainage pipe shall be installed at the back of the trench and connected to a prescribed outlet for draining groundwater.
5. Granular soil is defined as:
  - A. Classified as GM, GW, SM, SW, GW-GM, SW-SM referencing the Unified Soil Classification System (USCS).
  - B. Contains maximum particle size of 1-1/2 in (3.8 cm) and less than 12 percent fines passing No. 200 sieve (0.074 mm).
  - C. Inert earth material with less than 3 percent organics or other deleterious substances (wood, metal, plastic, waste, etc.).

OR

- D. Meets the untreated base grading requirements for 1-1/2 in (3.8 cm) maximum nominal size crushed aggregate per typical state construction standards.
6. For clay subgrade soils, line the trench with GEOTEX® 801 nonwoven geotextile. Place a 4 in (10 cm) thick loose lift of granular soil on top of the filter fabric and compact it to at least 90 percent of the specified modified Procter dry density per ASTM D 1557. Smooth the surface of the compacted soil to provide a level pad needed for the first layer of HPTRM.
7. The subgrade surface or surface of the compacted layer shall be level and smooth to provide a sufficient pad to receive the first row of PYRAWALL.

## PYRAWALL LAYDOWN

- Starting with the lowest portion of the wall alignment, roll out the first layer of the HPTRM along the trench line, with the inboard 4 ft. (1.2 m) of the 8.5 ft. (2.6 m) wide roll laid along the trench footprint. At each terminus of this lowest section of the wall alignment, curve the wall face slightly into the slope so the ends of this run can be buried, leaving no HPTRM edges exposed at the ground surface. Concave curves in the wall are formed by cutting and overlapping the fabric in the 4 ft. (1.2 m) backfill zone; convex curves are formed by spreading the fabric.
- Weave the bottom and upright internal bracing components (bars) through the interior pyramidal projections of the HPTRM toward the 4 ft. (1.2 m) fold line, being sure to catch 4-6 yarns with the bracing bar at each pyramid. Fold the fabric and stand-up the face, then connect the bars using a T-slot at the 4-ft fold line. While holding the face near vertical, connect those 2 bars with the third bar, aligned transverse to the other two using 2 T-slots. Do not allow the vertical face segment to lay down prior to installing this transverse bar, because the vertical bar likely will be damaged and require replacement. Install these braces at a uniform spacing of 2 ft. (0.6 m) along the wall face. Loose fabric at the outboard side is laid out away from the backfill area.

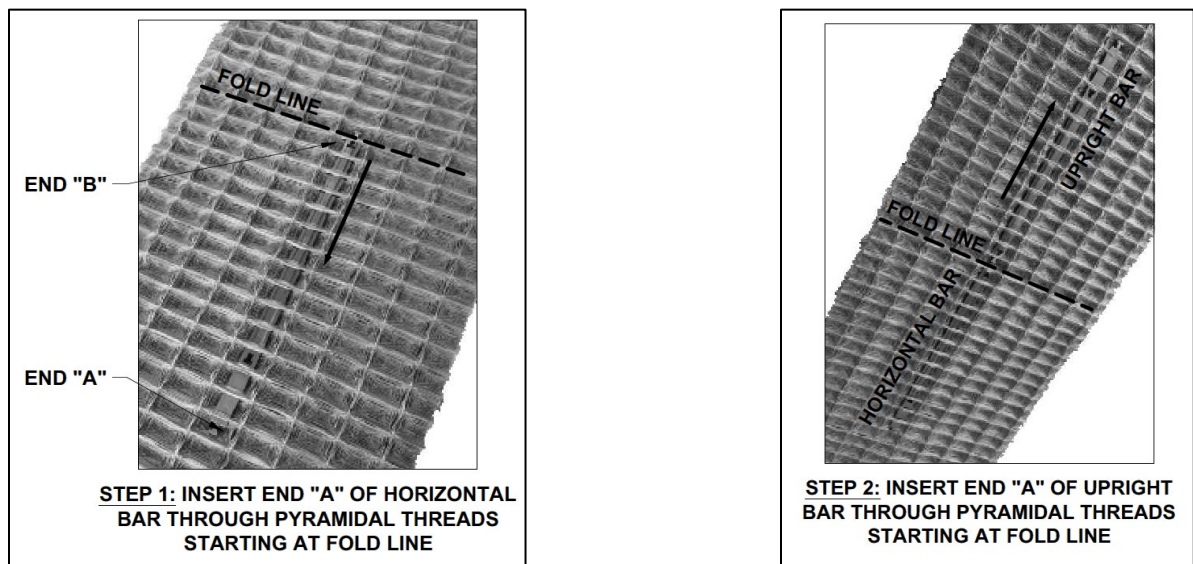
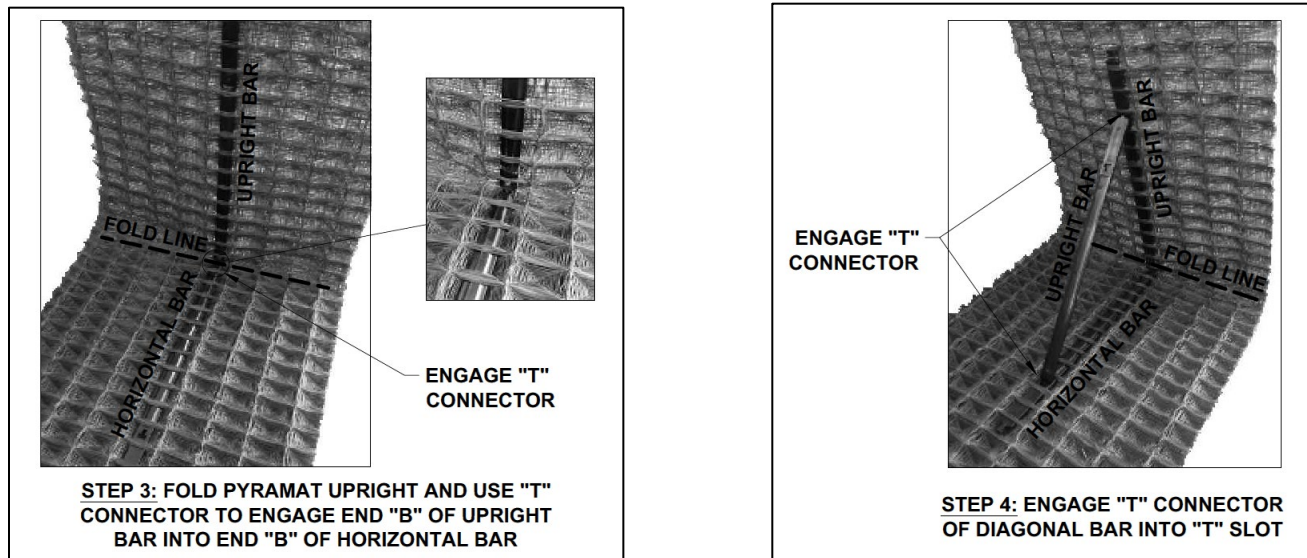
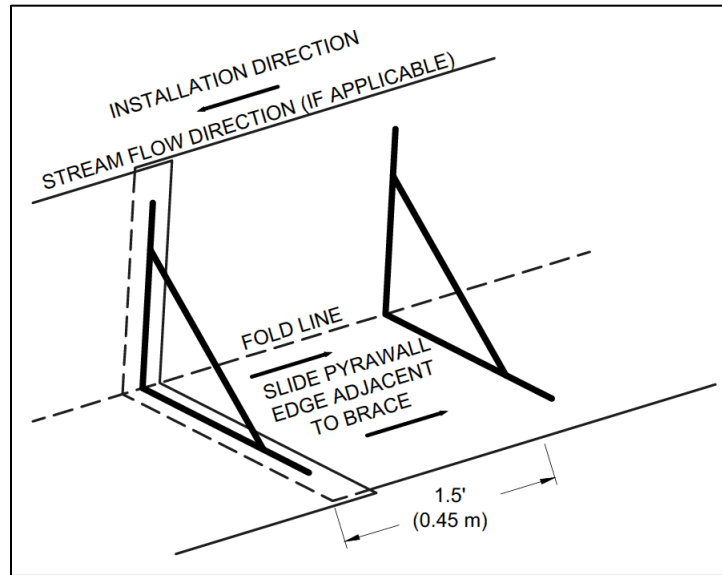


Figure 3 - Brace Component Assembly, Steps 1 and 2



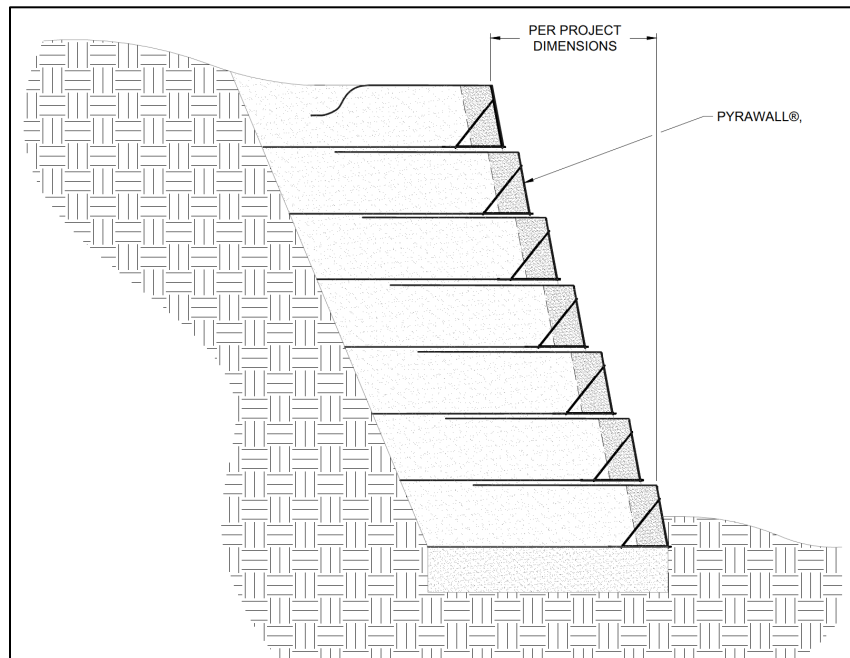
**Figure 4 - Brace Component Assembly, Steps 3 and 4**

3. Pull the fabric fairly taut in both directions, then drive stakes or pins 9 to 12 in long (225 to 305 mm) through the HPTRM near the front and rear of the 4 ft. (1.2 m) backfill zone to hold the fabric in place for subsequent soil backfilling at a frequency no less than 1 per 6.5-10 lineal feet (2-3 lineal meters). Exercise extreme caution when driving or operating equipment across this HPTRM, as sudden turns or braking may deform or damage the HPTRM, or pull the wall face out of proper alignment.
4. Place a 7 to 8 in (17 to 20 cm) thick loose lift of backfill soil approved by the Engineer along the 4 ft. (1.2 m) backfill zone, using hand shovels to place soil around the braces first, and then filling the space in-between braces along the face. Compact the soil lift to the specified modified Proctor dry density per the Engineer's recommendation, but never less than 85% of the maximum dry density per ASTM 1557.
5. The internal-braced design of the geosynthetic wrap allows mechanical compaction of the backfill zone immediately adjacent to the face without the use of temporary bracing and without the use of external support at the wall face.
6. Vibratory plate compactors should not be used within 3 in (7 cm) of the face; ramming compactors ("jumping jack" style) should not be used within 12 in (30 cm) of the face.
7. Place a second lift of backfill soil along the backfill zone and compact it to bring the total height up to 12 in (30 cm) at the face. Cohesive soils may tend to deform laterally more than granular soils and may require additional loose-lift height to achieve the final compacted height. The compacted lift thickness away from the face should be approximately 11 in (28 cm) to allow for a thin soil layer to be placed between the consecutive HPTRM wraps.
8. Fold the 3.5 ft. (1.1 m) outboard portion of the HPTRM wrap layer back over the backfill zone, stretch it taut to remove wrinkles, and pin it down. Spread approximately 1 in (25 mm) of fine backfill soil with no coarse gravel or larger particles evenly across the fabric in preparation for the next wrapped lift.
9. To splice onto the end of a HPTRM roll (previous roll), install a brace at 1.5 ft. (0.45 m) from the end of the roll (Figure 5). For the new roll to be added, insert a brace close to the roll end, then slide the new roll end into the previous roll end until the new roll end abuts against the final brace of the previous roll. After placing and compacting backfill, fold the top wrap back over the fill and stretch taut to provide an overlap of 1.5 ft. (0.45 m).



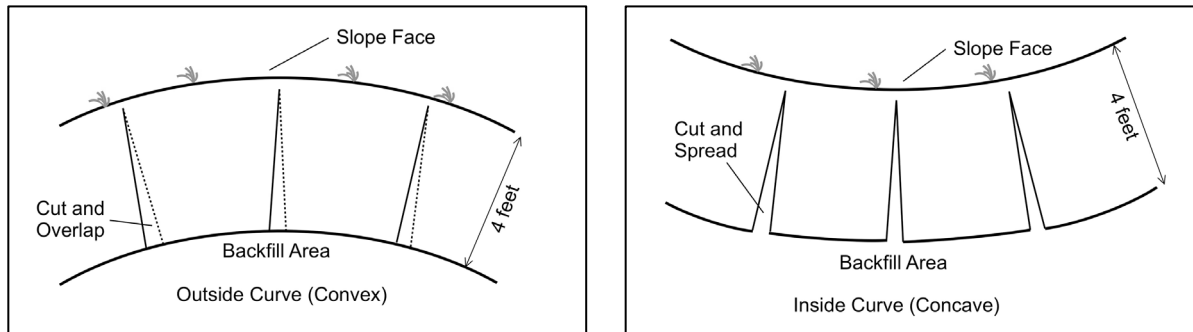
**Figure 5 - PYRAWALL Overlap**

10. Repeat Steps 1 through 9 for each subsequent backfill lift. Incorporate a setback with each lift to provide the desired overall slope angle.
11. Where each wrap-face lift ends at the lateral project limits, the wall face should be curved slightly into the slope and buried, leaving no HPTRM loose ends exposed at the ground surface. Overall wall layout and foundation steps are specified in the Construction Plans, but foundation grade elevations may need to be modified to match actual field conditions during construction. Damage to the Engineered Wrap-Face Vegetated Solution resulting from Contractor vehicles, equipment, or operations shall be repaired.



**Figure 6 - PYRAWALL Completed Cross-Section**

12. To form a curve in the wall alignment, cut the fabric laydown flaps perpendicular to the wall face. Cuts should extend from the back of the flap to not closer than 4 in (10 cm) from the wall face. Spread the fabric at the cuts to form a concave face curve or overlap the fabric at the cuts to form a convex face curve. Add an additional braces within the curve if needed.



**Figure 7 - Curve Construction**

13. For taller walls, the geosynthetic-reinforced zone behind the wrap-face will need to be widened by using supplemental geosynthetic layers sandwiched in-between the upper fabric layer of a given lift and the lower fabric layer of the subsequent lift. Apply a thin layer of soil at fabric interfaces to eliminate complete fabric-to-fabric contact. Alternatively, the supplemental geosynthetic layers can be placed at mid-lift height after the first 6 in (15 cm) lift is compacted.

## Vegetation Establishment

Vegetation can be established with PYRAWALL by seeding within the wall lift or hydraulic seed application (hydroseeding) post construction. Seed application rate, seed type, sod type, and irrigation rate should be follow the Landscape Designer's recommendations based on local or site specific knowledge and time of year. For best results, consider having a site specific soil test performed to help determine what soil amendments, such as lime and fertilizer, need to be incorporated into the soil to promote healthy vegetation.

1. Apply topsoil and seed directly behind the PYRAWALL face. Select and apply soil amendments and fertilizer as needed. A site specific soil test should be performed to help determine what soil amendments, such as lime and fertilizer, need to be incorporated into the soil to promote healthy vegetation. Do not apply excessive water to the slope which may result in excessive pore water pressure that may de-stabilize the structure.
2. If desired, additional seeding can be achieved post-construction by hydroseeding the completed PYRAWALL.
3. Irrigate as necessary to establish and maintain vegetation. Frequent, light irrigation may be needed if natural rain events have not occurred within two weeks of seeding.